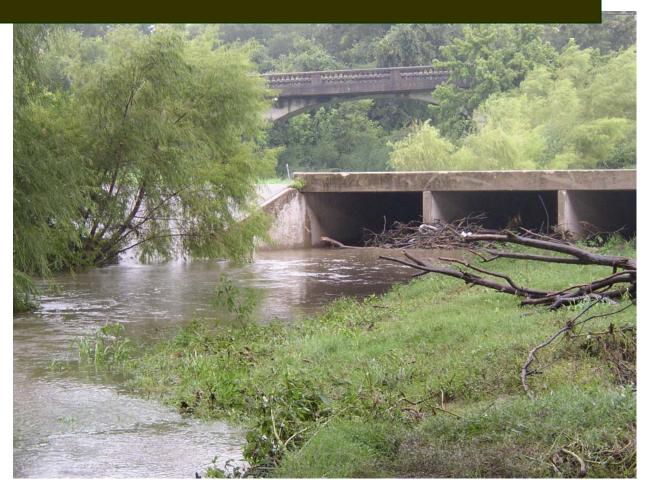
Impairment Verification Monitoring Biological and Habitat Components Segment 1906, Lower Leon Creek, Texas April 2005



Ecological Communications Corporation Austin, TX



# Impairment Verification Monitoring-Volume 2: Biological and Habitat Components Segment 1906, Lower Leon Creek

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#### **ABSTRACT**

Ecological Communications Corporation (EComm) conducted biological data collection and analysis as part of an impairment verification monitoring project for Lower Leon Creek (Segment 1906). Segment 1906 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, 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 appears to indicate a lower aquatic life use than the "High" use designated in the Texas Water Quality Standards (TCEQ 2000).

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Appendix A Complete Raw Data Set, Biological and Habitat Components, Segment 1906–Lower Leon Creek,: September 2002, March 2003, September 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

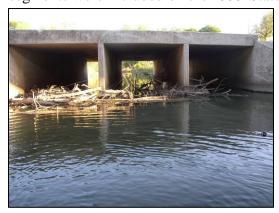


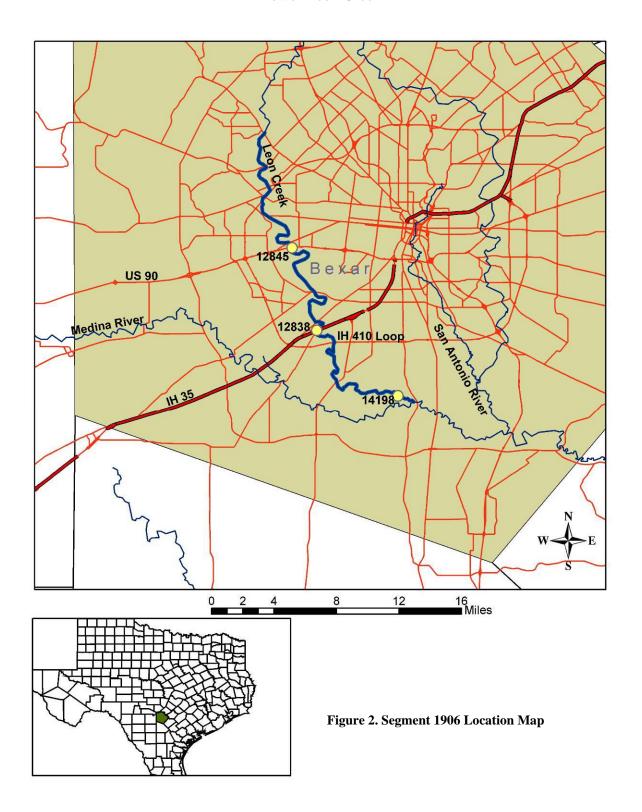
Figure 1. Station 12838

to concentrations of dissolved oxygen or bacteria or both which exceed established criteria. One of these water bodies was Lower Leon Creek (Segment 1906). The impairment to Segment 1906 was caused by an exceedance of the established dissolved oxygen criteria as indicated by data collected through the statewide monitoring program. Because an insufficient number of 24-hour dissolved oxygen values were available in 2002 to determine if the aquatic life use criterion is supported, Segment 1906 remained on the impaired waters list. As an initial phase in TMDL development, the aquatic life use impairment to Segment 1906 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 three sites within the segment in an effort to determine what course of action, if any

collected at three sites within the segment in an effort to determine what course of action, if any, needed to be taken to address impairments. Data collection activities would result in one of four outcomes: 1) Removal of the water body from the 303(d) list, 2) An evaluation of applicable water quality standards (aquatic life use impairments only), 3) TMDL, or 4) Additional monitoring to better characterize the impairment.

Segment 1906 begins approximately 110 yards upstream of State Highway 16 northwest of San Antonio in Bexar County. It flows for approximately 32 miles prior to the confluence with the Medina River in Bexar County. The creek flows through the western portions of San Antonio. Approximately one half of the segment is located inside Interstate 410 Loop. A location map of the segment is provided in Figure 2. Site 12845 is located at U.S. Highway 90 West in San Antonio. Site 12838 is located at Interstate Highway 35 in San Antonio. Site 14198 is located just upstream of Leon Creek Waste Water Treatment Plant.



#### 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, vegetation, climatic conditions, and 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 12845

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 1906 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 aquatic life impairment based upon exceedences of the dissolved oxygen criteria, a biological sampling regime satisfying the minimum UAA data requirements for biological data was conducted. Biological UAA requirements include at least three complete sampling events over two consecutive index periods. Nekton, benthos, and habitat data are collected and analyzed for each sampling event. 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 1906 was conducted in September 2002, March 2003, and September 2003. Therefore, if it is determined that the aquatic life uses and criteria should be evaluated within a UAA, sufficient data exists to make the determination.

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

<sup>\*</sup> 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 three 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



Figure 4. Station 14198

bed in five-minute intervals. In the event that no riffles were present, snags, leaf packs, and 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 contain fish. Active sampling (instances when current was applied to the water) was conducted for a minimum of 900 seconds. Field teams used best judgment to gauge if enough active sampling had been conducted to collect an accurate representation of present species; therefore, the minimum sampling time was exceeded at some sites. Maximum active sampling time for any site was approximately 1,000 seconds. Upon completion of electrofishing, fish were immediately identified, recorded, and returned 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 voucher.

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 RWA Procedures Manual (TNRCC 1999). These include bank erosion potential, aesthetics, dominant types of riparian vegetation, and to a lesser degree, percent instream cover and percent gravel or larger. For the purpose of this project, EComm attempted to standardize such measurements by using the same crews for each segment during as many sampling events as possible. Because this was not always possible, and because individuals within a crew may have different duties for any given sampling event, a training session was conducted prior to fieldwork to help 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 1906. 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 specific 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 32)	RBP	HQI
Limited	<34	<35	<22	<14
Intermediate	40-44	35-40	22-28	14-19
High	48-52	41-48	29-36	20-25
Exceptional	58-60	>48	>36	26-31

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

Table 3. Results of Biological and Habitat Sampling for Segment 1906-Lower Leon Creek

FY02	Statewide IBI	Regional IBI	RBP	HQI
12845	40 – Intermediate	41-High	22 – Intermediate	21 – Intermediate
12838	44 – Intermediate	33 – Limited	21 – Limited	15 – Intermediate
14198	40 - Intermediate	37 - Intermediate	28 - Intermediate	19 – Intermediate
FY03				
12845	42 – Intermediate	46 – High	28 – Intermediate	19 – Intermediate
12838	44 – Intermediate	38 – Intermediate	28 – Intermediate	15 – Intermediate
14198	44 - Intermediate	45 - High	28 - Intermediate	21 – High
FY04				
12845	40 – Intermediate	38 – Intermediate	28 – Intermediate	18 – Intermediate
12838	44 – Intermediate	40 – Intermediate	25 - Intermediate	17 – Intermediate
14198	46 – Intermediate-High	43 - High	33 - High	20 - 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 1906. Statewide IBI scores averaged approximately 42.7 (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 Texas Surface Water Quality Standards (TCEQ 2000). Regional IBI scores averaged 40.1 (Intermediate), and represented a higher agreement (44.4%; 0% above standard). RBP scores averaged 26.8 (Intermediate), an 11.1% agreement

(88.9% below standard), while HQI averaged approximately 18.3 (Intermediate) in 22.2% agreement with the aquatic life use (77.8% below standard).

#### 4.0 DISCUSSION

Average scores of all biological components generally reflected lower values than the high aquatic life use designation for Segment 1906. 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 the true aquatic life use of this segment. Low Regional IBI scores may be attributed to various biological parameters analyzed for each particular sampling event, including low species diversity, low abundance, unbalanced trophic structure, and limited presence of certain indicative species. Dissolved oxygen concentrations throughout the study were consistently above standards.

#### 5.0 CONCLUSION

Based on the Regional IBI, RBP, and HQI scores, the biological and habitat data appear to indicate a lower aquatic life use than the "High" use designated in the Texas Water Quality Standards.

#### REFERENCES

- CONRAD BLUCHER INSTITUTE FOR SURVEYING AND SCIENCE (CBI) 2005. Impairment Verification Monitoring –Volume 1: Physical and Chemical Components; Segment 1906, Lower Leon 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.
- TCEO, 2000. Texas Surface Water Quality Standards. 30 TAC 307.1 307.10
- 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 1906-Lower Leon Creek, Texas
September 2002
March 2003
September 2003



Ecological Communications Corporation Austin, TX

### BIOTIC ASSESSMENT – BENTHIC MACROINVERTEBRATES

Species Lists and Preliminary Data Manipulation



Stream	n Date	ID	Taxa	N=	Func.Gp.	Tolerance	НВІ
Leon	9/24/02	12845	Odonata-Coenagrionidae-Argia	4	P	6	0.4615385
			Ephemeroptera-Tricorythidae-Tricorythodes	1	CG	5	0.0961538
			Trichoptera-Hydropsychidae-Cheumatopsyche	4	FC	6	0.4615385
Func.G	€p %		Diptera-Chironomidae	2	P/CG/FC	6	0.2307692
Р	24.359		Diptera-Tabanidae-Tabanus	3	Р	7	0.4038462
SCR	0		Diptera-Simulidae-Simulium	32	FC	4	2.4615385
CG	3.20513		Hirudinea	4	Р	8	0.6153846
FC	72.4359		Tricladia (Dugesia)	1	Р	7.5	0.1442308
SHR	. 0	•	Gastropoda (Limnophila)- Lymnaeidae-Fossaria	6	-	-	-
	100		Bivalvia (Heterodonta)- Corbiculidae-Corbicula	1	FC	6	0.1153846
			Total	52			4.9903846
			Intolerant/Tolerant	1.74			
٥,	<b>5</b> .		_				
Stream		ID	Taxa	N=	•	Tolerance	HBI
Leon		12838	Odonata-Coenagrionidae- <i>Argia</i>	1	Р	6	0.5
Func.G	•		Odonata-Libellidae- <i>Perithemis</i>	1	P	4	0.3333333
Р	25		Ephemeroptera-Tricorythidae-Tricorythodes	2	CG	5	0.8333333
SCR			Trichoptera-Hydropsychidae-Cheumatopsyche	1	FC	6	0.5
CG	20.8333		Coleoptera-Elmidae- <i>Microcylloepus</i> (L)	1	CG/SCR	2	0.1666667
FC	50		Hirudinea	1	P	8	0.6666667
SHR			Bivalvia (Heterodonta)-Corbiculidae-Corbicula	5	FC	6	2.5
	100		Total	12			5.5
			Intolerant/Tolerant	0.5			
Stream	m Date	ID	Таха	N=	Func.Gp.	Tolerance	НВІ
Strear Leon		ID 14198	<b>Taxa</b> Odonata-Coenagrionidae- <i>Argia</i>	<b>N=</b> 1	Func.Gp.	Tolerance 6	<b>HBI</b> 0.0576923
					•		
			Odonata-Coenagrionidae-Argia	1	Р.	6	0.0576923
	9/23/02		Odonata-Coenagrionidae- <i>Argia</i> Ephemeroptera-Leptophlebiidae- <i>Thraulodes</i>	1 6	P CG/SCR	6 2	0.0576923 0.1153846
Leon	9/23/02	14198	Odonata-Coenagrionidae- <i>Argia</i> Ephemeroptera-Leptophlebiidae- <i>Thraulodes</i> Ephemeroptera-Leptophlebiidae- <i>Travarella</i>	1 6 1	P CG/SCR FC	6 2 2	0.0576923 0.1153846 0.0192308
Leon Func.G	9/23/02 Sp % 4.32692	14198	Odonata-Coenagrionidae- <i>Argia</i> Ephemeroptera-Leptophlebiidae- <i>Thraulodes</i> Ephemeroptera-Leptophlebiidae- <i>Travarella</i> Ephemeroptera-Isonychidae (Oligoneuriidae)- <i>Isonychia</i>	1 6 1 10	P CG/SCR FC FC	6 2 2 3	0.0576923 0.1153846 0.0192308 0.2884615
Leon Func.G	9/23/02 Sp % 4.32692	14198	Odonata-Coenagrionidae- <i>Argia</i> Ephemeroptera-Leptophlebiidae- <i>Thraulodes</i> Ephemeroptera-Leptophlebiidae- <i>Travarella</i> Ephemeroptera-Isonychidae (Oligoneuriidae)- <i>Isonychia</i> Ephemeroptera-Baetidae- <i>Baetis</i>	1 6 1 10 9	P CG/SCR FC FC SCR/CG	6 2 2 3 4	0.0576923 0.1153846 0.0192308 0.2884615 0.3461538
Func.G	9/23/02 Gp % 4.32692 9.61538	14198	Odonata-Coenagrionidae- <i>Argia</i> Ephemeroptera-Leptophlebiidae- <i>Thraulodes</i> Ephemeroptera-Leptophlebiidae- <i>Travarella</i> Ephemeroptera-Isonychidae (Oligoneuriidae)- <i>Isonychia</i> Ephemeroptera-Baetidae- <i>Baetis</i> Ephemeroptera-Baetidae- <i>Camelobaetidius (Dactylabaetis)</i>	1 6 1 10 9 1	P CG/SCR FC FC SCR/CG SCR/CG	6 2 2 3 4 4	0.0576923 0.1153846 0.0192308 0.2884615 0.3461538 0.0384615
Func.G P SCR CG	9/23/02  Sp % 4.32692 9.61538 12.9808 73.0769	14198	Odonata-Coenagrionidae-Argia Ephemeroptera-Leptophlebiidae-Thraulodes Ephemeroptera-Leptophlebiidae-Travarella Ephemeroptera-Isonychidae (Oligoneuriidae)-Isonychia Ephemeroptera-Baetidae-Baetis Ephemeroptera-Baetidae-Camelobaetidius (Dactylabaetis) Trichoptera-Hydropsychidae-Cheumatopsyche	1 6 1 10 9 1 6	P CG/SCR FC FC SCR/CG SCR/CG FC	6 2 2 3 4 4 6	0.0576923 0.1153846 0.0192308 0.2884615 0.3461538 0.0384615 0.3461538
Func.G P SCR CG FC	9/23/02  Sp % 4.32692 9.61538 12.9808 73.0769	14198	Odonata-Coenagrionidae-Argia Ephemeroptera-Leptophlebiidae-Thraulodes Ephemeroptera-Leptophlebiidae-Travarella Ephemeroptera-Isonychidae (Oligoneuriidae)-Isonychia Ephemeroptera-Baetidae-Baetis Ephemeroptera-Baetidae-Camelobaetidius (Dactylabaetis) Trichoptera-Hydropsychidae-Cheumatopsyche Trichoptera-Hydropsychidae-Smicridea	1 6 1 10 9 1 6	P CG/SCR FC FC SCR/CG SCR/CG FC FC	6 2 2 3 4 4 6 4	0.0576923 0.1153846 0.0192308 0.2884615 0.3461538 0.0384615 0.3461538 0.0769231
Func.G P SCR CG FC SHR	9/23/02  Sp % 4.32692 9.61538 12.9808 73.0769 0 100	14198	Odonata-Coenagrionidae-Argia Ephemeroptera-Leptophlebiidae-Thraulodes Ephemeroptera-Leptophlebiidae-Travarella Ephemeroptera-Isonychidae (Oligoneuriidae)-Isonychia Ephemeroptera-Baetidae-Baetis Ephemeroptera-Baetidae-Camelobaetidius (Dactylabaetis) Trichoptera-Hydropsychidae-Cheumatopsyche Trichoptera-Hydropsychidae-Smicridea Trichoptera-Philopotamidae-Chimarra	1 6 1 10 9 1 6 2 3	P CG/SCR FC FC SCR/CG SCR/CG FC FC	6 2 2 3 4 4 6 4 3	0.0576923 0.1153846 0.0192308 0.2884615 0.3461538 0.0384615 0.3461538 0.0769231 0.0865385
Func.G P SCR CG FC SHR	9/23/02  Sp % 4.32692 9.61538 12.9808 73.0769 0 100  Predator	14198	Odonata-Coenagrionidae-Argia Ephemeroptera-Leptophlebiidae-Thraulodes Ephemeroptera-Leptophlebiidae-Travarella Ephemeroptera-Isonychidae (Oligoneuriidae)-Isonychia Ephemeroptera-Baetidae-Baetis Ephemeroptera-Baetidae-Camelobaetidius (Dactylabaetis) Trichoptera-Hydropsychidae-Cheumatopsyche Trichoptera-Hydropsychidae-Smicridea Trichoptera-Philopotamidae-Chimarra Coleoptera-Elmidae-Hexacylloepus (A)	1 6 1 10 9 1 6 2 3 1	P CG/SCR FC SCR/CG SCR/CG FC FC CG/SCR	6 2 2 3 4 4 6 4 3 2	0.0576923 0.1153846 0.0192308 0.2884615 0.3461538 0.0384615 0.3461538 0.0769231 0.0865385 0.0192308
Func.G P SCR CG FC SHR	9/23/02  Sp % 4.32692 9.61538 12.9808 73.0769 0 100	14198	Odonata-Coenagrionidae-Argia Ephemeroptera-Leptophlebiidae-Thraulodes Ephemeroptera-Leptophlebiidae-Travarella Ephemeroptera-Isonychidae (Oligoneuriidae)-Isonychia Ephemeroptera-Baetidae-Baetis Ephemeroptera-Baetidae-Camelobaetidius (Dactylabaetis) Trichoptera-Hydropsychidae-Cheumatopsyche Trichoptera-Hydropsychidae-Smicridea Trichoptera-Philopotamidae-Chimarra Coleoptera-Elmidae-Hexacylloepus (A)	1 6 1 10 9 1 6 2 3 1	P CG/SCR FC FC SCR/CG SCR/CG FC FC CG/SCR CG/SCR	6 2 2 3 4 4 6 4 3 2 7	0.0576923 0.1153846 0.0192308 0.2884615 0.3461538 0.0384615 0.3461538 0.0769231 0.0865385 0.0192308 0.0673077
Func.G P SCR CG FC SHR	9/23/02  Sp % 4.32692 9.61538 12.9808 73.0769 0 100  Predator CR-Scraper G-Collector/CC-Filtering Co	14198 Gatherer ollector	Odonata-Coenagrionidae-Argia Ephemeroptera-Leptophlebiidae-Thraulodes Ephemeroptera-Leptophlebiidae-Travarella Ephemeroptera-Isonychidae (Oligoneuriidae)-Isonychia Ephemeroptera-Baetidae-Baetis Ephemeroptera-Baetidae-Camelobaetidius (Dactylabaetis) Trichoptera-Hydropsychidae-Cheumatopsyche Trichoptera-Hydropsychidae-Smicridea Trichoptera-Philopotamidae-Chimarra Coleoptera-Elmidae-Hexacylloepus (A) Coleoptera-Elmidae-Stenelmis (L)	1 6 1 10 9 1 6 2 3 1 1 2	P CG/SCR FC FC SCR/CG FC FC FC CG/SCR CG/SCR CG/SCR	6 2 2 3 4 4 6 4 3 2 7	0.0576923 0.1153846 0.0192308 0.2884615 0.3461538 0.0384615 0.3461538 0.0769231 0.0865385 0.0192308 0.0673077 0.1346154
Func.G P SCR CG FC SHR	9/23/02  Sp % 4.32692 9.61538 12.9808 73.0769 0 100  Predator CR-Scraper G-Collector/0	14198 Gatherer ollector	Odonata-Coenagrionidae-Argia Ephemeroptera-Leptophlebiidae-Thraulodes Ephemeroptera-Leptophlebiidae-Travarella Ephemeroptera-Isonychidae (Oligoneuriidae)-Isonychia Ephemeroptera-Baetidae-Baetis Ephemeroptera-Baetidae-Camelobaetidius (Dactylabaetis) Trichoptera-Hydropsychidae-Cheumatopsyche Trichoptera-Hydropsychidae-Smicridea Trichoptera-Philopotamidae-Chimarra Coleoptera-Elmidae-Hexacylloepus (A) Coleoptera-Elmidae-Stenelmis (L) Diptera-Chironomidae	1 6 1 10 9 1 6 2 3 1 1 2 9	P CG/SCR FC SCR/CG SCR/CG FC FC CG/SCR CG/SCR CG/SCR P/CG/FC	6 2 2 3 4 4 6 4 3 2 7 7	0.0576923 0.1153846 0.0192308 0.2884615 0.3461538 0.0384615 0.3461538 0.0769231 0.0865385 0.0192308 0.0673077 0.1346154 0.5192308
Func.G P SCR CG FC SHR	9/23/02  6p % 4.32692 9.61538 12.9808 73.0769 0 100  Predator CR-Scraper G-Collector/CC-Filtering Collector/CR-Shredder	14198 Gatherer ollector	Odonata-Coenagrionidae-Argia Ephemeroptera-Leptophlebiidae-Thraulodes Ephemeroptera-Leptophlebiidae-Travarella Ephemeroptera-Isonychidae (Oligoneuriidae)-Isonychia Ephemeroptera-Baetidae-Baetis Ephemeroptera-Baetidae-Camelobaetidius (Dactylabaetis) Trichoptera-Hydropsychidae-Cheumatopsyche Trichoptera-Hydropsychidae-Smicridea Trichoptera-Philopotamidae-Chimarra Coleoptera-Elmidae-Hexacylloepus (A) Coleoptera-Elmidae-Stenelmis (A) Coleoptera-Elmidae-Stenelmis (L) Diptera-Chironomidae Diptera-Simulidae-Simulium	1 6 1 10 9 1 6 2 3 1 1 2 9	P CG/SCR FC FC SCR/CG FC FC CG/SCR CG/SCR CG/SCR CG/SCR P/CG/FC FC	6 2 2 3 4 4 6 4 3 2 7 7 6 4	0.0576923 0.1153846 0.0192308 0.2884615 0.3461538 0.0384615 0.3461538 0.0769231 0.0865385 0.0192308 0.0673077 0.1346154 0.5192308 1.9615385
Func.G P SCR CG FC SHR	9/23/02  Sp % 4.32692 9.61538 12.9808 73.0769 0 100  Predator CR-Scraper G-Collector/CC-Filtering Collector/CR-Shredder	14198 Gatherer ollector	Odonata-Coenagrionidae-Argia Ephemeroptera-Leptophlebiidae-Thraulodes Ephemeroptera-Leptophlebiidae-Travarella Ephemeroptera-Isonychidae (Oligoneuriidae)-Isonychia Ephemeroptera-Baetidae-Baetis Ephemeroptera-Baetidae-Camelobaetidius (Dactylabaetis) Trichoptera-Hydropsychidae-Cheumatopsyche Trichoptera-Hydropsychidae-Smicridea Trichoptera-Philopotamidae-Chimarra Coleoptera-Elmidae-Hexacylloepus (A) Coleoptera-Elmidae-Stenelmis (A) Coleoptera-Elmidae-Stenelmis (L) Diptera-Chironomidae Diptera-Simulidae-Simulium Diptera-Empididae-Hemerodromia	1 6 1 10 9 1 6 2 3 1 1 2 9 51 1	P CG/SCR FC FC SCR/CG FC FC CG/SCR CG/SCR CG/SCR CG/SCR P/CG/FC FC	6 2 2 3 4 4 6 4 3 2 7 7 6 4	0.0576923 0.1153846 0.0192308 0.2884615 0.3461538 0.0384615 0.3461538 0.0769231 0.0865385 0.0192308 0.0673077 0.1346154 0.5192308 1.9615385 0.0576923
Func.G P SCR CG FC SHR	9/23/02  Sp % 4.32692 9.61538 12.9808 73.0769 0 100  Predator CR-Scraper G-Collector/CC-Filtering Collector/CR-Shredder BI-Hilsenhoff um(nt/N) whind, of a particular	Gatherer ollector  Biotic Index: ere n=number ticular taxa,	Odonata-Coenagrionidae-Argia Ephemeroptera-Leptophlebiidae-Thraulodes Ephemeroptera-Leptophlebiidae-Travarella Ephemeroptera-Isonychidae (Oligoneuriidae)-Isonychia Ephemeroptera-Baetidae-Baetis Ephemeroptera-Baetidae-Camelobaetidius (Dactylabaetis) Trichoptera-Hydropsychidae-Cheumatopsyche Trichoptera-Hydropsychidae-Smicridea Trichoptera-Philopotamidae-Chimarra Coleoptera-Elmidae-Hexacylloepus (A) Coleoptera-Elmidae-Stenelmis (A) Coleoptera-Elmidae-Stenelmis (L) Diptera-Chironomidae Diptera-Simulidae-Simulium Diptera-Empididae-Hemerodromia	1 6 1 10 9 1 6 2 3 1 1 2 9 51 1	P CG/SCR FC FC SCR/CG FC FC CG/SCR CG/SCR CG/SCR CG/SCR P/CG/FC FC	6 2 2 3 4 4 6 4 3 2 7 7 6 4	0.0576923 0.1153846 0.0192308 0.2884615 0.3461538 0.03461538 0.0769231 0.0865385 0.0192308 0.0673077 0.1346154 0.5192308 1.9615385 0.0576923
Func.G P SCR CG FC SHR	9/23/02  Sp % 4.32692 9.61538 12.9808 73.0769 0 100  Predator CR-Scraper G-Collector/CC-Filtering Collector/CC-Filtering Collector/CC-Fil	Gatherer ollector  Biotic Index: ere n=number circular taxa, ue of that	Odonata-Coenagrionidae-Argia Ephemeroptera-Leptophlebiidae-Thraulodes Ephemeroptera-Leptophlebiidae-Travarella Ephemeroptera-Isonychidae (Oligoneuriidae)-Isonychia Ephemeroptera-Baetidae-Baetis Ephemeroptera-Baetidae-Camelobaetidius (Dactylabaetis) Trichoptera-Hydropsychidae-Cheumatopsyche Trichoptera-Hydropsychidae-Smicridea Trichoptera-Philopotamidae-Chimarra Coleoptera-Elmidae-Hexacylloepus (A) Coleoptera-Elmidae-Stenelmis (A) Coleoptera-Elmidae-Stenelmis (L) Diptera-Chironomidae Diptera-Simulidae-Simulium Diptera-Empididae-Hemerodromia Total Intolerant/Tolerant	1 6 1 10 9 1 6 2 3 1 1 2 9 51 1	P CG/SCR FC FC SCR/CG FC FC CG/SCR CG/SCR CG/SCR CG/SCR P/CG/FC FC	6 2 2 3 4 4 6 4 3 2 7 7 6 4	0.0576923 0.1153846 0.0192308 0.2884615 0.3461538 0.0384615 0.3461538 0.0769231 0.0865385 0.0192308 0.0673077 0.1346154 0.5192308 1.9615385 0.0576923
Func.G P SCR CG FC SHR  P-I SC CC FC SI-I HE =s of t=tax	9/23/02  Sp % 4.32692 9.61538 12.9808 73.0769 0 100  Predator CR-Scraper G-Collector/CC-Filtering Collector/CC-Filtering Collector/CC-Fil	Gatherer ollector  Biotic Index: ere n=number ticular taxa,	Odonata-Coenagrionidae-Argia Ephemeroptera-Leptophlebiidae-Thraulodes Ephemeroptera-Leptophlebiidae-Travarella Ephemeroptera-Isonychidae (Oligoneuriidae)-Isonychia Ephemeroptera-Baetidae-Baetis Ephemeroptera-Baetidae-Camelobaetidius (Dactylabaetis) Trichoptera-Hydropsychidae-Cheumatopsyche Trichoptera-Hydropsychidae-Smicridea Trichoptera-Philopotamidae-Chimarra Coleoptera-Elmidae-Hexacylloepus (A) Coleoptera-Elmidae-Stenelmis (A) Coleoptera-Elmidae-Stenelmis (L) Diptera-Chironomidae Diptera-Simulidae-Simulium Diptera-Empididae-Hemerodromia Total Intolerant/Tolerant	1 6 1 10 9 1 6 2 3 1 1 2 9 51 1	P CG/SCR FC FC SCR/CG FC FC CG/SCR CG/SCR CG/SCR CG/SCR P/CG/FC FC	6 2 2 3 4 4 6 4 3 2 7 7 6 4	0.0576923 0.1153846 0.0192308 0.2884615 0.3461538 0.0384615 0.3461538 0.0769231 0.0865385 0.0192308 0.0673077 0.1346154 0.5192308 1.9615385 0.0576923
Func.G P SCR CG FC SHR  P-I SC CC FC SI-I HE =s of t=tax	9/23/02  Sp % 4.32692 9.61538 12.9808 73.0769 0 100  Predator CR-Scraper G-Collector/CC-Filtering Collector/CC-Filtering Collector/CC-Fil	Gatherer ollector  Biotic Index: ere n=number circular taxa, ue of that	Odonata-Coenagrionidae-Argia Ephemeroptera-Leptophlebiidae-Thraulodes Ephemeroptera-Leptophlebiidae-Travarella Ephemeroptera-Isonychidae (Oligoneuriidae)-Isonychia Ephemeroptera-Baetidae-Baetis Ephemeroptera-Baetidae-Camelobaetidius (Dactylabaetis) Trichoptera-Hydropsychidae-Cheumatopsyche Trichoptera-Hydropsychidae-Smicridea Trichoptera-Philopotamidae-Chimarra Coleoptera-Elmidae-Hexacylloepus (A) Coleoptera-Elmidae-Stenelmis (A) Coleoptera-Elmidae-Stenelmis (L) Diptera-Chironomidae Diptera-Simulidae-Simulium Diptera-Empididae-Hemerodromia Total Intolerant/Tolerant	1 6 1 10 9 1 6 2 3 1 1 2 9 51 1	P CG/SCR FC FC SCR/CG FC FC CG/SCR CG/SCR CG/SCR CG/SCR P/CG/FC FC	6 2 2 3 4 4 6 4 3 2 7 7 6 4	0.0576923 0.1153846 0.0192308 0.2884615 0.3461538 0.0384615 0.3461538 0.0769231 0.0865385 0.0192308 0.0673077 0.1346154 0.5192308 1.9615385 0.0576923
Func.G P SCR CG FC SHR  P-I SC CC FC SI-I HE =s of t=tax	9/23/02  Sp % 4.32692 9.61538 12.9808 73.0769 0 100  Predator CR-Scraper G-Collector/CC-Filtering Collector/CC-Filtering Collector/CC-Fil	Gatherer ollector  Biotic Index: ere n=number circular taxa, ue of that	Odonata-Coenagrionidae-Argia Ephemeroptera-Leptophlebiidae-Thraulodes Ephemeroptera-Leptophlebiidae-Travarella Ephemeroptera-Isonychidae (Oligoneuriidae)-Isonychia Ephemeroptera-Baetidae-Baetis Ephemeroptera-Baetidae-Camelobaetidius (Dactylabaetis) Trichoptera-Hydropsychidae-Cheumatopsyche Trichoptera-Hydropsychidae-Smicridea Trichoptera-Philopotamidae-Chimarra Coleoptera-Elmidae-Hexacylloepus (A) Coleoptera-Elmidae-Stenelmis (A) Coleoptera-Elmidae-Stenelmis (L) Diptera-Chironomidae Diptera-Simulidae-Simulium Diptera-Empididae-Hemerodromia Total Intolerant/Tolerant	1 6 1 10 9 1 6 2 3 1 1 2 9 51 1	P CG/SCR FC FC SCR/CG FC FC CG/SCR CG/SCR CG/SCR CG/SCR P/CG/FC FC	6 2 2 3 4 4 6 4 3 2 7 7 6 4	0.0576923 0.1153846 0.0192308 0.2884615 0.3461538 0.0384615 0.3461538 0.0769231 0.0865385 0.0192308 0.0673077 0.1346154 0.5192308 1.9615385 0.0576923

Stream: Leon			Species	N=	Tolerance	FFG	нві
Date: 3/31/03			Argia sp.	1	6	Р	0.055045872
Location: 12845			Erpetogomphus	1	1	Р	0.009174312
		%	Brechmorhoga	2	6	Р	0.110091743
	Р	4.89296636	Tricorythodes	4	5	CG	0.183486239
	SCR	39.9082569	Leptohypes	12	2	CG/SCR	0.220183486
	CG	46.17737	Caenis	1	7	SCR/CG	0.064220183
	FC	8.56269113	Fallceon	70	4	SCR/CG	2.568807339
	SHR	0.4587156	Cheumatopsyche	2	6	FC	0.110091743
		100	Psephenus	1	4	SCR	0.036697248
			Chironomidae	4	6	P/CG/FC	0.220183486
			Oligochaeta	2	8	CG	0.146788991
			Physella	1	9	SCR	0.082568807
			Corbicula	6	6	FC	0.330275229
			Hyalella	1	8	CG/SHR	0.073394495
			Cambaridae	1	5	CG	0.04587156
		-		109	4.45		4.256880734
Stream: Leon			Species	N=	Tolerance	FFG	НВІ
Date: 3/31/03			Argia sp.	2	6	Р	0.136363636
Location: 12838			Leptohypes	1	2	CG/SCR	0.022727273
		%	Caenis	1	7	SCR/CG	0.079545455
	Р	6.81818182	Fallceon	16	4	SCR/CG	0.727272727
	SCR	13.0681818	Cheumatopsyche	21	6	FC	1.431818182
	CG	14.7727273	Leucotrichia	1	3	CG/SCR	
	FC	64.7727273	Psephenus	1	4	SCR	0.045454545
	SHR	0.56818182	Stenus	1	-	Р	
		100	Chironomidae	6	6	P/CG/FC	0.409090909
			Simulium	34	4	FC	
			Tricladida	1	7.5	Р	0.085227273
			Physella	1	9	SCR	0.102272727
			Hyalella	1	8	CG/SHR	0.090909091
		_	Cambaridae	1	5	CG	0.056818182
				88	1.63636364		3.1875
Stream: Leon			Species	N=	Tolerance	FFG	нві
Date: 4/1/03			Argia sp.	9	6	P	0.415384615
Location: 14198			Brechmorhoga	3	6	Р	0.138461538
Location. 14130		%	Tricorythodes	1	5	CG	0.038461538
	Р	14.8717949	Leptohypes	9	2	CG/SCR	0.138461538
	SCR		Fallceon	16	4	SCR/CG	0.492307692
	CG	21.7948718	Thraulodes	1	2	CG/SCR	0.015384615
	FC	47.9487179	Isonychia	33	3	FC	0.761538462
	SHR	0	Camelobaetidius	1	4	SCR/CG	0.030769231
	J (	100	Fallceon	9	4	SCR/CG	0.276923077
P - Predator			Cheumatopsyche	21	6	FC	0.969230769
SCR - Scraper			Stenelmis (L)	3	7	CG/SCR	0.161538462
CG - Collector/Gatherer			Macrelmis (L)	1	2	CG/SCR	0.015384615
FC - Filtering Collector			Chironomidae	22	6	P/CG/FC	1.015384615
SHR - Shredder			Simulium	1	4	FC	0.030769231
		-		130	1.24137931	-	4.5
HBI=Hilsenhoff Biotic Inc							
sum(nt/N) where n=num							
of a particular taxa, t= to value of that taxon, and							
number of organisms in							
	a oan	.5.0.					
Ī		ı					

Stream: Leon		Species	N=	Tolerance	FFG	НВІ
Date: 9/21/03		Argia	8	6	P	0.461538462
Location: 12845		Tricorythodes	4	5	CG	0.192307692
	%	Leptohypes	2	2	CG	0.038461538
Р	35.5769231	Caenis	2	7	CG/SCR	0.134615385
SCR	16.8269231	Fallceon	16	4	SCR/CG	0.615384615
CG	27.4038462	Cheumatopsyche	8	6	FC	0.461538462
FC	15.3846154	Chimarra	1	3	FC	0.028846154
SHR	4.80769231	Stenelmis	8	7	SCR/CG	0.538461538
	100	Helichus (A)	7	4	SCR/CG	0.269230769
		Berosus (L)	1	9	Р	0.086538462
		Petrophila	1	5	SCR	0.048076923
		Hirudinea	2	8	Р	0.153846154
		Tricladida	26	7.5	P	1.875
		Corbicula	7	6	FC	0.403846154
		Hyalella	10	8	CG/SHR	0.769230769
	_	Cambaridae	1	5 0.4444444	CG	0.048076923
			104	0.44444444		6.125
Cturania I ann	I	Charles	N.	Talananaa	FFO	UDI
Stream: Leon		Species	N=	Tolerance	<b>FFG</b> P	HBI
Date: 9/21/03 Location: 12838		Erpetogomphus Leptohypes	1 3	1 2	CG	0.038461538 0.230769231
Location. 12838	%	Stenelmis	3	7	CG/SCR	0.80769231
Р	28.2051282	Psephenus	1	4	SCR	0.153846154
SCR	9.61538462	Chironomidae	1	6	P/CG/FC	0.230769231
CG	18.5897436	Hirudinea	6	8	P	1.846153846
FC	43.5897436	Corbicula	11	6	FC	2.538461538
SHR	0					
	100					
	_					
			26	0.23809524		5.846153846
Stream: Leon	I	Species	N=	Tolerance	FFG	НВІ
Date: 9/20/03		Tricorythodes	1	5	CG	0.04587156
Location: 14198		Leptohypes	13	2	CG/SCR	0.23853211
2004.0 1.100	%	Thraulodes	19	2	CG/SCR	0.348623853
Р	2.75229358	Travarella	1	2	FC	0.018348624
SCR	36.2385321	Isonychia	12	3	FC	0.330275229
CG	38.0733945	Baetis	30	4	CG/SCR	1.100917431
FC	22.9357798	Camelobaetidius	13	4	SCR/CG	0.47706422
SHR	0	Cheumatopsyche	2	6	FC	0.110091743
	100	Smicridea	3	4	FC	0.110091743
P-Predator		Chimarra	3	3	FC	0.082568807
SCR-Scraper		Microcylloepus (A)	1	2	CG/SCR	0.018348624
CG-Collector/Gatherer		Stenelmis (A)	1	7	CG/SCR	0.064220183
FC-Filtering Collector SHR-Shredder		Helichus (A)	2	4	CG/SCR	0.073394495
Si in-Silieddei		Corydalus	3	6	P	0.165137615
HBI-Hisenhoff Biotic Index	(=	Oligochaeta	1	8	CG	0.073394495
sum(nt/N)	-	Corbicula	4	9 0000001	FC	0.220183486
n=number of individuals o	fa		109	8.90909091		3.47706422
particular taxa						
t=tolerance value of that to						
N=total number of organis sample	ms in a					
Sample						

### BIOTIC ASSESSMENT – BENTHIC MACROINVERTEBRATES

Rapid Bioassessment Protocol



Stream: Leon	Date: 9/24/02	Location: 12845	County: Bexa	nr
	N	letric	Value	Score
1. Taxa Richness			9	2
2. EPT Taxa Abun	ndance		2	1
3. Biotic Index (HE	BI)		4.99	2
4. % Chironomida	е		3.84615385	4
5. % Dominant Ta	xon		61.5384615	1
6. % Dominant FF	G		72.4359038	1
7. % Predators			24.3589808	3
8. Ratio of Intolera	nt:Tolerant Taxa		1.74	2
9. % of Total Trich	optera as Hydropsy	chidae	100	1
10. # of Non-insec	t Taxa		4	3
11. % Collector-Ga	atherers		3.20512885	1
12. % of Total Nur	mber as Elmidae		0	1
Aqautic Life Use:	INTERMEDIATE	***(Total Sample Size = 58)***	Total Score:	22

Stream: Leon	Date: 9/24/02	Location: 12838	County: Be	exar
	N	letric	Value	Score
1. Taxa Richness			7	1
2. EPT Taxa Abun	dance		2	1
3. Biotic Index (HB	I)		5.5	1
4. % Chironomidae	e		0	1
5. % Dominant Taxon		41.666666	7 1	
6. % Dominant FFG		50	2	
7. % Predators			25	3
8. Ratio of Intolera	nt:Tolerant Taxa		0.5	1
9. % of Total Triche	optera as Hydropsy	chidae	100	1
10. # of Non-insect Taxa			2	2
11. % Collector-Gatherers			20.833333	3 3
12. % of Total Num	nber as Elmidae		8.3333333	3 4
Aqautic Life Use:	LIMITED ***(Total S	Sample Size= 12)****	Total Score	: 21

Stream: Leon Date: 9/23/02 Location:	14198 County: Bexa	ar
Metric	Value	Score
1. Taxa Richness	14	2
2. EPT Taxa Abundance	8	3
3. Biotic Index (HBI)	4.13	3
4. % Chironomidae	8.65384615	3
5. % Dominant Taxon	49.0384615	1
6. % Dominant FFG	73.0769231	1
7. % Predators	4.32692308	1
8. Ratio of Intolerant:Tolerant Taxa	4.2	3
9. % of Total Trichoptera as Hydropsychidae	72.7272727	2
10. # of Non-insect Taxa	0	1
11. % Collector-Gatherers	12.9807692	4
12. % of Total Number as Elmidae	3.84615385	4
Aqautic Life Use: INTERMEDIATE	Total Score:	28

Stream: Leon Date: 3/31/03 Location: 12845	County: Bexa	ır
Metric	Value	Score
1. Taxa Richness	15	3
2. EPT Taxa Abundance	5	2
3. Biotic Index (HBI)	4.26	3
4. % Chironomidae	3.66972477	4
5. % Dominant Taxon	64.2201835	1
6. % Dominant FFG	46.1743119	2
7. % Predators	4.88990826	4
8. Ratio of Intolerant:Tolerant Taxa	4.45	3
9. % of Total Trichoptera as Hydropsychidae	100	1
10. # of Non-insect Taxa	5	3
11. % Collector-Gatherers	46.1743119	1
12. % of Total Number as Elmidae	0	1
Aqautic Life Use: INTERMEDIATE	Total Score:	28

Stream: Leon Date: 3/31/03 Location: 12838 County: Bexar				
Metric	Value	Score		
1. Taxa Richness	14	2		
2. EPT Taxa Abundance	5	2		
3. Biotic Index (HBI)	3.19	4		
4. % Chironomidae	6.81818182	3		
5. % Dominant Taxon	38.6363636	2		
6. % Dominant FFG	64.7727273	1		
7. % Predators	6.81818182	4		
8. Ratio of Intolerant:Tolerant Taxa	1.64	2		
9. % of Total Trichoptera as Hydropsychidae	95.4545455	1		
10. # of Non-insect Taxa	3	2		
11. % Collector-Gatherers	14.7727273	4		
12. % of Total Number as Elmidae	0	1		
Aqautic Life Use: INTERMEDIATE	Total Score:	28		

Stream: Leon Date: 4/1/03 Location: 14198 County: Bexar					
Metric	Value	Score			
1. Taxa Richness	14	2			
2. EPT Taxa Abundance	7	3			
3. Biotic Index (HBI)	4.5	3			
4. % Chironomidae	16.9230769	1			
5. % Dominant Taxon	25.3846154	3			
6. % Dominant FFG	47.9461538	2			
7. % Predators	14.8692308	4			
8. Ratio of Intolerant:Tolerant Taxa	1.24	1			
9. % of Total Trichoptera as Hydropsychidae	100	1			
10. # of Non-insect Taxa	0	1			
11. % Collector-Gatherers	21.7923077	3			
12. % of Total Number as Elmidae	3.07692308	4			
Aqautic Life Use: INTERMEDIATE	Total Score:	28			

Stream: Leon Date: 9/21/03 Location: 12845	County: Bexa	ır
Metric	Value	Score
1. Taxa Richness	16	3
2. EPT Taxa Abundance	5	2
3. Biotic Index (HBI)	6.125	1
4. % Chironomidae	0	1
5. % Dominant Taxon	25	3
6. % Dominant FFG	35.5769231	4
7. % Predators	35.5769231	2
8. Ratio of Intolerant:Tolerant Taxa	0.44	1
9. % of Total Trichoptera as Hydropsychidae	88.888889	1
10. # of Non-insect Taxa	5	3
11. % Collector-Gatherers	27.4038462	3
12. % of Total Number as Elmidae	7.69230769	4
Aqautic Life Use: INTERMEDIATE	Total Score:	28

Stream: Leon Date: 9/21/03 Location: 12838	County: Bex	ar
Metric	Value	Score
1. Taxa Richness	7	1
2. EPT Taxa Abundance	6	2
3. Biotic Index (HBI)	5.85	1
4. % Chironomidae	3.84615385	4
5. % Dominant Taxon	42.3076923	1
6. % Dominant FFG	43.5769231	3
7. % Predators	28.1923077	2
8. Ratio of Intolerant:Tolerant Taxa	0.24	1
9. % of Total Trichoptera as Hydropsychidae	NoTrichoptera	1
10. # of Non-insect Taxa	2	2
11. % Collector-Gatherers	18.5769231	4
12. % of Total Number as Elmidae	11.5384615	3
Aqautic Life Use: INTERMEDIATE ***(Total Sample Size= 26)****	Total Score:	25

Stream: Leon Date: 9/20/03 Location: 14198	County: Bexa	ar
Metric	Value	Score
1. Taxa Richness	16	3
2. EPT Taxa Abundance	10	4
3. Biotic Index (HBI)	3.48	4
4. % Chironomidae	0	1
5. % Dominant Taxon	27.5229358	3
6. % Dominant FFG	38.0733945	3
7. % Predators	2.75229358	1
8. Ratio of Intolerant:Tolerant Taxa	8.9	4
9. % of Total Trichoptera as Hydropsychidae	62.5	2
10. # of Non-insect Taxa	2	2
11. % Collector-Gatherers	38.0733945	2
12. % of Total Number as Elmidae	1.83486239	4
Aqautic Life Use: HIGH	Total Score:	33

### BIOTIC ASSESSMENT – FISH

Species Lists and Preliminary Data Manipulation



#### FISH COLLECTED

Stream	Date	ID	Species	N= Type Met		Method	Tolerance	Trophic Gp
Leon	9/24/02	12845	Black Bullhead	1		Е	T	0
			Blacktail Shiner	1		Е	-	IF
			Bluegill	13	SF	E	Т	IF
			Bluegill	1	SF	S	Т	IF
			<b>Bullhead Minnow</b>	14		E	-	IF
			Channel Catfish	3		E	Т	0
			Gambusia affinis	13		E	Т	IF
			Gambusia affinis	46		S	Т	IF
			Gizzard Shad	2		Е	Т	0
			Green Sunfish	56	SF	E	Т	Р
			Green Sunfish	1	SF	S	Т	Р
			Longear Sunfish	1	SF	Е	-	IF
			Mexican Tetra	3		S	-	IF
			Redbreast Sunfish	5	SF	E	-	IF
			Red Shiner	1		E	Т	IF
			Rio Grande Cichlid	10		Е	-	IF
			Sailfin Molly	5		E	Т	0
			Spotted/Orange Spotted Sunfish	5	SF	S	-	IF
			Spotted/Orange Spotted Sunfish	9	SF	Е	-	IF
			Warmouth	7	SF	Е	T	Р
			Total	197				

Stream	Date	ID	Species	N=	Type	Method	Tolerance	Trophic Gp
Leon	9/24/02	12838	Bluegill	1	SF	S	Т	IF
			Gambusia affinis	31		S	Т	IF
			Green Sunfish	13	SF	E	Т	Р
**Abn	ormalities:		Longear Sunfish	7	SF	Е	-	IF
	busia with bla	ack	Redbreast Sunfish	6	SF	E	-	IF
splotch	ies		Rio Grande Cichlid	2		S	-	IF
			Rio Grande Cichlid	1		E	-	IF
			Sailfin Molly	3		S	Т	0
			Sailfin Molly	1		E	Т	0
			Guadalupe Bass	4		S	I	Р
			Spotted/Orange Spotted Sunfish	4	SF	S	-	IF
	\$		Spotted/Orange Spotted Sunfish	5	SF	E	-	IF
			Warmouth	1	SF	Е	Т	Р
			Total	79				•

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

#### FISH COLLECTED

Stream	Date	ID	Species	N= Type Method Toleranc		Tolerance	Trophic Gp	
Leon	9/25/02	14198	Bluegill	3	SF	Е	Т	IF
			Bluegill	4	SF	S	Т	IF
			<b>Bullhead Minnow</b>	14		S	-	IF
			Channel Catfish	1		E	Т	0
			Gambusia affinis	15		S	Т	IF
**Abnor			Gizzard Shad	2		E	Т	0
	Molly with b	olack	Green Sunfish	1	SF	S	Т	Р
splotches			Largemouth Bass	1		E	-	Р
			Longear Sunfish	2	SF	Е	-	IF
			Mexican Tetra	3		E	-	IF
			Rio Grande Cichlid	1		Е	-	IF
			Sailfin Molly	11		S	Т	0
			Spotted Bass	1		E	-	Р
			Spotted Bass	1		S	-	Р
			Spotted Gar	1		Е	Т	Р
			Spotted/Orange Spotted Sunfish	3	SF	Е	-	IF
			Spotted/Orange Spotted Sunfish	7	SF	S	-	IF
			Suckermouth catfish	1		Е	-	Н
			Texas Shiner	62		S	-	IF
			Warmouth	1	SF	E	T	Р
			Total	135				

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

Stream: Leon	Species	N=	Туре	Method	Tolerance	Trophic Gp.
Date: 3/31/03	Amazon molly	1		E	~	0
Location: 12845	Amazon molly	5		S	~	0
	Bluegill	5	SF	E	Т	IF
	Bluegill	1	SF	S	Т	IF
	Bullhead minnow	13	CY	E	~	IF
	Bullhead minnow	18	CY	S	~	IF
	Channel catfish	5		E	Т	0
	Channel catfish	1		S	Т	0
	Gambusia affinis	2		E	T	IF
	Gambusia affinis	10		S	Т	IF
	Green sunfish	2	SF	E	Т	Р
	Green sunfish	1	SF	S	T	Р
	Longear sunfish	14	SF	E	~	IF
	Longear sunfish	5	SF	S	~	IF
**juvy longear sunfish with	Mexican tetra	35		E	~	IF
abnormal growth on tail	Mexican tetra	2		S	~	IF
	Shiner	11	CY	E	~	IF
KEY:	Shiner	12	CY	S	~	IF
SF - Sunfish	Red shiner	43	CY	E	Т	IF
CY - Cyprinidae	Red shiner	118	CY	S	Т	IF
D - Darter	Redbreast sunfish	1	SF	E	~	IF
SU - Sucker	Rio Grande cichlid	4		E	~	IF
E - Electroshock S - Seine	Rio Grande cichlid	2		S	~	IF
V - Visually Observed	Sailfin molly	7		E	T	0
T - Tolerant	Sailfin molly	5		S	Т	0
I - Intolerant	Spottail shiner	2	CY	E	~	IF
~ - Intermediate	Spottail shiner	1	CY	S	~	IF
O - Omnivore IF - Invertiivore	Spotted bass	1		E	~	Р
P - Piscivore	Spotted sunfish	6	SF	E	~	IF
H - Herbivore	Texas shiner	164	CY	E	~	IF
	Texas shiner	337	CY	S	~	IF
	Warmouth	4	SF	E	Т	Р
	Yellow bullhead	1		E	~	0

Stream:	Leon
Date: 4/	1/03
Location	: 12838

\*\*2 sunfish with parasitic worms on fins

Species	N=	Туре	Method	Tolerance	Trophic Gp.
Amazon molly	2		E	~	0
Amazon molly	3		S	~	0
Bluegill	7	SF	E	Т	IF
Gambusia affinis	3		Е	Т	IF
Gambusia affinis	15		S	Т	IF
Green sunfish	1	SF	E	Т	Р
Guadalupe bass	1		E	1	Р
Longear sunfish	25	SF	E	~	IF
Longear sunfish	23	SF	S	~	IF
Longear/Redbreast hybrid	4	SF	E	~	IF
Redbreast sunfish	6	SF	E	~	IF
Redbreast sunfish	5	SF	S	~	IF
Rio Grande cichlid	1		E	~	IF
Sailfin molly	3		S	Т	0
Spotted gar	1		E	Т	Р
Spotted sunfish	4	SF	E	~	IF
Spotted sunfish	5	SF	S	~	IF
Texas shiner	33	CY	S	~	IF
Warmouth	6	SF	E	Т	Р

Stream: Leon Date: 4/1/03 Location: 14198

Species	N=	Туре	Method	Tolerance	Trophic Gp.
Amazon molly	1		E	Т	0
Amazon molly	2		S	Т	0
Bluegill	1	SF	S	Т	IF
Bullhead minnow	1	CY	E	~	IF
Channel catfish	1		E	Т	0
Gambusia affinis	4		S	Т	IF
Green sunfish	3	SF	E	Т	Р
Longear sunfish	7	SF	E	~	IF
Longear sunfish	4	SF	S	~	IF
Mexican tetra	1		E	~	IF
Mexican tetra	3		S	~	IF
Shiner	13	CY	E	~	IF
Shiner	58	CY	S	~	IF
Red shiner	1	CY	S	Т	IF
Redbreast sunfish	2	SF	E	~	IF
Rio Grande cichlid	1		E	~	IF
Spottail shiner	2	CY	S	~	IF
Spotted sunfish	7	SF	E	~	IF
Spotted sunfish	1	SF	S	~	IF
Texas shiner	14	CY	E	~	IF
Texas shiner	374	CY	S	~	IF

Stream	n: Leon
Date:	9/21/03
Locati	on: 12845

Species	N=	Type	Method	Tolerance	Trophic Gp.
Bluegill	17	SF	E	Т	IF
Bluegill	2	SF	S	Т	IF
Common Carp	2	CY	E	Т	0
Green Sunfish	9	SF	E	Т	Р
Guadalupe Bass	5		E	1	Р
Guadalupe Bass	1		S	1	Р
Largemouth Bass	2		E		Р
Lepomis sp.	4	SF	E		-
Lepomis sp.	1	SF	S		-
Longear Sunfish	11	SF	E		IF
Longear Sunfish	2	SF	S		IF
Red Shiner	5	CY	S	Т	IF
Rio Grande Cichlid	26		E		IF
Rio Grande Cichlid	2		S		IF
Sailfin Molly	21		E	Т	0
Sailfin Molly	10		S	Т	0
Threadfin Shad	2		E		0
Threadfin Shad	4		S		0
Warmouth	4	SF	E	Т	Р
Western Mosquitofish	3		E	Т	IF
Western Mosquitofish	22		S	Т	IF
	155		49	70	90

Stream: Leon Date: 9/21/03 Location: 12838

			106		
Species	N=	Type	Method	Tolerance	Trophic Gp.
Amazon Molly	1		S		0
Bluegill	4	SF	E	T	IF
Gizzard Shad	2		S	T	0
Guadalupe Bass	2		E	1	Р
Guadalupe Bass	1		S	1	Р
Largemouth Bass	1		E		Р
Lepomis sp.	5	SF	E		-
Longear Sunfish	8	SF	E		IF
Mexican Tetra	1		E		IF
Red Shiner	1	CY	E	T	IF
Red Shiner	5	CY	S	Т	IF
Redbreast Sunfish	2	SF	E		IF
Rio Grande Cichlid	21		E		IF
Sailfin Molly	7		E	Т	0
Sailfin Molly	3		S	Т	0
Warmouth	4	SF	E	Т	Р
Western Mosquitofish	6		E	Т	IF
Western Mosquitofish	128		S	Т	IF
	202		140	25	176

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Stream: Leon Date: 9/20/03 Location: 14198

Species	N=	Type	Method	Tolerance	Trophic Gp.
Central Stoneroller	20	CY	E		Н
Green Sunfish	2	SF	E	Т	Р
Grey Redhorse	1	S	E		IF
Guadalupe Bass	6		E	1	Р
Lepomis sp.	1	SF	E		-
Lepomis sp.	1	SF	S		-
Red Shiner	2	CY	S	Т	IF
Rio Grande Cichlid	73		E		IF
Rio Grande Cichlid	1		S		IF
Sailfin Molly	6		E	Т	0
Sailfin Molly	1		S	Т	0
Suckermouth Catfish	1		E		Н
Texas Logperch	3	D	E	1	IF
Texas Shiner	2	CY	E	Т	IF
Threadfin Shad	2		E		0
Western Mosquitofish	1		E	Т	IF
Western Mosquitofish	15		S	Т	IF
	138		20	29	98

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### BIOTIC ASSESSMENT – FISH

Indices of Biotic Integrity – Statewide Criteria



Stream: Leon	Date: 09/24/02 Location: 12845	County: Bexa	r
Category	Metric	Value	Score
Species Richness and Composition	Total number of fish species	16	5
	2. Number of darter species	0	1
	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	76	1
	7. Percentage of individuals as omnivores	6	5
Trophic Composition	Percentage of individuals as insectivores	62	3
	9. Percentage of individuals as piscivores	32	5
	10. Number of individuals in sample	197	3
Fish Abundance and Condition	11. Percentage of individuals as hybrids	0	5
	12. Percentage of individuals with disease/anomalies	0	5
	Aquatic Life Use: INTERMEDIATE	Total Points:	40

Stream: Leon	Date: 09/24/02 Location: 12838	County: Bexa	r
Category	Metric	Value	Score
Species Richness and Composition	Total number of fish species	10	5
	2. Number of darter species	0	1
	3. Number of sunfish species (exc. bass)	6	5
	4. Number of sucker speices	0	1
	5. Number of intolerant species	1	3
	6. Percentage of individuals as tolerants	63	1
	7. Percentage of individuals as omnivores	5	5
Trophic Composition	Percentage of individuals as insectivores	72	3
	9. Percentage of individuals as piscivores	23	5
	10. Number of individuals in sample	79	3
Fish Abundance and Condition	11. Percentage of individuals as hybrids	0	5
	12. Percentage of individuals with disease/anomalies	1	5
	Aquatic Life Use: INTERMEDIATE	Total Points:	44

Stream: Leon	Date: 09/25/02 Location: 14198	County: Bexa	r
Category	Metric	Value	Score
Species Richness and Composition	1. Total number of fish species	17	5
	2. Number of darter species	0	1
	3. Number of sunfish species (exc. bass)	5	5
	4. Number of sucker speices	0	1
	5. Number of intolerant species	0	1
	6. Percentage of individuals as tolerants	29	1
	7. Percentage of individuals as omnivores	10	5
Trophic Composition	Percentage of individuals as insectivores	85	5
	9. Percentage of individuals as piscivores	4	3
	10. Number of individuals in sample	135	3
Fish Abundance and Condition	11. Percentage of individuals as hybrids	0	5
	12. Percentage of individuals with disease/anomalies	1.3	5
	Aquatic Life Use: INTERMEDIATE	Total Points:	40

Stream: Leon	Date: 3/31/03	Location: 12845	County: Bexar	
Category	N	etric	Value	Score
Species Richness and Composition	1. Total # of fish species		19	5
	2. Number of darter species		0	1
	3. Number of sunfish species (	exc. bass)	6	5
	4. Number of sucker species		0	1
	5. Number of intolerant species	3	0	1
	6. Percentage of individuals as	tolerants	24	1
	7. Percentage of individuals as	omnivores	3	5
Trophic Composition	8. Percentage of individuals as	insectivores	96	5
	9. Percentage of individuals as	piscivores	1	3
	10. Number of individuals in sa	mple	839	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: INTERMEDIA	ATE	Total Points:	42

Stream: Leon	Date: 4/1/03	Location: 12838	County: Bexar	
Category		Metric	Value	Score
Species Richness and Composition	1. Total # of fish species		13	5
	2. Number of darter species		0	1
	3. Number of sunfish specie	s (exc. bass)	6	5
	4. Number of sucker species	3	0	1
	5. Number of intolerant spec	cies	1	3
	6. Percentage of individuals	as tolerants	24	1
	7. Percentage of individuals	as omnivores	5	5
Trophic Composition	8. Percentage of individuals	as insectivores	89	5
	9. Percentage of individuals	as piscivores	6	5
	10. Number of individuals in	sample	148	3
Fish Abundance and Condition	11. Percentage of individual	s as hybrids	0	5
	12. Percentage of individual	s with disease/anomolies	0	5
	Aquatic Life Use: INTERME	DIATE	Total Points:	44

Stream: Leon	Date: 4/1/03	Location: 14198	County: Bexar	
Category	ı	Metric	Value	Score
Species Richness and Composition	1. Total # of fish species		15	5
	2. Number of darter species		0	1
	3. Number of sunfish species	(exc. bass)	5	5
	4. Number of sucker species		0	1
	5. Number of intolerant specie	es	0	1
	6. Percentage of individuals a	s tolerants	3	5
	7. Percentage of individuals a	s omnivores	0.7	5
Trophic Composition	8. Percentage of individuals a	s insectivores	98	5
	9. Percentage of individuals a	s piscivores	0.5	1
	10. Number of individuals in s	ample	501	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: INTERMED	IATE	Total Points:	44

Stream: Leon	Date: 9/21/03	Location: 12845	County: Bexar	
Category	N	letric	Value	Score
Species Richness and Composition	1. Total # of fish species		13	5
	2. Number of darter species		0	1
	3. Number of sunfish species	(exc. bass)	5	5
	4. Number of sucker species		0	1
	5. Number of intolerant specie	s	1	3
	6. Percentage of individuals as	s tolerants	63.33333333	1
	7. Percentage of individuals as	s omnivores	26	3
Trophic Composition	8. Percentage of individuals as	s insectivores	60	3
	9. Percentage of individuals as	s piscivores	14	5
	10. Number of individuals in sa	ample	155	3
Fish Abundance and Condition	11. Percentage of individuals	as hybrids	0	5
	12. Percentage of individuals	with disease/anomolies	0	5
	Aquatic Life Use: INTERMEDI	ATE	Total Points:	40

Stream: Leon	Date: 9/21/03	Location: 12838	County: Bexar	
Category	Metric		Value	Score
Species Richness and Composition	Composition  1. Total # of fish species  2. Number of darter species  3. Number of sunfish species (exc. bass)		14	5
			0	1
			5	5
	4. Number of sucker species		0	1
	5. Number of intolerant species		1	3
	6. Percentage of individuals as tolerants		80.7106599	1
· · · · · · · · · · · · · · · · · · ·	7. Percentage of individuals as omnivores		6.598984772	5
	8. Percentage of individuals as insectivores		89.34010152	5
	Percentage of individuals as piscivores		4.060913706	3
Fish Abundance and Condition	10. Number of individuals in samp	le	202	5
	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: Leon	Date: 9/20/03	Location: 14198	County: Bexar	
Category	М	Metric		Score
Species Richness and Composition	1. Total # of fish species	1. Total # of fish species		5
	2. Number of darter species	2. Number of darter species		3
	3. Number of sunfish species (	3. Number of sunfish species (exc. bass)		5
	4. Number of sucker species	4. Number of sucker species		3
	5. Number of intolerant species	3	2	3
	6. Percentage of individuals as tolerants		21.32352941	1
Trophic Composition	7. Percentage of individuals as omnivores		6.617647059	5
	8. Percentage of individuals as insectivores		72.05882353	3
	9. Percentage of individuals as piscivores		5.882352941	5
Fish Abundance and Condition	10. Number of individuals in sa	imple	138	3
	11. Percentage of individuals a	11. Percentage of individuals as hybrids		5
	12. Percentage of individuals with disease/anomolies		0	5
	Aquatic Life Use: INTERMEDIA	ATE-HIGH	Total Points:	46

### BIOTIC ASSESSMENT – FISH

Indices of Biotic Integrity – Regional Criteria



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

Stream: Leon Date: 09/24/02 Location: 12845	County: Bexa	ır						
Metric	Value	Score						
1. Total number of fish species	16	5						
2. Number of native cyprinid species	3	3						
3. Number of benthic invertivore species	0	1						
4. Number of sunfish species	6	5						
5. Percentage of individuals as tolerants (exc. G. affinis)	46	3						
6. Percentage of individuals as omnivores	6	5						
7. Percentage of individuals as insectivores	62	3						
8. Percentage of individuals as piscivores	32	5						
9. Number of individuals in sample	197	-						
a. number of ind/seine haul	9	1						
b. number of ind/min electrofishing	9.4	5						
10. Percentage of ind. as non-native species	2.5	3						
11. Percentage of individuals with disease/anomalies 0								
Aquatic Life Use: HIGH	Total Points:	41						

<sup>\*</sup>Average of 9a and 9b

Drainage area upstream of 12845 ~ 492.0 sq. km.

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

Stream: Leon Date: 09/24/02 Location: 12838	County: Bexa	ar							
Metric	Value	Score							
1. Total number of fish species	10	3							
2. Number of native cyprinid species	0	1							
3. Number of benthic invertivore species	0	1							
4. Number of sunfish species	6	5							
5. Percentage of individuals as tolerants (exc. G. affinis)	24	5							
6. Percentage of individuals as omnivores	5	5							
7. Percentage of individuals as insectivores	72	5							
8. Percentage of individuals as piscivores	23	5							
9. Number of individuals in sample	79	-							
a. number of ind/seine haul	7.5	1							
b. number of ind/min electrofishing	2.3	1							
10. Percentage of ind. as non-native species	7.6	1							
11. Percentage of individuals with disease/anomalies 1.3									
Aquatic Life Use: LIMITED	Total Points:	33							

1\*

Drainage area upstream of 12838 ~ 535.9 sq. km.

<sup>\*</sup>Average of 9a and 9b

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

Stream: Leon Date: 09/25/02 Location: 14198	County: Bexa	ar						
Metric	Value	Score						
1. Total number of fish species	17	5						
2. Number of native cyprinid species	2	3						
3. Number of benthic invertivore species	0	1						
4. Number of sunfish species	5	5						
5. Percentage of individuals as tolerants (exc. G. affinis)	18	5						
6. Percentage of individuals as omnivores	10	3						
7. Percentage of individuals as insectivores	85	5						
8. Percentage of individuals as piscivores	4	1						
9. Number of individuals in sample	135	-						
a. number of ind/seine haul	19	1						
b. number of ind/min electrofishing	1.3	1						
10. Percentage of ind. as non-native species	0.7	5						
11. Percentage of individuals with disease/anomalies 0.7								
Aquatic Life Use: INTERMEDIATE	Total Points:	37						

<sup>\*</sup>Average of 9a and 9b

Drainage area upstream of 14198 ~ 611.0 sq. km.

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

Stream: Leon (32) Date: 3/31/03 Location: 12845	County: Bexar	
Metric	Value	Score
1. Total # of fish species	19	5
2.Total Number of cyprinid species	5	5
Number of benthic invertivore species	0	1
4. Number of sunfish species (exc. bass)	6	5
5. Percentage of individuals as tolerants (exc. G.affinis)	22.9	5
6. Percentage of individuals as omnivores	3	5
7. Percentage of individuals as insectivores	96	5
8. Percentage of individuals as piscivores	1	1
9. Number of individuals in sample	~	~
a. Number of individuals/seine hual	86.3	3
b. Number of individuals/min. electroshocking	21.4	5
10. Percentage of individuals as non-native species	0.1	5
11. Percentage of individuals with disease/anomolies	0.1	5
Aquatic Life Use: High	Total Points:	46

4,

Drainage area upstream of 12845  $\sim$  492 sq. km.

Stream: Leon (	32) Date: 4/1/03	Location: 12838	County: Bexar	
	Metric		Value	Score
1. Total # of fish	species		13	5
2.Total Number o	of cyprinid species	1	1	
3. Number of ber	thic invertivore species		0	1
4. Number of sun	fish species (exc. bass)		6	5
5. Percentage of	individuals as tolerants (exc	c. G.affinis)	14.2	5
6. Percentage of	individuals as omnivores		5.4	5
7. Percentage of	individuals as insectivores		88.5	5
8. Percentage of	individuals as piscivores		6.1	3
9. Number of indi	viduals in sample		~	~
a. Number of	individuals/seine hual		14.5	1
b. Number of	individuals/min. electroshoo	cking	4.2	3
10. Percentage o	f individuals as non-native s	pecies	7.4	1
11. Percentage o	f individuals with disease/an	nomolies	0	5
Aquatic Life Use:	INTERMEDIATE		Total Points:	38

O\*

Drainage area upstream of 12838 ~ 536 sq. km.

<sup>\*</sup>Average of 9a and 9b

<sup>\*</sup>Average of 9a and 9b

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

Stream: Leon (32) Date: 4/1/03 Location: 14198	County: Bexar	
Metric	Value	Score
1. Total # of fish species	15	5
2.Total Number of cyprinid species	5	5
3. Number of benthic invertivore species	0	1
4. Number of sunfish species (exc. bass)	5	5
5. Percentage of individuals as tolerants (exc. <i>G.affinis</i> )	1.6	5
6. Percentage of individuals as omnivores	0.8	5
7. Percentage of individuals as insectivores	98.6	5
8. Percentage of individuals as piscivores	0.6	1
9. Number of individuals in sample	~	~
a. Number of individuals/seine hual	75	3
b. Number of individuals/min. electroshocking	3.4	3
10. Percentage of individuals as non-native species	0.4	5
11. Percentage of individuals with disease/anomolies	0	5
Aquatic Life Use: HIGH	Total Points:	45

<sup>\*</sup>Average of 9a and 9b

Drainage area upstream of 14198 ~ 611 sq. km.

3\*

Stream: Leon (32) Date: 9/21/03 Location: 12845	County: Bexar						
Metric	Value	Score					
1. Total # of fish species	13	5					
2.Total Number of cyprinid species	2	3					
3. Number of benthic invertivore species	0	1					
4. Number of sunfish species (exc. bass)	5	5					
5. Percentage of individuals as tolerants (exc. <i>G.affinis</i> )	46.66666667	3					
6. Percentage of individuals as omnivores	26	1					
7. Percentage of individuals as insectivores	60	3					
Percentage of individuals as piscivores	14	5					
9 Number of individuals in sample		~					
a. Number of individuals/seine hual	8.166666667	1					
b. Number of individuals/min. electroshocking	7.066666667	3					
10. Percentage of individuals as non-native species	1.290322581	5					
11. Percentage of individuals with disease/anomolies	/anomolies 0 5						
Aquatic Life Use: INTERMEDIATE	Total Points:	38					

<sup>\*</sup>Average of 9a and 9b

Drainage area upstream of 12845 ~ 492 sq. km.

Stream: Leon (32) Date: 9/21/	03 Location: 12838	County: Bexar						
Metri	ic	Value	Score					
1. Total # of fish species		14	5					
2.Total Number of cyprinid species	1	1						
3. Number of benthic invertivore species		0	1					
4. Number of sunfish species (exc. bass)		5	5					
5. Percentage of individuals as tolerants	(exc. G.affinis)	12.69035533	5					
6. Percentage of individuals as omnivore	S	6.598984772	5					
7. Percentage of individuals as insectivor	res	89.34010152	5					
8. Percentage of individuals as piscivores	S	4.060913706	1					
9 Number of individuals in sample			~					
a. Number of individuals/seine hual		23.33333333	1					
b. Number of individuals/min. electros	shocking	4.133333333	3					
10. Percentage of individuals as non-nati	ve species	0.99009901	5					
11. Percentage of individuals with diseas	11. Percentage of individuals with disease/anomolies 0							
Aquatic Life Use: HIGH		Total Points:	40					

<sup>\*</sup>Average of 9a and 9b

Drainage area upstream of 12838  $\sim 535.9 \ \text{sq. km}.$ 

2\*

Stream: Leon (32) Date:9/20/03	Location: 14198	County: Bexar	
Metric		Value	Score
Total # of fish species		13	3
2.Total Number of cyprinid species	3	3	
3. Number of benthic invertivore species		1	3
4. Number of sunfish species (exc. bass)		2	3
5. Percentage of individuals as tolerants (ex	c. <i>G.affini</i> s)	9.558823529	5
6. Percentage of individuals as omnivores		6.617647059	5
7. Percentage of individuals as insectivores		72.05882353	5
8. Percentage of individuals as piscivores		5.882352941	3
9 Number of individuals in sample			~
a. Number of individuals/seine hual		3.333333333	1
b. Number of individuals/min. electrosho	cking	7.866666667	5
10. Percentage of individuals as non-native	species	0.724637681	5
11. Percentage of individuals with disease/a	nomolies	0	5
Aquatic Life Use: HIGH		Total Points:	43

<sup>\*</sup>Average of 9a and 9b

Drainage area upstream of 14198 ~ 611 sq. km.

3\*

### HABITAT ASSESSMENT

Part I – Stream Physical Characteristics Worksheet



### Part I - Stream Physical Characteristics Worksheet

Observers: Dat	te: Time:_	_ Weather	conditions:														
Stream:Locat	ion of site:	Ler	igth of stream rea	ich:													
Stream Segment No.:_ Ob	served Stream	Uses:	Aesthetics (d	circle on	e): (1) w	vildernes	s (2) na	itural (3	s) comm	on (4)	offensiv	'e					
Stream Type (Circle One):	perennial or	intermitte	nt w/ perennial p	pools Str	eam Be	nds: No.	Well De	efined_;	No. Mo	deratel	y Defin	ed_; No	. Poorl	y Define	d_		
Channel Obstructions/Mod	difications:	No.	of Riffles: Cha	annel Flo	ow Statu	ıs (circle	one): hi	igh mod	erate lo	w no fl	ow						
Riparian Vegetation (%): Left Bank: Trees Right Bank: Tree	S_ Shrubs_ G	rasses, For Grasses, Fo	bs_ Cult. Fields_ orbs_ Cult. Field	Other_s_ Othe	<u>r_</u>						4448						
Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)		Thalwe	eg Depth:	Stream	n Depths	Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)						
																44	
	Habitat Type One) Riffle Glide Pool	itat Type (Circle ) Riffle Run de Pool  Dominant Substrate Type					Left E	nant Typ Bank: Bank:		% Gravel or Larger							
	Algae or Ma (Circle One) Abundant C Rare Absen	Common	Width of Natura Vegetation (m) LB: RB:	l Buffer		Instrea	m Cover	Types:						(b)		% Instream Cover	
																	ir -
Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)		Thalwe	eg Depth:	Stream	n Depths	(m) at P	oints Ac	ross Tra	nsect			Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
															W		
	Habitat Type One) Riffle Glide Pool	e (Circle Run	Dominant Subst		Dominant Types Riparian Vegetation: Left Bank: Right Bank:									% Gravel or Larger			
-	Algae or Ma (Circle One) Abundant C Rare Absen	Common	Width of Natura Vegetation (m) LB: RB:	ith of Natural Buffer tetation (m) RB:  Instream Cover Types:								% Instream Cover					

Location of Transect	Stream Width (m)	Left Bank Slope	Left Bank Erosion Potential (%)		Thalwe	g Depth:	Stream	n Depths	(m) at Po	Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)						
														1				
-	Habitat Type One) Riffle I Glide Pool	(Circle Run	Dominant Subst	Dominant Substrate Type					s Riparia		% Gravel or Larger							
	Algae or Mac (Circle One) Abundant C Rare Absen	crophytes common	Width of Natura Vegetation (m) LB: RB:	l Buffer		m Cover Types:									% Instream Cover			
Location of Transect	Stream Width (m)	Left Bank Slope	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect  Right Bank Slope C									Right Bank Erosion Potential (%)	Tree Canopy (%)				
																(70)		
	Habitat Type One) Riffle I Glide Pool	(Circle Run	Dominant Subst	rate Type			Domin Left B		s Riparia	n Veget	ation:		7.			% Gravel or Large	% Gravel or Larger	
***	Algae or Mac (Circle One) Abundant C Rare Absent	crophytes onimon	Width of Natura Vegetation (m) LB: RB:	l Buffer		Instream	n Cover	Types:								% Instream Cover		
Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)		Thalw	eg Depth:	Stream	n Depths	(m) at Po	oints Acı	ross Tran	sect			Right Bank Slope	Right Bank Erosion Potential (%)	Tree Canopy (%)	
				147												(70)		
	Habitat Type One) Riffle I Glide Pool	(Circle Run	Dominant Substi	rate Type			Domii Left B Right		s Riparia	n Veget	ation:					% Gravel or Large	er	
	Algae or Mac (Circle One) Abundant C Rare Absent	ommon	Width of Natura Vegetation (m) LB: RB:	l Buffer		Instream	n Cover						7			% Instream Cover		
Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)		Thalw	eg Depth:	Stream	n Depths	(m) at Po	oints Acı	ross Tran	sect			Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)	
				1010				rou".		10.00								
	Habitat Type One) Riffle I Glide Pool	(Circle Run	Dominant Subst	Dominant Substrate Type  Dominant Types Riparian Vegetation: Left Bank:  Right Bank:								% Gravel or Larger						
	Algae or Mac (Circle One) Abundant C Rare Absent	crophytes onunon	Width of Natural Vegetation (m) LB: RB:	l Buffer	ora ova	Instream	n Cover	Types:	Y				7			% Instream Cover		

### Part I - Stream Physical Characteristics Worksheet

Observers: Dat	te: Time:_	_ Weather	conditions:															
Stream:Locat	ion of site:	Ler	igth of stream rea	ich:														
Stream Segment No.:_ Ob	served Stream	Uses:	Aesthetics (d	circle on	e): (1) w	vildernes	s (2) na	itural (3	s) comm	on (4)	offensiv	'e						
Stream Type (Circle One):	perennial or	intermitte	nt w/ perennial p	pools Str	eam Be	nds: No.	Well De	efined_;	No. Mo	deratel	y Defin	ed_; No	. Poorl	y Define	d_			
Channel Obstructions/Mod	difications:	No.	of Riffles: Cha	annel Flo	ow Statu	ıs (circle	one): hi	igh mod	erate lo	w no fl	ow							
Riparian Vegetation (%): Left Bank: Trees Right Bank: Tree	S_ Shrubs_ G	rasses, For Grasses, Fo	bs_ Cult. Fields_ orbs_ Cult. Field	Other_s_ Othe	<u>r_</u>						4448							
Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)		Thalwe	eg Depth:	Stream	n Depths	Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)							
																44		
	Habitat Type One) Riffle Glide Pool	oitat Type (Circle e) Riffle Run de Pool  Dominant Substrate Type					Left E	nant Typ Bank: Bank:		% Gravel or Larger								
	Algae or Ma (Circle One) Abundant C Rare Absen	Common	Width of Natura Vegetation (m) LB: RB:	l Buffer		Instrea	m Cover	Types:						(b)		% Instream Cover		
																	ir -	
Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)		Thalwe	eg Depth:	Stream	n Depths	(m) at P	oints Ac	ross Tra	nsect			Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)	
															W			
	Habitat Type One) Riffle Glide Pool	e (Circle Run	Dominant Subst		Dominant Types Riparian Vegetation: Left Bank: Right Bank:									% Gravel or Larger				
-	Algae or Ma (Circle One) Abundant C Rare Absen	Common	Width of Natura Vegetation (m) LB: RB:	ith of Natural Buffer tetation (m) RB:  Instream Cover Types:								% Instream Cover						

Location of Transect	Stream Width (m)	Left Bank Slope	Left Bank Erosion Potential (%)		Thalwe	g Depth:	Stream	n Depths	(m) at Po	oints Acr	oss Tran	sect			Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
														1			
-	Habitat Type One) Riffle I Glide Pool	(Circle Run	Dominant Subst	rate Type	y a		Left E	nant Type Jank: Bank:	s Riparia	an Veget	ation:					% Gravel or Large	er
	Algae or Mac (Circle One) Abundant C Rare Absen	crophytes common	Width of Natura Vegetation (m) LB: RB:	l Buffer		Instrea	n Cover	Types:						14		% Instream Cover	
Location of Transect	Stream Width (m)	Left Bank Slope	Left Bank Erosion Potential (%)		Thalw	eg Depth:		n Depths	(m) at Po	oints Ac	ross Tran	sect		•	Right Bank Slope	Right Bank Erosion Potential (%)	Tree Canopy (%)
																(70)	
	Habitat Type One) Riffle I Glide Pool	(Circle Run	Dominant Subst	rate Type			Domin Left B		s Riparia	n Veget	ation:		7.			% Gravel or Large	er
***	Algae or Mac (Circle One) Abundant C Rare Absent	crophytes onimon	Width of Natura Vegetation (m) LB: RB:	l Buffer		Instream	n Cover	Types:								% Instream Cover	
Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)		Thalw	eg Depth:	Stream	n Depths	(m) at Po	oints Acı	ross Tran	sect			Right Bank Slope	Right Bank Erosion Potential (%)	Tree Canopy (%)
				147												(70)	
	Habitat Type One) Riffle I Glide Pool	(Circle Run	Dominant Substi	rate Type			Domii Left B Right		s Riparia	n Veget	ation:					% Gravel or Large	er
	Algae or Mac (Circle One) Abundant C Rare Absent	ommon	Width of Natura Vegetation (m) LB: RB:	l Buffer		Instream	n Cover						7			% Instream Cover	
Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)		Thalw	eg Depth:	Stream	n Depths	(m) at Po	oints Acı	ross Tran	sect			Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
				1010				104",		10.00							
	Habitat Type One) Riffle I Glide Pool	(Circle Run	Dominant Subst	rate Type		NAME OF STREET	Domit Left B Right		s Riparia	n Veget	ation:					% Gravel or Large	er
	Algae or Mac (Circle One) Abundant C Rare Absent	crophytes onunon	Width of Natural Vegetation (m) LB: RB:	l Buffer	ora ova	Instream	n Cover	Types:	Y				7			% Instream Cover	

### Part I - Stream Physical Characteristics Worksheet

Observers: Dat	te: Time:_	_ Weather	conditions:														
Stream:Locat	ion of site:	Ler	igth of stream rea	ich:													
Stream Segment No.:_ Ob	served Stream	Uses:	Aesthetics (d	circle on	e): (1) w	vildernes	s (2) na	itural (3	s) comm	on (4)	offensiv	'e					
Stream Type (Circle One):	perennial or	intermitte	nt w/ perennial p	pools Str	eam Be	nds: No.	Well De	efined_;	No. Mo	deratel	y Defin	ed_; No	. Poorl	y Define	d_		
Channel Obstructions/Mod	difications:	No.	of Riffles: Cha	annel Flo	ow Statu	ıs (circle	one): hi	igh mod	erate lo	w no fl	ow						
Riparian Vegetation (%): Left Bank: Trees Right Bank: Tree	S_ Shrubs_ G	rasses, For Grasses, Fo	bs_ Cult. Fields_ orbs_ Cult. Field	Other_s_ Othe	<u>r_</u>						4448						
Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)		Thalwe	eg Depth:	Stream	n Depths	(m) at P	oints Acı	ross Trar	sect			Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
																44	
	Habitat Type One) Riffle Glide Pool	e (Circle Run	Dominant Subst	rate Type			Left E	nant Typ Bank: Bank:	es Ripar	ian Vege	etation:					% Gravel or Large	er
	Algae or Ma (Circle One) Abundant C Rare Absen	Common	Width of Natura Vegetation (m) LB: RB:	l Buffer		Instrea	m Cover	Types:						(b)		% Instream Cover	
																	ir -
Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)		Thalwe	eg Depth:	Stream	n Depths	(m) at P	oints Ac	ross Tra	nsect			Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
															W		
	Habitat Type One) Riffle Glide Pool	e (Circle Run	Dominant Subst	rate Type			Left I	inant Typ Bank: t Bank:	es Ripar	ian Vege	etation:					% Gravel or Larg	ger
-	Algae or Ma (Circle One) Abundant C Rare Absen	Common	Width of Natura Vegetation (m) LB: RB:	l Buffer		Instrea	m Cover	Types:								% Instream Cove	er ·

Location of Transect	Stream Width (m)	Left Bank Slope	Left Bank Erosion Potential (%)		Thalwe	g Depth:	Stream	n Depths	(m) at Po	oints Acr	oss Tran	sect			Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
														1			
-	Habitat Type One) Riffle I Glide Pool	(Circle Run	Dominant Subst	rate Type	y a		Left E	nant Type Jank: Bank:	s Riparia	an Veget	ation:					% Gravel or Large	er
	Algae or Mac (Circle One) Abundant C Rare Absen	crophytes common	Width of Natura Vegetation (m) LB: RB:	l Buffer		Instrea	n Cover	Types:						14		% Instream Cover	
Location of Transect	Stream Width (m)	Left Bank Slope	Left Bank Erosion Potential (%)		Thalw	eg Depth:		n Depths	(m) at Po	oints Ac	ross Tran	sect		•	Right Bank Slope	Right Bank Erosion Potential (%)	Tree Canopy (%)
																(70)	
	Habitat Type One) Riffle I Glide Pool	(Circle Run	Dominant Subst	rate Type			Domin Left B		s Riparia	n Veget	ation:		7.			% Gravel or Large	er
***	Algae or Mac (Circle One) Abundant C Rare Absent	crophytes onimon	Width of Natura Vegetation (m) LB: RB:	l Buffer		Instream	n Cover	Types:								% Instream Cover	
Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)		Thalw	eg Depth:	Stream	n Depths	(m) at Po	oints Acı	ross Tran	sect			Right Bank Slope	Right Bank Erosion Potential (%)	Tree Canopy (%)
				147												(70)	
	Habitat Type One) Riffle I Glide Pool	(Circle Run	Dominant Substi	rate Type			Domii Left B Right		s Riparia	n Veget	ation:					% Gravel or Large	er
	Algae or Mac (Circle One) Abundant C Rare Absent	ommon	Width of Natura Vegetation (m) LB: RB:	l Buffer		Instream	n Cover						7			% Instream Cover	
Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)		Thalw	eg Depth:	Stream	n Depths	(m) at Po	oints Acı	ross Tran	sect			Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
				1010				104",		10.00							
	Habitat Type One) Riffle I Glide Pool	(Circle Run	Dominant Subst	rate Type		NAME OF STREET	Domit Left B Right		s Riparia	n Veget	ation:					% Gravel or Large	er
	Algae or Mac (Circle One) Abundant C Rare Absent	crophytes onunon	Width of Natural Vegetation (m) LB: RB:	l Buffer	ora ova	Instream	n Cover	Types:	Y				7			% Instream Cover	

47.01

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

Part I - Stream Physical Characteristics Workshoot

Observers; Ju. St. Date: Str. Prime: H. Weather conditions: 5

Stream: Lead Lecation of site: 128-15 Length of stream reach; 24-0m

Stream Segment No. \_\_ Observed Stream Uses: Pac\_\_ Assidetics (circle one): (1) wilderness (2) matural (3) common (4) offensive

Stream Type (Circle One), perenniable intermittent w/ perennial pools Stream Bends: No. Well Defined, No. Moderntely Defined, No. Poorly Defined, Channel Obsaructions/Modifications: Lyc(4) No. of Rifflest & Channel Flow Status (circle one); high moderate low no flow

Riparian Vegeration (%):
Left Bank: Trees O Shrubst Grasses, Forbsto Cuit, Fields Other Lot Right Bank: Trees Shrubst Grasses, Forbsto Cuit. Fields Other Lot

Right Tree Bank Erosion Chaopy Fuendal (%)	0% 1.5	veloc Lager	% Instream Cover
	(+	# Grav	% Inst
Sueara Deprisa (m) at Polmts Across Transact	1.45 2.41 2.43 2.46 7.41 225 8.51 2.18 1.21 .10 0.13 33	Descione Tyges Riparities Vegenation: Left Bank: Torky - Other - Right Bank: Total Shock -	Engineer Const Types.
Left Bank Erotion Postgital	70% 1.45 2.41	Deminant Substitute Type  8 Lift on la.	Wright of Nanswal Buffer Vegenition (m) 1.B: nas = 20 - 1
Left Bank Siops	58.	Circle	erophytes terranon
Suram Widsh Umb	Plm	A POST OF THE PERSON NAMED IN COLUMN TO PERS	Algae or Min (Circle One) Absordant C
Lecusion of Transect	10	Gless Rom	

Location of Triainect	Sureaux Wideh (m)	Sign	Left Buck Englos Populal	-	Thebase Dead	Steam De	Stream Depths (m) at Polists Across	AS Acres	Transect		Right Slope Coe	Right Bank Ensslon Potential (%)	O Dee
0	1.8m	230	ah	3-5 0.56 -MT 0	14. a.N.	D.54 04	17.0 3	0.15 0	0.54 045 0.41 0.25 0.20 0.4 0.04	M 0.00	15.	40%	0
donostran	Habbier Top Cone, Berry Cone, Pess	a (Circle Roan	Designant Substi	Cobble Cobble		Domicant Left Bank Right Beni	Pypes Ripard	An Vegetori	St. Fach			% Onvel or Larger	11
of Greening	Agne or Mi	Cesseson d	Width of Natural Buffer Vegetalion (m) LBI - A. KB: 700-w	1 Buffer	San C	Overhouse C	Cot	W. G	Jobble Gard Alone	100	Succes	% Insceed Cover	14

Short Personal
States Type (Circle Denisons Subsensis Type Circle Res) Rem Color From Color From
Aline of Martinghyper Width of Meissell Buffer Vogetalist for Shall Buffer Magazine Causes at LB-Q RB i g
Loth Book Brosins Stope Petersian
1600 410 LONG 0.05 0.52 1850 1850 1850 1850 1850 1850 1850 1850
Ages as Manney years Volta of Name 2 Boths Volta of One; Abresian Canada Lagarda Abrell Agranda Abrell
Lah Lah Resis Traplor Topo Personal
14. 50%, 015
Habitat Trype Circle Osci Milde Rom Gilde Cod Gilde Cod
Algae or Alexcophysis Width of Nissail Buffer (Circle One) - Vigatation (and Absorption Common LE 200 Kits (10 at the Absorption Circles (10 at the Absorpti
Left Bank Benjon Bank Possiel Stope Possiel
Noblem Type (Circle Occioner Schausse Type Clinte People Clinte Clinte People Clinte C
Adjust on Macrophysis Wolds of Massel Buffer (Chick Ober) Abushkas Corvense LE: RH:

Henry, Sanke, Torole, Smulbours

Parl - 14 Sami - CER.
Ren
Stille
ZATE 1
Sami - CER.

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

Part I - Stream Physical Characteristics Worksheet

Observers: Jw 3 H Date: 2/2 Time if Wenther conditions: 5

Streams, Least Location of size; 12345 Length of stream reach; 25624

Stream Segment No.: Observed Stream Uses: Lee. Aesthetics (circle ane): (1) wilderness (2) natural (3) common (4) affensive

Stream Type (Circle One): Ferential per internation w/ perential pools Stream Bends: No. Well Defined g. No. Moderately Defined g. No. Poorly Defined g. Channel Obstructions/Modifications: 144(2) No. of Riffles: L. Channel Flow Status (clivie cue): high-moderate low no flow

Ripatian Vegerarion (%): Left Bank: Trees Shrubs Grasses, Forbis Oult Fields Other 19 Right Bank: Trees Shrubs Grasses, Forbis Oult Field Cother 19

Right Right Tree Bank Eroston Canopy Sigge Population (%)	65	& Gravel or Larger	So Instruction Cover
Suram Depths (m) at Points Across Transact  [14]	7 1.34 1.65 1.64 1.35 1.34 1.50 1.54 1.52 0.38	Dominan Types Riparian Vegetation:	Lysteam Cover Types:
Bank Erosion Potential 759	85% 0.00 1.1	Dominant Substrate Type	Width of Natural Buffer Vegetation (m) LB: ga RB: O
Suream Left Width Bank (m) Stope	Sm 915	Habitat Type (Circle One) Riffle Run Glide Pool	Algae or Macrophytes (Circle One) Abandant Common Port
Leamion of Trimasco	70	CIm Upstriam	

Canopy (%)	1/19		
Right Bank Brosson Potential	70%	% Gravel or Larger	% Institutes Cover
Right Slops	18.		1
Stream Depths (m) at Points Across Transect Thalwer Depth	0.02 0.50 pm 6.58 0 5" 0.00 0 95 cm 0 34 100 0.00	Dominant Types Ripatian Vegetation: Left Bank: Prof. 6	Instrum
Bank Bresion Potential (%)	30%	Dominate Substrate Type  Creenel	Width of Natural Buffer Vegetation (m) LB: 6 RB: 2 C o
Slope Slope	100	(Circle un	naphytes
Stream Width (m)	10.5m	Habitat Type One; Riffle R Glide Feely	Algae or Maca (Circle One) Abundant Co Rar DAbient
Location of Transes	M	Ju Lum Lan	

Campy (%)			Tros Casedy (%)	21/52	ж		Christy (%)	11/12		н	Date Contegy (%)	į.	8	
Reak Erasion Potential (%)	% Oravel or Larger	% braticass Cover	Right Bank Eresion Forential	65%	% Gravel or Located	% bratowas Cover	Right Bank Breslen Notential	208	% Gand or Lapo	% britishi Osva	Eight Busk Physica Federald (%)	% Grivel at Locper	S Ingirtum Coves	
Ruph Stope			Right Sink Sink	64		2	Right Stope To	220			MARC			
Parch Region Protection Protection Theology Dupts  (6-5%, 6-4%, 6-4%, 6-4% 6-4% 6-4% 6-4% 6-4% 6-4% 6-4% 6-4%	Damican Types Riparlan Vegetatlen: Left finesk: Right Sock:	Victorial of Missional Building Americans Cover Types:  Vigoraliana Israel  All And Sounds Governor  All And Sounds Governor	South English Fallent Patient	45% 0003 050 049 004 043 849 014 000 0150 0145 0103	Developm Substants Type  Loft Brack Soft Soft Soft Soft Soft Soft Soft Soft	25	Breich Breisen Persental Persental (%)	79% 052 Well 1.96 1.55 1.57 1.02 LOG DAS GAZ GAM 000	Dentions Substant Type  Left Bank SONS F CAS 2 1/4 5/4 5/4 5/4 5	With a Name Before Inneren Cover Dperi	And Equipm Forested Potested Televisid Thailway Dayth:	Dondrost Substate Type  Dondrost Substate Type  Lat Rank:  Eigh Each:	Wright of Named Beffer Better Spect Vectories (19)	
Tic o	Rices	ischugibytes B Cesensen	Hoth Sleye	484	pe tClacks Ram	Ocrophysis Camerine	Stope Stope	130	pe (Clocks Ross		Short Short	py (Clirclo	ixerophyses Currentes of	
Social Wilder		Algor of Moor (Chele One) Aboutdent C. Rarel/Moreni	Shenm Wideh ped	2.1 m	Constant Down	Algan of Moo (Charle Con) Alganization Con Alganization C	Stepan Width Int	Non	E4.8 /	Algae of Mistrophysia IChtair Che) Alagodani Centrico Rate Abest	NA I	Haking They Olde North	Algas of Miscrophysis (Citche Out) Abundant Cummon Rare Alexan	
Lecturius of Transpart	US - Star down Trans LORC		Lacation of Truntees	7	· Hownsteen	3 charce	Lections of Transver	93	How Land		Lecrino at Thataus	af	,	in mi

To be

Part I - Stream Physical Characteristics Worksheet

Location of size; 19119 Length of stream teach, 25,44 Observers: Ed. D. Date Walnet & Weather conditions: S

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

Stream Type (Circle One)scherennialor internations w/ perennial pools Stream Bends: No. Well Defined?; No. Modermely Defined.]: No. Foorly Defined. No. of Rifflet; L. Chantel Flow Status (circle one); high moderate low no flow Channel Obstructions/Modifications:

Riparian Vegenation (B.): Brubs La Grasses, Forby Cale Fields Other Latt Bank: Trees Shrubs Latterses, Forby Cale Fields Other Cale Right Bank: Trees Shrubs Latterses, Forby Cale Fields

Tree Canopy (%)	4/0		
Right Brosion Potential (%)	1,08.	% Gravel or Larger 15 %	% Instream Cover
Right Bark Stope	250		
Sustan Depths (m) at Points Actors Transact Thaiwag Depth;	0,51 0.55 0.56 044 1,10 1,14 0.85 0.42,960 0,19	Dominan Types Elgacian Vegrenifor 5 5% 7 Right Bank: 45.4 7 5% 5 5% 0	Datation Cover Types:
Bank Entsion Potential	10% 0.41	Dominant Substitute Type	Width of Natural Buffer Vegetation (m) LB: 720
Less Stope	,61	Cincle	ophytes
Stream Width (m)	15	Hibbin Type ( One) Rime Ri Gude Fest	Algae or Macr (Circle One) Abundant-Co Rare (Gisen)
Location of Traduct		TO THE	OK NE

The Canopy (%)	£1/5°	r Larger	Cover
A A	2000	% Onvel or Larger	S Instrum 40%
Right Bank Shope	0		
Stream Daysthe (m) at Polmas Acress Trensiect	0.08 015 030 0.25 030 038 022 020 034 004 043	Dominant Type  Left Bank: Types Ripardan Vegetation: 10%.0  Right Bank: 40% F 10%.0	at Buffer Instrum Cover Types:
Left Busk Erosion Potential	9,45	Dominant Subs	Width of Name Vegetation (m) LB 1/10 KB: -7
Left Bank Sigpe	3900	(Circle kun	crophyses
Stephen Widoh cond	4	Nabicar-Tops One) Kuffbri Glide Pool	Algae or Mac (Carle One) Abundant C Rare Aband
Location of Transect	000	15° 48 KILLY	STATE OF THE PERSON OF THE PER

Legiticism of Trumani	Species Wilds and	Left Beeck Sloos CO	Left Dark Evalue Perceital (2)	Shearn   Thinkwag Duyth:	Steam Depths (mp at Penist Across Thanson	State State Store	Right Book Propies Potential (%)	Canada
200	. An	430	(married)	DOM 0.55 049 4.48 0MY	CAMP 1.18 1.25 1.35 1.07 0.45	211	28.4	25/17
150m Co	Child Kent	Rom	Dominasi Sabarete Type  Grave 6		Left Bank: Types Rigardian Vegetation: 10% 5 10%		S Gravel or Larger	2 1/2
	Algar ochlo (Chels One) Albanigaet. Raje Clevit	heczęlytes sp. Communi	With of Namb Beffer Vegenation Ind US yealth >2.0	Duce	Уран		% Ligaroans Cover	
Lacation of Transco	Ness Sigh	Mark Mark Mark	Left Brock Crection Potential (18)	Storten Thelemag Dagali:	Storam Deprins (mil at Polisits Actions Themsect	Single Hand	Right Sunk Erssion Potential	Canapy (G)
DH	10m	26.	=	5 0.04	80 8:27 0 018 1.08 1.07 1.06 0M3	235	42%	3/12
35 m	200	Per FClacks Elkenn	Devoluted Substitute Type		2	Λ	% Gravel or Langer	
than Us	Alpe at No (Chair One) Absorbed Rangeling	Comme	Width of Named Buffer Vegetation and Law Mile > 2.0	Bracean Cover 7	None		% Instrum Control	
Location of Transport	Street Width Uni	A Section 1	Left Rank Engsjon Potennial	Stream Thubber Doads	Stream Daptis (hi) si Polini Acrosa Transsci	Tangara Salah Salah	Right Broth Expelon Population	Changy (%)
75	19w	35.	1,51	-	0.00 0,14 0,26 011 0.34 0.59 0.40 0.03	90	2,50	£1/1
Sh re		pe (Churia g Ross	Deminent Substitute Type  \$\int   \frac{1}{2}   \frac{1}{4}		Sole F (5%		S Grand or Large	
	Algas at Miscouligies (Clicke One) Absulgant, announ Rosz Attern)	Secretarion S		Haffer Jameson Cover Types 2.0 Octor C	Jabble Snow		Schangan Covin	
Location of Transact	Scena Wideli (m)	Sing.	Len Bonk Erosten Fotestial	Stream Thalwag Death:	Streets Depths (et.) at Points Assess Transact	Name And Section	Right Born Broslos Possicial (%)	Chespy (%)
20	1500	18	_	6	07 001 0,13 000 0,11 Did 0,07		49%	5/17
James Ames	2.5	A Kins	Domina Schape Type		Section Supracion (15%)		\$ Go-ut a Larpa 75 %	,
	Algae or Macrophysis iChrie Onei Absologg Paneman Rare Alascit.	Serophysis Summan	With of Manual Buffer Veganition (rtt) LB: RB: 7.2.0	Buffer Tourna Cover Types	Spar Gravel		St Ingivern Cover	

20/020/03

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

Part I - Stream Physical Characteristics Worksheet

Observers: Ju, A3 Date 7/11 Time: 11 Weather conditions:

Stream: Lan Location of site: 17845 Length of stream reach: 260m

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

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

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

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

crossine	Ob w upstreo		Location of Transect
Algae or Macrophytes (Circle One) Abundant Common Rare Absent	Habitat Type (Circle One) Riffie Run Glide Pool	ત્ર)	Stream Width (m)
rophytes	(Circle	S	Left Bank Slope (°)
Width of Natural Buffer Vegetation (m) LB; RB; >20	Dominant Substrate Type	300%	Left Bank Erosien Potential (%)
ıl Buffer	Substrate Type	0.0	
Instree			Thalweg Depth:
Instream Cover Types:	Dominant Types Riparian Vegetation: Left Bank: 30 tree 15 Shrwb 56 Farbes 16 Right Bank: 35 tree 10 Shrwb 50 Farbes 16	20	Stream Depths (n1) at Points Across Transect Back Sto Sto
D'	2000	0	Right Bank Slope
% Instream Cover	% Gravel or Larger	30%	Right Bank Erosion Potential (%)
	н	1	Tree Canopy (%)

Stream is out of bank

stream is out

Chossins

Algae or Macrophytes (Circle One) Abundant Common Rare Absent

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

Instream Cover Types:

2000

Some!

Warre'

STATE

% Instream Cover

% Gravel or Larger

80%

Right Bank:

down stream 512 a of road

Habitat Type (Circle One) Riffle Run Glitle Pool

Donunant Substrate Type

Dominant Types Riparian Vegetation: Left Bank: 0,5 6,7545

& bank

Location of Transect

Stream Width (m)

Left Bank Slope

Left Bank Erosion Potential (%)

6.19

Stream Depths (m) at Points Across Transect

Right Bank Slope

Right Bank Erosion Potential (%)

Tree Canopy (%)

stream out of bank streamout of bank stream is out or bank

I				Stream	w Drig	0	- banl	 57(80	MOUT	7	DANK	Stre	am 15	10 50	4 06 1
			Location of Transect	Same astar	50 M.	V51	Location of Transect	Moder Lassin	35 3	DO	Location of Transect	pilshowny ries		LU LU	Location of Transect
Algae or Macrophytes (Circle One) Abundant Common Rare Absent	Habitat Type (Circle One) Riffle Run Glide Pool		Stream Width (m)	Algae or Macrophytes (Circle One) Abundant Common Rare Absent	Habitat Type tCircle One) Riffic Run Glide Pool	16.5	Stream Width (m)	Algae or Macrophytes (Circle One) . Abundani Common Rure Absent	Habitat Typer(Circle One) Riffle Run Glide Pool	16	Stream Width (m)	Algae or Macrophytes (Circle One) Abundant Common Rure Absent	Habitat Type (Circle One) Riffle Run Clide Pool	ای	Stream Width (m)
enninon	(Circle Cun	1	Left Bank Slope	-	Rum	돐	Left Bank Slope	crophytes	tCircle Run	50	Left Bank Slope	crophytes Jonunon it	Rum	×18	Left Bank Slope (*)
Width of Natural Buffer Vegetation (m) LB: RB:	Dominant Substrate Type	100	Left Bank Erosion Potential	Width of Natural Buffer Vegetation (m) LB: RB:	Dominant Substrate Type	88	Left Bank Erosion Potential (%)	Width of Natural Buffer Vegetation (m) LB: RB:	Dominant Substrate Type	455	Left Bank Erosion Potential (%)	Width of Natural Buffer Vegetation (m) LB: RB:	Dominant Substrate Type	90.	Left Bank Erosion Potential (%)
Buffer	ate Type	William I	This	Buffer	rate Type		Thalw	Buffer	rate Type		Thalw	l Buffer	rate Type	of: 01.	O.43 Thalwe
Instream Cover Types:	Duninant Types Riparian Vegetation: Left Bank: Right Flank:	THE SAME	Stream Depths (m) at Points Across Transect	Instream Cover Types: Oxleinans ve	Dominant Types Riparian Vegetation: Left Bank: Right Bank:		Stream Depths (m) at Points Across Transect Thalweg Depth:	Instream Cover Types:	Dominant Types Riparian Vegetation: Left Bank: Right Bank:		Stream Depths (m) at Points Across Transect	Instream Cover Types: Modero, Stare Lobble	Domiumn Types Riparian Vegetation: Left Bank: Right Bank:	1.55,80,175, Lus 1.51, 33, 30, 121, 104	Stream Depths (m) at Points Across Transect Thatweg Depth:
	M	3	Right Bank Slope	T.	- - - - - - -	5	Right Bank Slope	27.5	75.	र्स	Right Bank Slope			U)	Right Bank Slope
% Insticam Cover	% Chavel or Larger	(%)	Right Bank Erosion Potential	% Instream Cover	% Gravel or Larger	85	Right Bank Brosion Potential	% Instrumn Cover	% Gravel or Larger	28	Right Bank Erosion Potential	% Instream Cover	% Gravel or Larger	GD .	Right Bank Erosion Potential
	4		Tree Camopy (%)		-	モジ	Tree Canopy (%)		N.	E/LE	Tree Canopy (%)		E	0	Tree Canopy (%)

# (2/26/03

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

Part I - Stream Physical Characteristics Worksheet

Stream Segment No .: Observed Stream Uses: New Aesthetics (circle one): (1) wilderness (2) natural (3) common (4) offensive Stream: LOOM Location of site: 18838 Length of stream reach: 250 m Observers: JW MB Date: 912 Ame: 3 Weather conditions: Comy

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

Riparian Vegetation (%):
Left Bank: Trees\_ Shrubs\_ Grasses, Forbs\_ Cult. Fields\_ Other\_
Right Bank: Trees\_ Shrubs\_ Grasses, Forbs\_ Cult. Fields\_ Other\_ Channel Obstructions/Modifications: \_\_\_\_No. of Riffles: \_\_ Channel Flow Status (circle one): high moderate low no flow

From low	m upstream		Location of Transect	
Algae or Macrophytes (Circle One) Abundant Common Rare Absent	Habitat Type (Circle One) Riffle Run Glide Pool	=	Stream Width (m)	
Common	e (Circle Run	30 30	Left Bank Slope (°)	
Width of Natural Buffer Vegetation (m) LB: RB:	Dominant Substrate Type	90	Left Bank Erosion Potential (%)	
l Buffer	rnte Type	03,	T	
Instream Cover Types:	Dominant Types Riparian Vegetation: Left Bank: 10 + 70 - 5 5 5 6 70 Right Bank: 10 - 70 - 5 5 10 8		Stream Depths (m) at Points Across Transect Thalweg Depth:	
overhans, Nes, Grave)	showb SUBribes 35 after	*10	Right Bank Slove (°)	
% Instream Cover	% Gravel or Larger	90	Right Bank Erosion Potential (%)	
H	1,000	4/17	Tree Canopy (%)	

5	Sm down	C gu	Location of Transect
Algae or Macrophytes (Circle One). Asyndant Common (Rare Absent	Habitat Type (Circle One) Riffle Run Glide Pool	13	Stream Width (m)
crophytes Common	Run	*	Left Bank Slope (*)
Width of Natural Buffer Vegetation (m) LB: RB:	Dominant Substrate Type	90	Left Bank Erosion Potential (%)
l Buffer	rate Type	10.	
Instrea		9P, PH.	0.40 Thalweg Depth:
Instream Cover Types: Slavel, coloble	Dominant Ty Left Bank: Right Bank:	90,90	Stream Depth
coloble	Dominant Types Riparian Vegetation: Left Bank: 75 1100 3 Right Bank: 85 1100	98.0	Stream Depths (m) at Points Across Transect
	regetation:	121,95	Across Tra
	61/60	188,	nsect
		0, 07	
		*36	Right Bank Slope
% Instream Cover	% Gravel or Larger	90	Right Bank Erosion Potential (%)
Д	ger.	0	Tree Canopy (%)

stream out of bank stream out of bank stream out of bank

		STER	WE WWD	70	+ par	VK	STre	arn Di	170	ot bain	K stre	ava Dv	t	ot ban
	Location of Transcet	tram U4	3		Location of Transect		other side of Lw	65m down	P)	Location of Transect		From LWC	02	Location of Transect
Hahini Type (Circle One) Kiffle Run Glide Pool  Algae or Macrophytes Almidant Common Rare Absent	Strenn) Width (m)	Algae or Macrophytes (Circle One) Abundant Common Rare Absent	Habitat Type-Circle One) Riffic Run Glide Pool		Stream Width (m)		Algae or Macrophytes (Circle One) . Admidant Common Rure Absent	Habitat Type (Circle One) Riffle Run Glide Pool	16	Sictom Width (m)	Algae or Macrophytes (Circle One) Abundant Common Rare Absent	Habint Type Circle One) Riffie Run Glide Pool	تو	Stream Width (m)
(Circle lun Stophytes	Left Bank Slope (")		A Chicke	0°	Left Bank Slope		crophytes	: (Circle Run	012	Left Bank Slope	Common	Run	() ()	Loft Bank Slope
Dominant Substrate Type  Dominant Substrate Type  Width of Natural Buffer  Vegetation (m)  LB: RB;	Left Bank Erosion Potential (%)	Width of Natural Buffer Vegetation (m) LB: RB:	Dominant Substrate Type	90	Left Bank Brosion Potential (%)		Width of Natural Buffer Vegetation (m) LB: O RB: O	Daminant Substrate Type	80	Left Bank Erosion Potential (%)	Width of Natural Buffer Vegetation (m) LB: RB: O	Dominant Substrate Type	. 03	Left Bank Erosion Potential (%)
inte Type   Buffer	Thalw	l Buffer	Type		Thalw		l Buffer	rate Type	LU 36.	0.8l	l Buffer	rate Type	op. 01.	O Thalwe
Instream (	Thalweg Depth:	Instream (			Thalweg Depth:		Instream		- رة رة	6 ( Thalweg Depth:	Instream		.88.	0.69 Thatweg Depth:
Dominant Types Riparian Vegetation: Left Bank: Right Bank: Instream Cover Types:	Stream Depths (m) at Points Across Transcet	Instream Cover Types: MALVO, ONE	Dominant Types Riparian Vegetation: Left Bank: 6 5 4745 5 477 Right Bank: 80 57855 26	1.351.31	Stream Depths (111) at Points Across Transect		Instream Cover Types: LOOD'SE,	Dominant Types Riparian Vegetation: Left Bank:	971,181,1181,1161,11	Stream Depths (m) at Points Across Transect	Instream Cover Types:	Dominum Types Riparian Vegetalion: Left Bank: 905/95/100	47/1,00,24/101,94	Stream Depths (m) at Points Across Transect
	nsect	boulder, snass	o other	1,15.87,12	ווצהכנ		Thrus , snays	other	,913 JJ ,02	nsect	Snass	OTEN	16 16 02	rsect .
	Right Bank Stope	7	30 04180	30	Right Bank Slope		S. S.		017	Right Bank Slope (^)			× ×	Right Bank Slope
% Chavel or Larger	Right Bank Erosion Potential (%)	% Instream Cover	% Gravel or Larger	90	Right Bank Erosion Potential		% Instrum Cover	% Gravel or Larger	0	Right Bank Erosion Potential (%)	% Instream Cover	% Gravel or Larger 75%	90	Right Bank Erosjon Potential (%)
e e	Tree Canopy (%)		Gt.		Tree Canopy (%)			GI.	1/17	Tree Canopy (%)		er	3117	Tree Canopy (%)

Part I - Stream Physical Characteristics Worksheet

and not complete

transects

Observers: Ju, 1848 Date: 4/2/17me: 164Weather conditions: Park Stream: Lean Location of site: 14146 Length of stream reach:

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

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

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

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

S. S. G. A. S. Instream Cover						1
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Instream Cover Types:	Width of Natural Buffer Vegetation (m) LB: RB:	ommon	(Circle One) Abundant Co		1
5 (5 other 5%	Right Bank: 5 tree 30 shr wb 60 Kra		4			
ss 15 atker % Gravel or Larger	Dominant Types Riparian Vegetation:	Dominant Substrate Type	One) Riffle Run Glide Pool	One) Ri Glide P		
5	0		4		フー	_
31 14	50 37 151 10 7 28 18 1	10 11 11 11				
	Thalweg Depth:		7/	Ţ		_
Right Right Bank Bank Erosion	Stream Depths (m) at Points Across Transect	Bank Erosion Potential	Bank	Width (m)	Transect	_
		Left	Left	Stream	Location of	•

		C	)	
				Transect
Algae or Macrophytes (Circle One). Abundant Common Rare Absent	Habitat Type (Circle One) Riffie Run Glitle Pool		2)	Width (m)
rophytes	(Circle	0.0	00	Left Bank Slope
Width of Natural Buffer Vegetation (m) LB: RB:	Dominant Substrate Type	00	27	Left Bank Erosion Potential (%)
l Buffer	Substrate Type	300	1	
		1 0%	Timing Dobin.	Tholwar
instream C	11 12	148	Solom.	
Instream Cover Types:	Dominant Typ Left Bank: Right Bank:	36.58		tream Dept
marro, antique	Dominant Types Riparian Vegetation: Left Bank: Right Bank:	. 20		Stream Depths (m) at Points Across Transect
240	an Vegetation:	17		oints Across
	on:	11:31		s Transect
grave)	2005 Sept 5			
2/00	25	101		
j.	2750	50	300	Right Bank Slone
% Instream Cover	% Gravel or Larger	Qb.	(%)	Right Bank Erosion
H	Set	1/7	(%)	Тree Сапору

B-29

		Location of Transect			Location of Transect			Location of Transect		. (	7,3	Location of Transect
Algae or Macrophytes (Circle One) Abundant Common Rare Absent	Habitat Type (Circle One) Riffle Run Glide Pool	Stream Width (m)	Algae or Macrophytes (Circle One) Abundant Common Rare Absent	Habitat Type (Circle One) Riffle Run Glide Pool	Stream Width (m)	Algae or Macrophytes (Circle One) . Abundant Common Rare Absent	Habitat Type (Circle One) Riffle Run Glide Pool	Stream Width (m)	Algae or Macrophytes (Circle One) Abundust Common Rare Absent	Habitat Type (Circle One) Ruffle Run Glide Pool	355	Stream Width (m)
crophytes Common	e (Circle Run	Left Hank Slope	crophytes	(Circle Run	Left Bank Slope (")	crophytes common	(Circle	Left Bank Slope	erophytes Common	(Circle Run	40	Left Bank Slope
Width of Natural Buffer Vugetation (m) LB: RB;	Dominant Substrate Type	Left Bank Erosion Potential (%)	Width of Natural Buffer Vegetation (m) LB: RB:	Dominant Substrate Type	Left Bank Exosion Potential (%)	Width of Natural Buffer Vegetation (m) LB: RB:	Dominant Substrate Type	Left Bank Erosion Potential (%)	Width of Natural Buffer Vegetation (m) LB: RB:	Dominant Substrate Type	112	Lest Bank Erosion Potential (%)
l Buffer	гате Туре		Buffer	into Type		Buffer	сана Туре		Buffer X31-1	ate Type		Th
Instream		Thalweg Depth:	Instream		Thalweg Depth:	Instream		Thalweg Depth:	Instrum			Thalweg Depth:
Instream Cover Types:	Dominant Types Riparian Vegetation: Left Bank: Right Bank:	Stream Depths (m) at Points Across Transcet	Instream Cover Types:	Dominant Types Riparian Vegetation: Left Bank: Right Bank:	Stream Depths (m) at Points Across Transect	Instream Cover Types:	Dominant Types Ripation Vegetation: Left Bank: Right Bank:	Stream Depths (m) at Points Across Transcer	Instrant Cover Types:	Dominant Types Riparian Vegetation: Left Bank: Right Bank:		Stream Depths (m) at Points Across Transect
	s Riparian Vo	(m) at Points		s Riparian Ve	(m) at Points		s Riparian Ve	(m) at Points		s Ripatian Vc	7.0	m) at Paints A
2	ogetation:	Across Transc		getation:	Across Transe		getation:	Across Transco		getation:	SIL,00.5	Veross Transec
								2		20 E	15 ,61	
										253	. 45	I I I I I I I I I I I I I I I I I I I
		Right Bank Slope			Right Bank Slope			Right Bank Slope (*)		50 Sp.	Ö	Right Bank Slope
% Instream Cover	% Gravel or Larger	Right Bank Erosion Potential (%)	% Instream Cover	% Gravel or Larger	Right Bank Prosion Potential (%)	% Instream Cover	% Gravel or Larger	Right Bank Erosion Potential (%)	% Instream Cover	% Gravel or Larger	90	Right Bank Erosion Potential (%)
ei.	ger.	Tree Canopy (%)	31	ger	Tree Canopy (%)		šet	Tree Canopy (%)		ici	570	Tree Canopy (%)

### HABITAT ASSESSMENT



Stream name	Leon 12845
Date of assessment	9/24/2002
Stream bed slope over evaluated reach	0.0035
Approximate drainage area above transect furthest downstream	492km²
Stream order	3
Length of stream evaluated	260m
Number of lateral transects made	5
Average stream width	8.80m
Average stream depth	1.23m
Instantaneous flow	5.94 ft <sup>3</sup> /sec
Indicate flow measurement method	Current Meter
Channel flow status	High
Maximum pool width	5m
Maximum pool depth	>1m
Total number of stream bends	1
Number of well defined bends  Number of moderately defined bends	0
Number of poorly defined bends	1
Total number of riffles	2
Dominant substrate type	Gravel
Average percent of substrate gravel sized or larger	88%
Average percent instream cover	51%
Number of stream cover types	7
Average percent stream bank erosion potential	52%
Average stream bank slope	57°
Average width of vegetative buffer	12m
Average riparian vegetation percent composition by: Trees Shrubs Grasses/Forbes Cultivated Fields Other	15.50% 5.50% 36%
Average percent tree canopy coverage	12%
Overall aesthetic appraisal of stream	Common

Stream name	Leon 12838
Date of assessment	9/24/2002
Stream bed slope over evaluated reach	0.0012
Approximate drainage area above transect furthest downstream	536km²
Stream order	3
Length of stream evaluated	250m
Number of lateral transects made	5
Average stream width	9.22m
Average stream depth	0.91m
Instantaneous flow	19.2 ft <sup>3</sup> /sec
Indicate flow measurement method	Current Meter
Channel flow status	Moderate
Maximum pool width	10m
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
Total number of riffles	0
Dominant substrate type	Sand
Average percent of substrate gravel sized or larger	42%
Average percent instream cover	18%
Number of stream cover types	6
Average percent stream bank erosion potential	83%
Average stream bank slope	50°
Average width of vegetative buffer	15m
Average riparian vegetation percent composition by:	
Trees Shrubs	6%
Grasses/Forbes	<u>1%</u> 36%
Cultivated Fields	3070
Other	57%
Average percent tree canopy coverage	35%
Overall aesthetic appraisal of stream	Common

Stream name	Leon 14198
Date of assessment	9/25/2002
Stream bed slope over evaluated reach	0.0024
Approximate drainage area above transect furthest downstream	611km²
Stream order	3
Length of stream evaluated	375m
Number of lateral transects made	6
Average stream width	10.39m
Average stream depth	0.78m
Instantaneous flow	26.78 ft <sup>3</sup> /sec
Indicate flow measurement method	Current Meter
Channel flow status	High
Maximum pool width	8m
Maximum pool depth	>1m
Total number of stream bends	2
Number of well defined bends	0
Number of moderately defined bends  Number of poorly defined bends	2
Total number of riffles	1
Dominant substrate type	Silt
Average percent of substrate gravel sized or larger	32%
Average percent instream cover	16%
Number of stream cover types	5
Average percent stream bank erosion potential	83%
Average stream bank slope	54°
Average width of vegetative buffer	>20m
Average riparian vegetation percent composition by:	
Trees Shrubs	17% 
Grasses/Forbes	42%
Cultivated Fields	
Other	38%
Average percent tree canopy coverage	16%
Overall aesthetic appraisal of stream	Natural

Date of assessment         3/31/2003           Stream bed slope over evaluated reach         0.0035           Approximate drainage area above transect furthest downstream         492km²           Stream order         3           Length of stream evaluated         260m           Number of lateral transects made         5           Average stream width         15.8m           Average stream depth         .090m           Indicate flow measurement method         Current Meter           Channel flow status         Moderate           Maximum pool width         19m           Maximum pool depth         >1m           Total number of stream bends         1           Number of well defined bends         0           Number of well defined bends         0           Number of moderately defined bends         0           Number of infiles         2           Dominant substrate type         Cobble           Average percent of substrate gravel sized or larger         77%           Average percent instream cover         27%           Number of stream cover types         7           Average percent stream bank erosion potential         48%           Average width of vegetative buffer         12m           Average ripa	Stream name	Leon 12845
Approximate drainage area above transect furthest downstream         492km²           Stream order         3           Length of stream evaluated         260m           Number of lateral transects made         5           Average stream width         15.8m           Average stream depth         .090m           Instantaneous flow         Indicate flow measurement method         Current Meter           Channel flow status         Moderate           Maximum pool width         19m           Maximum pool width         19m           Maximum pool depth         1           Total number of stream bends         0           Number of well defined bends         0           Number of moderately defined bends         0           Number of poorly defined bends         0           Number of poorly defined bends         1           Total number of riffles         2           Dominant substrate type         Cobble           Average percent of substrate gravel sized or larger         77%           Average percent instream cover         27%           Number of stream cover types         7           Average percent stream bank erosion potential         48%           Average riparian vegetative buffer         12m	Date of assessment	3/31/2003
Stream order         3           Length of stream evaluated         260m           Number of lateral transects made         5           Average stream width         15.8m           Average stream depth         .090m           Instantaneous flow	Stream bed slope over evaluated reach	0.0035
Length of stream evaluated         260m           Number of lateral transects made         5           Average stream width         15.8m           Average stream depth         .090m           Instantaneous flow         Indicate flow measurement method           Channel flow status         Moderate           Maximum pool width         19m           Maximum pool depth         >1m           Total number of stream bends         1           Number of well defined bends         0           Number of moderately defined bends         0           Number of poorly defined bends         1           Total number of riffles         2           Dominant substrate type         Cobble           Average percent of substrate gravel sized or larger         77%           Average percent instream cover         27%           Number of stream cover types         7           Average percent stream bank erosion potential         48%           Average width of vegetative buffer         12m           Average riparian vegetation percent composition by:         Trees           Shrubs         2.00%           Grasses/Forbes         29%           Cultivated Fields         00%           Other         60%	Approximate drainage area above transect furthest downstream	492km²
Number of lateral transects made         5           Average stream width         15.8m           Average stream depth         .090m           Instantaneous flow         .090m           Indicate flow measurement method         Current Meter           Channel flow status         Moderate           Maximum pool width         19m           Maximum pool depth         >1m           Total number of stream bends         1           Number of well defined bends         0           Number of moderately defined bends         0           Number of poorly defined bends         0           Number of oporly defined bends         1           Total number of riffles         2           Dominant substrate type         Cobble           Average percent of substrate gravel sized or larger         77%           Average percent instream cover         27%           Number of stream cover types         7           Average percent stream bank erosion potential         48%           Average width of vegetative buffer         12m           Average width of vegetative buffer         12m           Average riparian vegetation percent composition by:         17           Trees         9.00%           Shrubs         2.00%	Stream order	3
Average stream width         15.8m           Average stream depth         .090m           Instantaneous flow         Current Meter           Channel flow status         Moderate           Maximum pool width         19m           Maximum pool depth         >1m           Total number of stream bends         1           Number of well defined bends         0           Number of moderately defined bends         0           Number of poorly defined bends         1           Total number of riffles         2           Dominant substrate type         Cobble           Average percent of substrate gravel sized or larger         77%           Average percent instream cover         27%           Number of stream cover types         7           Average percent stream bank erosion potential         48%           Average width of vegetative buffer         12m           Average riparian vegetation percent composition by:         Trees           Shrubs         2.00%           Grasses/Forbes         2.00%           Cultivated Fields         00%           Other         60%           Average percent tree canopy coverage         1%	Length of stream evaluated	260m
Average stream depth         .090m           Instantaneous flow         Current Meter           Channel flow status         Moderate           Maximum pool width         19m           Maximum pool depth         >1m           Total number of stream bends         1           Number of well defined bends         0           Number of moderately defined bends         0           Number of poorly defined bends         1           Total number of riffles         2           Dominant substrate type         Cobble           Average percent of substrate gravel sized or larger         77%           Average percent instream cover         27%           Number of stream cover types         7           Average percent stream bank erosion potential         48%           Average width of vegetative buffer         12m           Average width of vegetative buffer         12m           Average riparian vegetation percent composition by:         7           Trees         9.00%           Shrubs         2.00%           Grasses/Forbes         2.9%           Cultivated Fields         60%           Other         60%	Number of lateral transects made	5
Instantaneous flow Indicate flow measurement method Channel flow status Moderate  Maximum pool width 19m  Maximum pool depth	Average stream width	15.8m
Indicate flow measurement method  Channel flow status  Maximum pool width  19m  Maximum pool depth  Total number of stream bends  Number of well defined bends  Number of moderately defined bends  Number of poorly defined bends  Number of poorly defined bends  Total number of riffles  2 Dominant substrate type  Cobble  Average percent of substrate gravel sized or larger  Average percent instream cover  Number of stream cover types  Average stream bank erosion potential  Average width of vegetative buffer  Average riparian vegetation percent composition by:  Trees  Shrubs  Grasses/Forbes  Cultivated Fields  Other  Average percent tree canopy coverage  1%  Current Meter  Moderate  Moderate  Moderate  Moderate  Moderate  Moderate  Moderate  Algem  Adverage tream bends  1  1  Average  1  Moderate  Moderate  Moderate  Average  1  Moderate  Average  Average percent of substrate gravel sized or larger  7  Average pricent stream cover  1  Average stream bank erosion potential  4  48%  Average riparian vegetative buffer  1  2  Average riparian vegetation percent composition by:  Trees  Shrubs  Grasses/Forbes  Cultivated Fields  Other  60%	Average stream depth	.090m
Channel flow status         Moderate           Maximum pool width         19m           Maximum pool depth         >1m           Total number of stream bends         1           Number of well defined bends         0           Number of moderately defined bends         0           Number of poorly defined bends         1           Total number of riffles         2           Dominant substrate type         Cobble           Average percent of substrate gravel sized or larger         77%           Average percent instream cover         27%           Number of stream cover types         7           Average percent stream bank erosion potential         48%           Average width of vegetative buffer         12m           Average riparian vegetation percent composition by:         12m           Trees         9.00%           Shrubs         2.00%           Grasses/Forbes         2.9%           Cultivated Fields         60%           Other         60%           Average percent tree canopy coverage         11%	Instantaneous flow	
Maximum pool width         19m           Maximum pool depth         >1m           Total number of stream bends         1           Number of well defined bends         0           Number of moderately defined bends         0           Number of poorly defined bends         1           Total number of riffles         2           Dominant substrate type         Cobble           Average percent of substrate gravel sized or larger         77%           Average percent instream cover         27%           Number of stream cover types         7           Average percent stream bank erosion potential         48%           Average stream bank slope         34°           Average riparian vegetative buffer         12m           Average riparian vegetation percent composition by:         9.00%           Trees         9.00%           Shrubs         2.00%           Grasses/Forbes         2.9%           Cultivated Fields         00           Other         60%           Average percent tree canopy coverage         1%	Indicate flow measurement method	Current Meter
Maximum pool depth>1mTotal number of stream bends1Number of well defined bends Number of moderately defined bends Number of poorly defined bends0Number of poorly defined bends1Total number of riffles2Dominant substrate typeCobbleAverage percent of substrate gravel sized or larger77%Average percent instream cover27%Number of stream cover types7Average percent stream bank erosion potential48%Average stream bank slope34°Average width of vegetative buffer12mAverage riparian vegetation percent composition by:9.00%Trees Shrubs Grasses/Forbes Cultivated Fields Other29%Cultivated Fields Other60%Average percent tree canopy coverage1%	Channel flow status	Moderate
Total number of stream bends  Number of well defined bends Number of moderately defined bends Number of poorly defined bends Number of poorly defined bends  Total number of riffles  2  Dominant substrate type  Cobble  Average percent of substrate gravel sized or larger  Average percent instream cover  27%  Number of stream cover types  7  Average percent stream bank erosion potential  Average stream bank slope  Average width of vegetative buffer  Average riparian vegetation percent composition by:  Trees Shrubs Grasses/Forbes Cultivated Fields Other  Average percent tree canopy coverage  1%	Maximum pool width	19m
Number of well defined bends Number of moderately defined bends Number of poorly defined bends 1  Total number of riffles 2  Dominant substrate type Cobble  Average percent of substrate gravel sized or larger Average percent instream cover 27%  Number of stream cover types 7  Average percent stream bank erosion potential 48%  Average stream bank slope 34°  Average width of vegetative buffer 12m  Average riparian vegetation percent composition by: Trees Shrubs Grasses/Forbes Cultivated Fields Other  Average percent tree canopy coverage 1%	Maximum pool depth	>1m
Number of moderately defined bends Number of poorly defined bends 1  Total number of riffles 2  Dominant substrate type Average percent of substrate gravel sized or larger Average percent instream cover  Number of stream cover types 7  Average percent stream bank erosion potential Average stream bank slope Average width of vegetative buffer Average riparian vegetation percent composition by:  Trees Shrubs Grasses/Forbes Cultivated Fields Other  Average percent tree canopy coverage 1%	Total number of stream bends	1
Total number of riffles  Dominant substrate type  Average percent of substrate gravel sized or larger  Average percent instream cover  27%  Number of stream cover types  7  Average percent stream bank erosion potential  48%  Average stream bank slope  34°  Average width of vegetative buffer  12m  Average riparian vegetation percent composition by:  Trees  Shrubs  Grasses/Forbes  Cultivated Fields  Other  Average percent tree canopy coverage  1%	Number of moderately defined bends	0
Average percent of substrate gravel sized or larger  Average percent instream cover  Number of stream cover types  7  Average percent stream bank erosion potential  Average stream bank slope  34°  Average width of vegetative buffer  12m  Average riparian vegetation percent composition by:  Trees  Shrubs  Grasses/Forbes  Cultivated Fields Other  Average percent tree canopy coverage  1%		2
Average percent of substrate gravel sized or larger  Average percent instream cover  Number of stream cover types  7  Average percent stream bank erosion potential  Average stream bank slope  34°  Average width of vegetative buffer  12m  Average riparian vegetation percent composition by:  Trees  Shrubs  Grasses/Forbes  Cultivated Fields Other  Average percent tree canopy coverage  1%	Dominant substrate type	Cobble
Average percent instream cover  Number of stream cover types  7  Average percent stream bank erosion potential  48%  Average stream bank slope  34°  Average width of vegetative buffer  12m  Average riparian vegetation percent composition by:  Trees  Shrubs  Grasses/Forbes  Cultivated Fields Other  Average percent tree canopy coverage  1%		
Average percent stream bank erosion potential 48%  Average stream bank slope 34°  Average width of vegetative buffer 12m  Average riparian vegetation percent composition by:  Trees 9.00% Shrubs 2.00% Grasses/Forbes 29% Cultivated Fields Other 60%  Average percent tree canopy coverage 1%		27%
Average percent stream bank erosion potential 48%  Average stream bank slope 34°  Average width of vegetative buffer 12m  Average riparian vegetation percent composition by:  Trees 9.00% Shrubs 2.00% Grasses/Forbes 29% Cultivated Fields Other 60%  Average percent tree canopy coverage 1%	Number of stream cover types	7
Average width of vegetative buffer 12m  Average riparian vegetation percent composition by:  Trees 9.00% Shrubs 2.00% Grasses/Forbes 29% Cultivated Fields Other 60%  Average percent tree canopy coverage 1%		48%
Average riparian vegetation percent composition by:  Trees 9.00% Shrubs 2.00% Grasses/Forbes 29% Cultivated Fields Other 60%  Average percent tree canopy coverage 1%	Average stream bank slope	34°
Trees         9.00%           Shrubs         2.00%           Grasses/Forbes         29%           Cultivated Fields         60%           Average percent tree canopy coverage         1%	Average width of vegetative buffer	12m
Average percent tree canopy coverage 1%	Trees Shrubs Grasses/Forbes Cultivated Fields	2.00% 29%
		-
	Overall aesthetic appraisal of stream	

Stream name	Leon 12838
Date of assessment	3/31/2003
Stream bed slope over evaluated reach	0.0012
Approximate drainage area above transect furthest downstream	536km²
Stream order	3
Length of stream evaluated	250m
Number of lateral transects made	5
Average stream width	9.16m
Average stream depth	0.72m
Instantaneous flow	
Indicate flow measurement method	Current Meter
Channel flow status	Moderate
Maximum pool width	16m
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	0
Dominant substrate type	Gravel
Average percent of substrate gravel sized or larger	50%
Average percent instream cover	6%
Number of stream cover types	6
Average percent stream bank erosion potential	71%
Average stream bank slope	45°
Average width of vegetative buffer	15m
Average riparian vegetation percent composition by:	
Trees Shrubs	5% 1%
Grasses/Forbes	66%
Cultivated Fields	
Other	18%
Average percent tree canopy coverage	29%
Overall aesthetic appraisal of stream	Common

Stream name	Leon 14198
Date of assessment	4/1/2003
Stream bed slope over evaluated reach	0.0024
Approximate drainage area above transect furthest downstream	611km²
Stream order	3
Length of stream evaluated	375m
Number of lateral transects made	6
Average stream width	12.2m
Average stream depth	0.49m
Instantaneous flow	
Indicate flow measurement method	Current Meter
Channel flow status	High
Maximum pool width	15m
Maximum pool depth	>1m
Total number of stream bends	2
Number of well defined bends Number of moderately defined bends Number of poorly defined bends	0 1 1
Total number of riffles	2
Dominant substrate type	Silt
Average percent of substrate gravel sized or larger	50%
Average percent instream cover	18%
Number of stream cover types	4
Average percent stream bank erosion potential	88%
Average stream bank slope	41°
Average width of vegetative buffer	>20m
Average riparian vegetation percent composition by: Trees Shrubs Grasses/Forbes Cultivated Fields Other	8% 2% 73%
Average percent tree canopy coverage	16%
Overall aesthetic appraisal of stream	Natural

Stream name	Leon 12845
Date of assessment	9/21/2003
Stream bed slope over evaluated reach	0.0035
Approximate drainage area above transect furthest downstream	492km²
Stream order	3
Length of stream evaluated	260m
Number of lateral transects made	5
Average stream width	14.8m
Average stream depth	0.31
Instantaneous flow	
Indicate flow measurement method	Current Meter
Channel flow status	High
Maximum pool width	20m
Maximum pool depth	>2m
Total number of stream bends	1
Number of well defined bends	0
Number of moderately defined bends  Number of poorly defined bends	<u> </u>
Total number of riffles	
Dominant substrate type	Gravel
Average percent of substrate gravel sized or larger	76%
Average percent instream cover	29%
Number of stream cover types	7
Average percent stream bank erosion potential	87%
Average stream bank slope	27
Average width of vegetative buffer	15m
Average riparian vegetation percent composition by:	
Trees	13.00%
Shrubs Grasses/Forbes	8.00% 70%
Cultivated Fields	
Other	9%
Average percent tree canopy coverage	38%
Overall aesthetic appraisal of stream  **Stream out of banks	Common

Stream name	Leon 12838
Date of assessment	9/21/2003
Stream bed slope over evaluated reach	0.0012
Approximate drainage area above transect furthest downstream	536km²
Stream order	3
Length of stream evaluated	250m
Number of lateral transects made	5
Average stream width	12.6m
Average stream depth	0.73m
Instantaneous flow	
Indicate flow measurement method	Current Meter
Channel flow status	High
Maximum pool width	16m
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	<u> </u>
Total number of riffles	1
Dominant substrate type	Silt
Average percent of substrate gravel sized or larger	42%
Average percent instream cover	16%
Number of stream cover types	8
Average percent stream bank erosion potential	80%
Average stream bank slope	33
Average width of vegetative buffer	10m
Average riparian vegetation percent composition by: Trees Shrubs Grasses/Forbes Cultivated Fields	2% 1% 65%
Other	31%
Average percent tree canopy coverage	11%
Overall aesthetic appraisal of stream  **Stream out of banks	Common

Stream name	Leon 14198
Date of assessment	9/20/2003
Stream bed slope over evaluated reach	0.0024
Approximate drainage area above transect furthest downstream	611km²
Stream order	3
Length of stream evaluated	150m (heavy rain, rising water)
Number of lateral transects made	3 (heavy rain, rising water)
Average stream width	11.3m
Average stream depth	0.54m
Instantaneous flow	
Indicate flow measurement method	Current Meter
Channel flow status	High
Maximum pool width	14m
Maximum pool depth	>1m
Total number of stream bends	2
Number of well defined bends  Number of moderately defined bends  Number of poorly defined bends	0 1 1
Total number of riffles	1
Dominant substrate type	Cobble
Average percent of substrate gravel sized or larger	48%
Average percent instream cover	30%
Number of stream cover types	6
Average percent stream bank erosion potential	80%
Average stream bank slope	53
Average width of vegetative buffer	>20m
Average riparian vegetation percent composition by:  Trees Shrubs Grasses/Forbes Cultivated Fields Other	13% 17% 52% 18%
Average percent tree canopy coverage	2%
Overall aesthetic appraisal of stream	Natural
**Stream out of banks (3 transacts completed due to safety concerns of rising water)	

<sup>\*\*</sup>Stream out of banks (3 transects completed due to safety concerns of rising water)

### HABITAT ASSESSMENT



Habitat Parameter	Scoring Category		Location: 12845	Date: 9/24/02
Available Instream Cover	Abundant	Common	Rare	Absent
	>50% of substrate favorable	30-50% of substrate supports	10-29.9% of substrate	<10% of substrate supports
	for colonization and fish cover;	a stable habitat; adequate	supports stable habitat;	stable habitat; lack of
	good mix of several stable	habitat for maintenance of	habitat availability less than	habitat is obvious; substrate
	(not new fall or transient)	populations; may be limited in	desirable; substrate	unstable or lacking
	cover types such as snags,	the number of different habitat	frequently disturbed or	3
	cobble, undercut banks,	types	removed	
	macrophytes	7,7		
	I add op 11, 100			
Score: 4	4	3	2	1
Bottom Substrate Stability	Stable	Moderately Stable	Moderately Unstable	Unstable
	>50% gravel or larger	30-50% gravel or larger	10-29.9% gravel or larger	<10% gravel or larger
	substrate, i.e., gravel, cobble,	substrate; dominant substrate	substrate; dominant	substrate; substrate is
	boulders; dominant substrate	type is mix of gravel with some	substrate type is finer than	uniform sand, silt, clay, or
	type is gravel or larger	finer sediments	gravel, but may still be in mix	bedrock
			of sizes	
Score: 4	4	3	2	1
Number of Riffles	Abundant	Common	Rare	Absent
To be counted, riffles must extend	≥5 riffles	2-4 riffles	1 riffle	No riffles
>50% the width of the channel and be				
at least as long as the channel width				
-				
Score: 3	4	3	2	1
Dimensions of Largest Pool	Large	Moderate	Small	Absent
	Pool covers more than 50% of	Pool covers approximately	Pool covers approximately	No existing pools; only
	the channel width; maximum	50% or slightly less than the	25% of the channel width;	shallow auxillary pockets
	depth is > 1m	channel width; maximum depth	maximum depth is <0.5	, .
	·	is 0.5-1 meter	meter .	
Score: 3	3	2	1	0
Channel Flow Status	High	Moderate	Low	No Flow
	Water reaches the base of	Water fills <75% of the	Water fills 25-75% of the	Very little water in the
	both the lower banks; <5% of	channel; or <25% of channel	available channel and/or	channel and mostly present
	channel substrate is exposed	substrate is exposed	riffle substrates are mostly	in standing pools; or stream
		,	exposed	is dry
Score: 3	3	2	1	0
Bank Stability	Stable	Moderately Stable	Moderately Unstable	Unstable
	Little evidence (<10%) of	Some evidence (10-29.9%) of	Evidence of erosion bank	Large and frequent
	erosion bank failure; bank	erosion or bank failure; small	failure is common (30-50%);	evidence (>50%) of erosion
	angles average <30°	areas of erosion mostly healed	high potential of erosion	or bank failure; raw areas
		over; bank angles average 30-	during flooding; bank angles	frequent along steep banks;
		39.9°	average 40-60°	bank angles average >60°
				a a margine and a grant a consideration
Score: 0	3	2	1	0
Channel Sinuosity	High	Moderate	Low	None
	≥2 well-defined bends with	1 well-defined bend OR ≥3	<3 moderately-defined	Straight channel; may be
	deep outside areas (cut	moderately-defined bends	bends OR only poorly-	channelized
	banks) and shallow inside	present	defined bends present	
	areas (point bars) are present	•		
	, , , , , , , , , , , , , , , , , , , ,			
Score: 1	3	2	1	0
Riparian Buffer Vegetation	Extensive	Wide	Moderate	Narrow
_	Width of natural buffer is >20	Width of natural buffer is 10.1-	Width of natural buffer is 5-	Width of natural buffer is <5
	meters	20 meters	10 meters	meters
Score: 2	3	2	1	0
	Wilderness	Natural Area	Common Setting	Offensive
Aesthetics of Reach	Wildelliess		Not offensive; area is	Stream does not enhance
Aesthetics of Reach	Outstanding natural beauty;	Tree and/or native vegetation	riot offeriolive, area is	
Aesthetics of Reach	Outstanding natural beauty;	<u> </u>	The state of the s	the aesthetics of the area;
Aesthetics of Reach	Outstanding natural beauty; usually wooded or unpastured	common; some development	developed, but uncluttered	the aesthetics of the area;
Aesthetics of Reach	Outstanding natural beauty; usually wooded or unpastured area; water clarity is usually	common; some development evident (from fields, pastures,	developed, but uncluttered such as in an urban park;	the aesthetics of the area; cluttered; highly developed;
Aesthetics of Reach	Outstanding natural beauty; usually wooded or unpastured	common; some development evident (from fields, pastures, dwellings); water clarity may be	developed, but uncluttered such as in an urban park; water clarity may be turbid or	the aesthetics of the area; cluttered; highly developed; may be a dumping area;
Aesthetics of Reach	Outstanding natural beauty; usually wooded or unpastured area; water clarity is usually	common; some development evident (from fields, pastures,	developed, but uncluttered such as in an urban park;	the aesthetics of the area; cluttered; highly developed; may be a dumping area; water clarity is usually turbid
Aesthetics of Reach	Outstanding natural beauty; usually wooded or unpastured area; water clarity is usually	common; some development evident (from fields, pastures, dwellings); water clarity may be	developed, but uncluttered such as in an urban park; water clarity may be turbid or	the aesthetics of the area; cluttered; highly developed; may be a dumping area;
Aesthetics of Reach  Score: 1	Outstanding natural beauty; usually wooded or unpastured area; water clarity is usually	common; some development evident (from fields, pastures, dwellings); water clarity may be	developed, but uncluttered such as in an urban park; water clarity may be turbid or	the aesthetics of the area; cluttered; highly developed; may be a dumping area; water clarity is usually turbid

Habitat Barameter	Scoring Catagony		Location: 12020	Data: 0/24/02
Habitat Parameter	Scoring Category	Common	Location: 12838	Date: 9/24/02
Available Instream Cover	Abundant	Common	Rare	Absent
	>50% of substrate favorable	30-50% of substrate supports	10-29.9% of substrate	<10% of substrate supports
	for colonization and fish cover;	a stable habitat; adequate	supports stable habitat;	stable habitat; lack of
	good mix of several stable	habitat for maintenance of	habitat availability less than	habitat is obvious; substrate
	(not new fall or transient)	populations; may be limited in	desirable; substrate	unstable or lacking
	cover types such as snags,	the number of different habitat	frequently disturbed or	· ·
	cobble, undercut banks,	types	removed	
	macrophytes	1,000		
	macrophytes			
Score: 2	4	3	2	1
Bottom Substrate Stability	Stable	Moderately Stable	Moderately Unstable	Unstable
	>50% gravel or larger	30-50% gravel or larger	10-29.9% gravel or larger	<10% gravel or larger
	substrate, i.e., gravel, cobble,	substrate; dominant substrate	substrate; dominant	substrate; substrate is
		,		uniform sand, silt, clay, or
	boulders; dominant substrate	type is mix of gravel with some		
	type is gravel or larger	finer sediments	gravel, but may still be in mix	bedrock
2		•	of sizes	4
Score: 3	4	3	2	1
Number of Riffles	Abundant	Common	Rare	Absent
Γο be counted, riffles must extend	≥5 riffles	2-4 riffles	1 riffle	No riffles
>50% the width of the channel and				
be at least as long as the channel				
width				
Score: 1	4	3	2	1
Dimensions of Largest Pool	Large	Moderate	Small	Absent
- ···· - · · · · · · · · · · · · · · ·	Pool covers more than 50% of		Pool covers approximately	No existing pools; only
				01 , ,
	the channel width; maximum	50% or slightly less than the	25% of the channel width;	shallow auxillary pockets
	depth is > 1m	channel width; maximum depth	· ·	
_	_	is 0.5-1 meter	meter	_
Score: 3	3	2	1	0
Channel Flow Status	High	Moderate	Low	No Flow
	Water reaches the base of	Water fills <75% of the	Water fills 25-75% of the	Very little water in the
	both the lower banks; <5% of	channel; or <25% of channel	available channel and/or	channel and mostly present
	channel substrate is exposed	substrate is exposed	riffle substrates are mostly	in standing pools; or stream
		, and the second	exposed	is dry
Score: 2	3	2	1	0
Bank Stability	Stable	Moderately Stable	Moderately Unstable	Unstable
<b>,</b>	Little evidence (<10%) of	Some evidence (10-29.9%) of	Evidence of erosion bank	Large and frequent
	erosion bank failure; bank	erosion or bank failure; small		evidence (>50%) of erosion
	-		, , , , , , , , , , , , , , , , , , , ,	` ,
	angles average <30°	-	high potential of erosion	or bank failure; raw areas
		over; bank angles average 30-		frequent along steep banks
		39.9°	average 40-60°	bank angles average >60°
Score: 0	3	2	1	0
Channel Sinuosity	High	Moderate	Low	None
	≥2 well-defined bends with	1 well-defined bend OR ≥3	<3 moderately-defined	Straight channel; may be
	deep outside areas (cut	moderately-defined bends	bends OR only poorly-	channelized
	banks) and shallow inside	present	defined bends present	
		present	defined bends present	
	areas (point bars) are present			
Score: 1	3	2	1	0
Score: 1			•	
Riparian Buffer Vegetation	Extensive	Wide	Moderate	Narrow
	Width of natural buffer is >20	Width of natural buffer is 10.1-	Width of natural buffer is 5-	Width of natural buffer is <5
	meters	20 meters	10 meters	meters
Score: 2	3	2	1	0
Aesthetics of Reach	Wilderness	Natural Area	Common Setting	Offensive
	Outstanding natural beauty;	Tree and/or native vegetation	Not offensive; area is	Stream does not enhance
	usually wooded or unpastured		developed, but uncluttered	the aesthetics of the area;
	area; water clarity is usually	evident (from fields, pastures,	such as in an urban park;	cluttered; highly developed:
	exceptional	dwellings); water clarity may be		
		slightly turbid	discolored	water clarity is usually turbic
				or discolored
	1	Ī	1	
Score: 1	3 INTERMEDIATE	2	1	0

Habitat Parameter	Scoring Category		Location: 14198	Date: 9/25/02
Available Instream Cover	Abundant	Common	Rare	Absent
	>50% of substrate favorable	30-50% of substrate supports	10-29.9% of substrate	<10% of substrate supports
	for colonization and fish cover;	a stable habitat; adequate	supports stable habitat;	stable habitat; lack of
	good mix of several stable	habitat for maintenance of	habitat availability less than	habitat is obvious: substrate
	(not new fall or transient)	populations; may be limited in	desirable; substrate	unstable or lacking
	cover types such as snags,		frequently disturbed or	unstable of lacking
	,,		removed	
	cobble, undercut banks,	types	removed	
	macrophytes			
Score: 2	4	3	2	1
Bottom Substrate Stability	Stable	Moderately Stable	Moderately Unstable	Unstable
Bottom Substrate Stability		_	<u> </u>	
	>50% gravel or larger	30-50% gravel or larger	10-29.9% gravel or larger	<10% gravel or larger
	substrate, i.e., gravel, cobble,	substrate; dominant substrate	substrate; dominant	substrate; substrate is
	boulders; dominant substrate	type is mix of gravel with some		uniform sand, silt, clay, or
	type is gravel or larger	finer sediments	gravel, but may still be in mix	bedrock
			of sizes	
Score: 3	4	3	2	1
Number of Riffles	Abundant	Common	Rare	Absent
To be counted, riffles must extend	≥5 riffles	2-4 riffles	1 riffle	No riffles
>50% the width of the channel and				
be at least as long as the channel				
width				
Score: 2	4	3	2	1
Dimensions of Largest Pool	Large	Moderate	Small	Absent
· ·	Pool covers more than 50% of	Pool covers approximately	Pool covers approximately	No existing pools; only
	the channel width; maximum	50% or slightly less than the	25% of the channel width;	shallow auxillary pockets
	depth is > 1m	channel width; maximum depth		Shallow adxillary pockets
	deptil is > IIII	is 0.5-1 meter	· ·	
Score: 3	3	2	meter 1	0
Channel Flow Status	High	Moderate	Low	No Flow
Chamile i low Status	1 -			
	Water reaches the base of	Water fills <75% of the	Water fills 25-75% of the	Very little water in the
	both the lower banks; <5% of	channel; or <25% of channel	available channel and/or	channel and mostly present
	channel substrate is exposed	substrate is exposed	riffle substrates are mostly	in standing pools; or stream
_		_	exposed	is dry
Score: 3	3	2	1	0
Bank Stability	Stable	Moderately Stable	Moderately Unstable	Unstable
	Little evidence (<10%) of	Some evidence (10-29.9%) of	Evidence of erosion bank	Large and frequent
	erosion bank failure; bank	erosion or bank failure; small	failure is common (30-50%);	evidence (>50%) of erosion
	angles average <30°	areas of erosion mostly healed	high potential of erosion	or bank failure; raw areas
		over; bank angles average 30-	during flooding; bank angles	frequent along steep banks
		39.9°	average 40-60°	bank angles average >60°
				a a maranga a a a a a a a a a a a a a a a a a a
Score: 0	3	2	1	0
Channel Sinuosity	High	Moderate	Low	None
•	≥2 well-defined bends with	1 well-defined bend OR ≥3	<3 moderately-defined	Straight channel; may be
	deep outside areas (cut	moderately-defined bends	bends OR only poorly-	channelized
	banks) and shallow inside	present	defined bends present	onaniionzou
		present	delined bends present	
	areas (point bars) are present			
Score: 1	3	2	1	^
Score: 1		Wide	•	Norrow
Riparian Buffer Vegetation	Extensive		Moderate	Narrow
	Width of natural buffer is >20	Width of natural buffer is 10.1-	Width of natural buffer is 5-	Width of natural buffer is <5
	meters	20 meters	10 meters	meters
Score: 3	3	2	1	0
Aesthetics of Reach	Wilderness	Natural Area	Common Setting	Offensive
	Outstanding natural beauty;	Tree and/or native vegetation	Not offensive; area is	Stream does not enhance
	usually wooded or unpastured	common; some development	developed, but uncluttered	the aesthetics of the area;
		evident (from fields, pastures,	such as in an urban park;	cluttered; highly developed;
	area; water clarity is usually	evident (ironi neids, pastures,		
	, , ,	,	· · ·	may be a dumping area.
	area; water clarity is usually exceptional	dwellings); water clarity may be	water clarity may be turbid or	
	, , ,	,	· · ·	water clarity is usually turbic
	, , ,	dwellings); water clarity may be	water clarity may be turbid or	
Score: 2	, , ,	dwellings); water clarity may be	water clarity may be turbid or	water clarity is usually turbic

Habitat Parameter	Scoring Category		Location: 12845	Date: 3/31/03
Available Instream Cover	Abundant	Common	Rare	Absent
	>50% of substrate favorable	30-50% of substrate supports	10-29.9% of substrate	<10% of substrate supports
	for colonization and fish cover;	a stable habitat; adequate	supports stable habitat;	stable habitat; lack of
	good mix of several stable	habitat for maintenance of	habitat availability less than	habitat is obvious; substrate
	(not new fall or transient)	populations; may be limited in	desirable; substrate	unstable or lacking
	cover types such as snags,	the number of different habitat	frequently disturbed or	
	cobble, undercut banks,	types	removed	
	macrophytes	1,700	lemeved	
	macrophyteo			
Score: 2	4	3	2	1
Bottom Substrate Stability	Stable	Moderately Stable	Moderately Unstable	Unstable
	>50% gravel or larger	30-50% gravel or larger	10-29.9% gravel or larger	<10% gravel or larger
	substrate, i.e., gravel, cobble,	substrate; dominant substrate	substrate; dominant	substrate; substrate is
	boulders; dominant substrate	type is mix of gravel with some	· ·	uniform sand, silt, clay, or
	type is gravel or larger	finer sediments	gravel, but may still be in mix	
	type is graver or larger		of sizes	
Score: 4	4	3	2	1
Number of Riffles	Abundant	Common	Rare	Absent
To be counted, riffles must extend	≥5 riffles	2-4 riffles	1 riffle	No riffles
>50% the width of the channel and be				
at least as long as the channel width				
at load ad long ad the chamier what				
Score: 3	4	3	2	1
Dimensions of Largest Pool	Large	Moderate	Small	Absent
3 · · · · · · · · · · · · · · · · · · ·	_	Pool covers approximately	Pool covers approximately	No existing pools; only
	the channel width; maximum	50% or slightly less than the	25% of the channel width;	shallow auxillary pockets
	depth is > 1m	channel width; maximum depth		orialion advillary poonoto
	depth is - iiii	is 0.5-1 meter	meter	
Score: 3	3	2	1	0
Channel Flow Status	High	Moderate	Low	No Flow
Charmer Flow Status	Water reaches the base of	Water fills <75% of the	Water fills 25-75% of the	Very little water in the
	both the lower banks; <5% of	channel; or <25% of channel	available channel and/or	channel and mostly present
	· · · · · · · · · · · · · · · · · · ·	,		• •
	channel substrate is exposed	substrate is exposed	riffle substrates are mostly	in standing pools; or stream
Score: 2	3	2	exposed 1	is dry 0
Bank Stability	Stable	Moderately Stable	Moderately Unstable	Unstable
Barik Glabinty	Little evidence (<10%) of	Some evidence (10-29.9%) of	Evidence of erosion bank	Large and frequent
	` '	` '		
	erosion bank failure; bank	erosion or bank failure; small		evidence (>50%) of erosion
	angles average <30°	areas of erosion mostly healed	high potential of erosion	or bank failure; raw areas
		over; bank angles average 30-	during flooding; bank angles	
		39.9°	average 40-60°	bank angles average >60°
C 4			4	
Score: 1	3	2 Moderate	1	0
Channel Sinuosity	High		Low	None
	≥2 well-defined bends with	1 well-defined bend OR ≥3	<3 moderately-defined	Straight channel; may be
	deep outside areas (cut	moderately-defined bends	bends OR only poorly-	channelized
	banks) and shallow inside	present	defined bends present	
	areas (point bars) are present			
Score: 1	3	2	1	0
Riparian Buffer Vegetation	Extensive	Wide	Moderate	Narrow
	Width of natural buffer is >20	Width of natural buffer is 10.1-	Width of natural buffer is 5-	Width of natural buffer is <5
	meters	20 meters	10 meters	meters
Score: 2	3	2	1	0
Aesthetics of Reach	Wilderness	Natural Area	Common Setting	Offensive
	Outstanding natural beauty;	Tree and/or native vegetation	Not offensive; area is	Stream does not enhance
	usually wooded or unpastured	common; some development	developed, but uncluttered	the aesthetics of the area;
	usually wooded of ulipastured		1	cluttered; highly developed;
	area; water clarity is usually	evident (from fields, pastures,	such as in an urban park;	ciullerea, riigriiv aevelopea.
	area; water clarity is usually			, 0 ,
		dwellings); water clarity may be	water clarity may be turbid or	may be a dumping area;
	area; water clarity is usually			may be a dumping area; water clarity is usually turbid
	area; water clarity is usually	dwellings); water clarity may be	water clarity may be turbid or	may be a dumping area;
Score: 1	area; water clarity is usually	dwellings); water clarity may be	water clarity may be turbid or	may be a dumping area; water clarity is usually turbid

Habitat Parameter	Scoring Catagony		Location: 12829	Data: 3/31/02
Habitat Parameter	Scoring Category  Abundant	Common	Location: 12838  Rare	Date: 3/31/03 Absent
Available Instream Cover				
	>50% of substrate favorable	30-50% of substrate supports	10-29.9% of substrate	<10% of substrate supports
	for colonization and fish cover;	a stable habitat; adequate	supports stable habitat;	stable habitat; lack of
	good mix of several stable	habitat for maintenance of	habitat availability less than	habitat is obvious; substrate
	(not new fall or transient)	populations; may be limited in	desirable; substrate	unstable or lacking
	cover types such as snags,	the number of different habitat	frequently disturbed or	_
	cobble, undercut banks,	types	removed	
	macrophytes	3,500		
	as.sp.i.ytes			
Score: 1	4	3	2	1
Bottom Substrate Stability	Stable	Moderately Stable	Moderately Unstable	Unstable
ŕ	>50% gravel or larger	30-50% gravel or larger	10-29.9% gravel or larger	<10% gravel or larger
	substrate, i.e., gravel, cobble,	substrate; dominant substrate	substrate; dominant	substrate; substrate is
	boulders; dominant substrate	,		uniform sand, silt, clay, or
		type is mix of gravel with some		
	type is gravel or larger	finer sediments	gravel, but may still be in mix	bedrock
2		•	of sizes	4
Score: 3	4	3	2	1
Number of Riffles	Abundant	Common	Rare	Absent
Γο be counted, riffles must extend	≥5 riffles	2-4 riffles	1 riffle	No riffles
>50% the width of the channel and				
be at least as long as the channel				
width				
Score: 1	4	3	2	1
Dimensions of Largest Pool	Large	Moderate	Small	Absent
g	Pool covers more than 50% of		Pool covers approximately	No existing pools; only
				01 , ,
	the channel width; maximum	50% or slightly less than the	25% of the channel width;	shallow auxillary pockets
	depth is > 1m	channel width; maximum depth	l '	
_		is 0.5-1 meter	meter	
Score: 3	3	2	1	0
Channel Flow Status	High	Moderate	Low	No Flow
	Water reaches the base of	Water fills <75% of the	Water fills 25-75% of the	Very little water in the
	both the lower banks; <5% of	channel; or <25% of channel	available channel and/or	channel and mostly present
	channel substrate is exposed	substrate is exposed	riffle substrates are mostly	in standing pools; or stream
		ouzonato lo expessu	exposed	is dry
Score: 2	3	2	1	0
Bank Stability	Stable	Moderately Stable	Moderately Unstable	Unstable
za otazty	Little evidence (<10%) of	Some evidence (10-29.9%) of	Evidence of erosion bank	Large and frequent
	· · · ·	, , ,		
	erosion bank failure; bank	erosion or bank failure; small		evidence (>50%) of erosion
	angles average <30°	-	high potential of erosion	or bank failure; raw areas
		over; bank angles average 30-	during flooding; bank angles	frequent along steep banks
		39.9°	average 40-60°	bank angles average >60°
Score: 1	3	2	1	0
Channel Sinuosity	High	Moderate	Low	None
	≥2 well-defined bends with	1 well-defined bend OR ≥3	<3 moderately-defined	Straight channel; may be
	deep outside areas (cut	moderately-defined bends	bends OR only poorly-	channelized
		present		onanii onzod
	banks) and shallow inside	present	defined bends present	
	areas (point bars) are present			
0 4			4	
Score: 1	3	2	1	0
Riparian Buffer Vegetation	Extensive	Wide	Moderate	Narrow
	Width of natural buffer is >20	Width of natural buffer is 10.1-	Width of natural buffer is 5-	Width of natural buffer is <5
	meters	20 meters	10 meters	meters
Score: 2	3	2	1	0
Aesthetics of Reach	Wilderness	Natural Area	Common Setting	Offensive
	Outstanding natural beauty;	Tree and/or native vegetation	Not offensive; area is	Stream does not enhance
	usually wooded or unpastured		developed, but uncluttered	the aesthetics of the area;
			•	
	area; water clarity is usually	evident (from fields, pastures,	such as in an urban park;	cluttered; highly developed
	exceptional	dwellings); water clarity may be		
		slightly turbid	discolored	water clarity is usually turbic
				or discolored
	l			
Score: 1	3	2	1	0

Habitat Darameter	Spering Cotogery		Location: 14100	Data: 4/1/02
Habitat Parameter	Scoring Category	Common	Location: 14198	Date: 4/1/03 Absent
Available Instream Cover	Abundant	Common	Rare	
	>50% of substrate favorable	30-50% of substrate supports	10-29.9% of substrate	<10% of substrate supports
	for colonization and fish cover;	· · ·	supports stable habitat;	stable habitat; lack of
	good mix of several stable	habitat for maintenance of	habitat availability less than	habitat is obvious; substrate
	(not new fall or transient)	populations; may be limited in	desirable; substrate	unstable or lacking
	cover types such as snags,	the number of different habitat	frequently disturbed or	
	cobble, undercut banks,	types	removed	
	macrophytes			
	. ,			
Score: 2	4	3	2	1
Bottom Substrate Stability	Stable	Moderately Stable	Moderately Unstable	Unstable
	>50% gravel or larger	30-50% gravel or larger	10-29.9% gravel or larger	<10% gravel or larger
	substrate, i.e., gravel, cobble,	substrate; dominant substrate	substrate; dominant	substrate; substrate is
	boulders; dominant substrate	type is mix of gravel with some	substrate type is finer than	uniform sand, silt, clay, or
	type is gravel or larger	finer sediments	gravel, but may still be in mix	bedrock
	Type is graver or image.		of sizes	
Score: 3	4	3	2	1
Number of Riffles	Abundant	Common	Rare	Absent
To be counted, riffles must extend	≥5 riffles	2-4 riffles	1 riffle	No riffles
>50% the width of the channel and				
be at least as long as the channel			ĺ	
width				
Score: 3	4	3	2	1
Dimensions of Largest Pool	Large	Moderate	Small	Absent
Differisions of Largest Fool				
	Pool covers more than 50% of		Pool covers approximately	No existing pools; only
	the channel width; maximum	50% or slightly less than the	25% of the channel width;	shallow auxillary pockets
	depth is > 1m	channel width; maximum depth	maximum depth is <0.5	
		is 0.5-1 meter	meter	
Score: 3	3	2	1	0
Channel Flow Status	High	Moderate	Low	No Flow
	Water reaches the base of	Water fills <75% of the	Water fills 25-75% of the	Very little water in the
	both the lower banks; <5% of	channel; or <25% of channel	available channel and/or	channel and mostly present
	channel substrate is exposed	substrate is exposed	riffle substrates are mostly	in standing pools; or stream
	•	•	exposed	is dry
Score: 3	3	2	1	0
Bank Stability	Stable	Moderately Stable	Moderately Unstable	Unstable
	Little evidence (<10%) of	Some evidence (10-29.9%) of	Evidence of erosion bank	Large and frequent
	erosion bank failure; bank	erosion or bank failure; small	failure is common (30-50%);	evidence (>50%) of erosion
	angles average <30°	*	high potential of erosion	or bank failure; raw areas
		over; bank angles average 30-	<b>.</b>	frequent along steep banks;
		39.9°	average 40-60°	bank angles average >60°
		39.9	average 40-00	bank angles average >00
Score: 1	3	2	1	0
Channel Sinuosity	High	Moderate	Low	None
S. G. Hor Sillacony	≥2 well-defined bends with	1 well-defined bend OR ≥3	<3 moderately-defined	Straight channel; may be
	deep outside areas (cut		,	channelized
		moderately-defined bends	bends OR only poorly-	cnannelized
	banks) and shallow inside	present	defined bends present	
	areas (point bars) are present			
0	_	_		_
Score: 1	3	2	1	0
Riparian Buffer Vegetation	Extensive	Wide	Moderate	Narrow
	Width of natural buffer is >20	Width of natural buffer is 10.1-	Width of natural buffer is 5-	Width of natural buffer is <5
	meters	20 meters	10 meters	meters
	3	2	1	0
		Natural Area	Common Setting	Offensive
	Wilderness		Not offensive; area is	Stream does not enhance
	Outstanding natural beauty;	Tree and/or native vegetation	INOLUIICIISIVE, alea is	ou oan accomor cimanoc
	Outstanding natural beauty;		developed, but uncluttered	the aesthetics of the area;
	Outstanding natural beauty; usually wooded or unpastured	common; some development	developed, but uncluttered	the aesthetics of the area;
	Outstanding natural beauty; usually wooded or unpastured area; water clarity is usually	common; some development evident (from fields, pastures,	developed, but uncluttered such as in an urban park;	the aesthetics of the area; cluttered; highly developed;
	Outstanding natural beauty; usually wooded or unpastured	common; some development evident (from fields, pastures, dwellings); water clarity may be	developed, but uncluttered such as in an urban park; water clarity may be turbid or	the aesthetics of the area; cluttered; highly developed; may be a dumping area;
Score: 3 Aesthetics of Reach	Outstanding natural beauty; usually wooded or unpastured area; water clarity is usually	common; some development evident (from fields, pastures,	developed, but uncluttered such as in an urban park;	the aesthetics of the area; cluttered; highly developed; may be a dumping area; water clarity is usually turbio
	Outstanding natural beauty; usually wooded or unpastured area; water clarity is usually	common; some development evident (from fields, pastures, dwellings); water clarity may be	developed, but uncluttered such as in an urban park; water clarity may be turbid or	the aesthetics of the area; cluttered; highly developed; may be a dumping area;
	Outstanding natural beauty; usually wooded or unpastured area; water clarity is usually	common; some development evident (from fields, pastures, dwellings); water clarity may be	developed, but uncluttered such as in an urban park; water clarity may be turbid or	the aesthetics of the area; cluttered; highly developed; may be a dumping area; water clarity is usually turbio

Habitat Parameter	Scoring Category		Location: 12845	Date: 9/21/03
Available Instream Cover	Abundant	Common	Rare	Absent
	>50% of substrate favorable	30-50% of substrate supports	10-29.9% of substrate	<10% of substrate supports
	for colonization and fish cover;	a stable habitat; adequate	supports stable habitat;	stable habitat; lack of
	good mix of several stable	habitat for maintenance of	habitat availability less than	habitat is obvious; substrate
	(not new fall or transient)	populations; may be limited in	desirable; substrate	unstable or lacking
	cover types such as snags,	the number of different habitat	frequently disturbed or	3
	cobble, undercut banks,	types	removed	
	macrophytes	typoo	Tomovou	
	macrophyteo			
Score: 2	4	3	2	1
Bottom Substrate Stability	Stable	Moderately Stable	Moderately Unstable	Unstable
	>50% gravel or larger	30-50% gravel or larger	10-29.9% gravel or larger	<10% gravel or larger
	substrate, i.e., gravel, cobble,	substrate; dominant substrate	substrate; dominant	substrate; substrate is
	boulders; dominant substrate	type is mix of gravel with some	substrate type is finer than	uniform sand, silt, clay, or
	type is gravel or larger	finer sediments	gravel, but may still be in mix	bedrock
	3, 1 3 1 1 3		of sizes	
Score: 4	4	3	2	1
Number of Riffles	Abundant	Common	Rare	Absent
To be counted, riffles must extend	≥5 riffles	2-4 riffles	1 riffle	No riffles
>50% the width of the channel and be				
at least as long as the channel width				
3 · · · · · · · · · · · · · · · · · · ·				
Score: 2	4	3	2	1
Dimensions of Largest Pool	Large	Moderate	Small	Absent
-	Pool covers more than 50% of	Pool covers approximately	Pool covers approximately	No existing pools; only
	the channel width; maximum	50% or slightly less than the	25% of the channel width;	shallow auxillary pockets
	depth is > 1m	channel width; maximum depth	maximum depth is <0.5	<u>, , , , , , , , , , , , , , , , , , , </u>
		is 0.5-1 meter	meter	
Score: 3	3	2	1	0
Channel Flow Status	High	Moderate	Low	No Flow
	Water reaches the base of	Water fills <75% of the	Water fills 25-75% of the	Very little water in the
	both the lower banks; <5% of	channel; or <25% of channel	available channel and/or	channel and mostly present
	channel substrate is exposed	substrate is exposed	riffle substrates are mostly	in standing pools; or stream
	charmer substrate is exposed	Substrate is exposed	exposed	is dry
Score: 3	3	2	1	0
Bank Stability	Stable	Moderately Stable	Moderately Unstable	Unstable
,	Little evidence (<10%) of	Some evidence (10-29.9%) of	Evidence of erosion bank	Large and frequent
	erosion bank failure; bank	erosion or bank failure; small		evidence (>50%) of erosion
	angles average <30°	areas of erosion mostly healed	high potential of erosion	or bank failure; raw areas
	aligies average <50	_	during flooding; bank angles	
		over; bank angles average 30-		
		39.9°	average 40-60°	bank angles average >60°
Score: 0	3	2	1	0
Channel Sinuosity	High	Moderate 2	Low	None
Chambo Officootty	≥2 well-defined bends with	1 well-defined bend OR ≥3	<3 moderately-defined	Straight channel; may be
		moderately-defined bends	_	channelized
	deep outside areas (cut	,	bends OR only poorly-	cnannelized
	banks) and shallow inside	present	defined bends present	
	areas (point bars) are present			
Sporo: 1			4	
Score: 1 Riparian Buffer Vegetation	S S S S S S S S S S S S S S S S S S S	Wide 2	Moderate	Norrow
ripanan buller vegetation	Extensive		Moderate	Narrow
	Width of natural buffer is >20	Width of natural buffer is 10.1-	Width of natural buffer is 5-	Width of natural buffer is <5
S 2	meters	20 meters	10 meters	meters
Score: 2	Wilderness 3	Notice Area	Common Setting	Offensive 0
Aesthetics of Reach	Wilderness	Natural Area	Common Setting	Offensive
	Outstanding natural beauty;	Tree and/or native vegetation	Not offensive; area is	Stream does not enhance
		common; some development	developed, but uncluttered	the aesthetics of the area;
	area; water clarity is usually	evident (from fields, pastures,	such as in an urban park;	cluttered; highly developed;
	exceptional	dwellings); water clarity may be	water clarity may be turbid or	may be a dumping area;
	ĺ	slightly turbid	discolored	water clarity is usually turbid
	ĺ			or discolored
Coores 1	3	2	1	0
Score: 1 Total Score: 18	INTERMEDIATE		•	<u> </u>

Habitat Darameter	Scoring Catagony		Location: 42020	Data: 0/24/02
Habitat Parameter	Scoring Category  Abundant	Common	Location: 12838 Rare	Date: 9/21/03 Absent
Available Instream Cover				
	>50% of substrate favorable	30-50% of substrate supports	10-29.9% of substrate	<10% of substrate supports
	for colonization and fish cover;	a stable habitat; adequate	supports stable habitat;	stable habitat; lack of
	good mix of several stable	habitat for maintenance of	habitat availability less than	habitat is obvious; substrate
	(not new fall or transient)	populations; may be limited in	desirable; substrate	unstable or lacking
		the number of different habitat	frequently disturbed or	unotable of lacking
		types	removed	
	macrophytes			
Score: 2	4	3	2	1
Bottom Substrate Stability	Stable	Moderately Stable	Moderately Unstable	Unstable
	>50% gravel or larger	30-50% gravel or larger	10-29.9% gravel or larger	<10% gravel or larger
		substrate; dominant substrate	substrate; dominant	substrate; substrate is
		type is mix of gravel with some	substrate type is finer than	uniform sand, silt, clay, or
	-	· .		, , ,
	type is gravel or larger	finer sediments	gravel, but may still be in mix	реагоск
			of sizes	
Score: 3	4	3	2	1
Number of Riffles	Abundant	Common	Rare	Absent
To be counted, riffles must extend	≥5 riffles	2-4 riffles	1 riffle	No riffles
>50% the width of the channel and				
be at least as long as the channel	l '			
_	· ·			
width				<u>,</u>
Score: 2	4	3	2	1
Dimensions of Largest Pool	Large	Moderate	Small	Absent
	Pool covers more than 50% of	Pool covers approximately	Pool covers approximately	No existing pools; only
	the channel width; maximum	50% or slightly less than the	25% of the channel width;	shallow auxillary pockets
	depth is > 1m	channel width; maximum depth		onanon auxinary poonote
	depth is > iiii		· ·	
0		is 0.5-1 meter	meter	•
Score: 3	3	2	1	0
Channel Flow Status	High	Moderate	Low	No Flow
	Water reaches the base of	Water fills <75% of the	Water fills 25-75% of the	Very little water in the
	both the lower banks; <5% of	channel; or <25% of channel	available channel and/or	channel and mostly present
	channel substrate is exposed	substrate is exposed	riffle substrates are mostly	in standing pools; or stream
	onamier substitute is expessu		exposed	is dry
Score: 3	3	2	1	0
Bank Stability	Stable	Moderately Stable	Moderately Unstable	Unstable
Balik Stability		_	_	
	Little evidence (<10%) of	Some evidence (10-29.9%) of	Evidence of erosion bank	Large and frequent
	erosion bank failure; bank	erosion or bank failure; small	failure is common (30-50%);	evidence (>50%) of erosion
	angles average <30°	areas of erosion mostly healed	high potential of erosion	or bank failure; raw areas
	angles average 100	over bank angles average 30-	during flooding: bank angles	
	angles average 166	over; bank angles average 30-	during flooding; bank angles	frequent along steep banks;
	angles avoluge to	over; bank angles average 30-39.9°	during flooding; bank angles average 40-60°	· ·
Score: 0	, ,	39.9°	average 40-60°	frequent along steep banks; bank angles average >60°
Score: 0	3	39.9° <b>2</b>	average 40-60°	frequent along steep banks; bank angles average >60°
Score: 0 Channel Sinuosity	3 High	39.9° 2 Moderate	average 40-60°  1  Low	frequent along steep banks; bank angles average >60° 0 None
	3	39.9° <b>2</b>	average 40-60°	frequent along steep banks; bank angles average >60°
	3 High	39.9° 2 Moderate	average 40-60°  1  Low	frequent along steep banks; bank angles average >60° 0 None
	3 High ≥2 well-defined bends with deep outside areas (cut	39.9°  2  Moderate 1 well-defined bend OR ≥3 moderately-defined bends	average 40-60°  1  Low <3 moderately-defined bends OR only poorly-	frequent along steep banks; bank angles average >60°  0  None  Straight channel; may be
	3 High ≥2 well-defined bends with deep outside areas (cut banks) and shallow inside	39.9°  2  Moderate 1 well-defined bend OR ≥3	average 40-60°  1  Low <3 moderately-defined	frequent along steep banks; bank angles average >60°  0  None  Straight channel; may be
	3 High ≥2 well-defined bends with deep outside areas (cut	39.9°  2  Moderate 1 well-defined bend OR ≥3 moderately-defined bends	average 40-60°  1  Low <3 moderately-defined bends OR only poorly-	frequent along steep banks; bank angles average >60°  0  None  Straight channel; may be
Channel Sinuosity	3 High ≥2 well-defined bends with deep outside areas (cut banks) and shallow inside areas (point bars) are present	39.9°  2  Moderate 1 well-defined bend OR ≥3 moderately-defined bends present	average 40-60°  1  Low <3 moderately-defined bends OR only poorly-defined bends present	frequent along steep banks; bank angles average >60°  O  None  Straight channel; may be channelized
Channel Sinuosity  Score: 1	3 High ≥2 well-defined bends with deep outside areas (cut banks) and shallow inside areas (point bars) are present	39.9°  2  Moderate 1 well-defined bend OR ≥3 moderately-defined bends present	average 40-60°  1  Low <3 moderately-defined bends OR only poorly-defined bends present	frequent along steep banks; bank angles average >60°  O  None Straight channel; may be channelized
Channel Sinuosity	3 High ≥2 well-defined bends with deep outside areas (cut banks) and shallow inside areas (point bars) are present  3 Extensive	39.9°  2  Moderate 1 well-defined bend OR ≥3 moderately-defined bends present  2  Wide	average 40-60°  1  Low <3 moderately-defined bends OR only poorly-defined bends present  1  Moderate	frequent along steep banks; bank angles average >60°  O  None Straight channel; may be channelized  O  Narrow
Channel Sinuosity  Score: 1	3 High ≥2 well-defined bends with deep outside areas (cut banks) and shallow inside areas (point bars) are present	39.9°  2  Moderate 1 well-defined bend OR ≥3 moderately-defined bends present	average 40-60°  1  Low <3 moderately-defined bends OR only poorly-defined bends present	frequent along steep banks; bank angles average >60°  O  None Straight channel; may be channelized
Channel Sinuosity  Score: 1	3 High ≥2 well-defined bends with deep outside areas (cut banks) and shallow inside areas (point bars) are present  3 Extensive	39.9°  2  Moderate 1 well-defined bend OR ≥3 moderately-defined bends present  2  Wide	average 40-60°  1  Low <3 moderately-defined bends OR only poorly-defined bends present  1  Moderate	frequent along steep banks; bank angles average >60°  O  None Straight channel; may be channelized  O  Narrow
Channel Sinuosity  Score: 1 Riparian Buffer Vegetation	3 High ≥2 well-defined bends with deep outside areas (cut banks) and shallow inside areas (point bars) are present  3 Extensive Width of natural buffer is >20	39.9°  2  Moderate 1 well-defined bend OR ≥3 moderately-defined bends present  2  Wide  Width of natural buffer is 10.1-	average 40-60°  1  Low <3 moderately-defined bends OR only poorly-defined bends present  1  Moderate  Width of natural buffer is 5-	frequent along steep banks; bank angles average >60°  O  None Straight channel; may be channelized  O  Narrow  Width of natural buffer is <5
Channel Sinuosity  Score: 1 Riparian Buffer Vegetation  Score: 2	3 High ≥2 well-defined bends with deep outside areas (cut banks) and shallow inside areas (point bars) are present  3 Extensive Width of natural buffer is >20 meters 3	39.9°  2  Moderate 1 well-defined bend OR ≥3 moderately-defined bends present  2  Wide  Width of natural buffer is 10.1-20 meters	average 40-60°  1  Low  <3 moderately-defined bends OR only poorly-defined bends present  1  Moderate Width of natural buffer is 5-10 meters  1	frequent along steep banks; bank angles average >60°  O  None Straight channel; may be channelized  O  Narrow  Width of natural buffer is <5 meters  O
Channel Sinuosity  Score: 1 Riparian Buffer Vegetation	3 High ≥2 well-defined bends with deep outside areas (cut banks) and shallow inside areas (point bars) are present  3 Extensive Width of natural buffer is >20 meters 3 Wilderness	39.9°  2  Moderate 1 well-defined bend OR ≥3 moderately-defined bends present  2  Wide  Width of natural buffer is 10.1-20 meters  2  Natural Area	average 40-60°  1  Low  <3 moderately-defined bends OR only poorly-defined bends present  1  Moderate Width of natural buffer is 5-10 meters  1  Common Setting	frequent along steep banks; bank angles average >60°  O  None Straight channel; may be channelized  O  Narrow Width of natural buffer is <5 meters  O  Offensive
Channel Sinuosity  Score: 1 Riparian Buffer Vegetation  Score: 2	3 High ≥2 well-defined bends with deep outside areas (cut banks) and shallow inside areas (point bars) are present  3 Extensive Width of natural buffer is >20 meters 3 Wilderness Outstanding natural beauty;	39.9°  2  Moderate 1 well-defined bend OR ≥3 moderately-defined bends present  2  Wide  Width of natural buffer is 10.1- 20 meters  2  Natural Area  Tree and/or native vegetation	average 40-60°  1  Low  3 moderately-defined bends OR only poorly-defined bends present  1  Moderate Width of natural buffer is 5-10 meters  1  Common Setting Not offensive; area is	frequent along steep banks; bank angles average >60°  O  None Straight channel; may be channelized  O  Narrow Width of natural buffer is <5 meters  O  Offensive Stream does not enhance
Channel Sinuosity  Score: 1 Riparian Buffer Vegetation  Score: 2	3 High ≥2 well-defined bends with deep outside areas (cut banks) and shallow inside areas (point bars) are present  3 Extensive Width of natural buffer is >20 meters 3 Wilderness Outstanding natural beauty; usually wooded or unpastured	39.9°  2  Moderate 1 well-defined bend OR ≥3 moderately-defined bends present  2  Wide Width of natural buffer is 10.1- 20 meters  2  Natural Area  Tree and/or native vegetation common; some development	average 40-60°  1  Low <3 moderately-defined bends OR only poorly-defined bends present  1  Moderate Width of natural buffer is 5-10 meters 1  Common Setting Not offensive; area is developed, but uncluttered	frequent along steep banks; bank angles average >60°  O  None Straight channel; may be channelized  O  Narrow Width of natural buffer is <5 meters  O  Offensive Stream does not enhance the aesthetics of the area;
Channel Sinuosity  Score: 1 Riparian Buffer Vegetation  Score: 2	3 High ≥2 well-defined bends with deep outside areas (cut banks) and shallow inside areas (point bars) are present  3 Extensive Width of natural buffer is >20 meters 3 Wilderness Outstanding natural beauty;	39.9°  2  Moderate 1 well-defined bend OR ≥3 moderately-defined bends present  2  Wide  Width of natural buffer is 10.1- 20 meters  2  Natural Area  Tree and/or native vegetation	average 40-60°  1  Low  3 moderately-defined bends OR only poorly-defined bends present  1  Moderate Width of natural buffer is 5-10 meters  1  Common Setting Not offensive; area is	frequent along steep banks; bank angles average >60°  O  None Straight channel; may be channelized  O  Narrow Width of natural buffer is <5 meters  O  Offensive Stream does not enhance
Channel Sinuosity  Score: 1 Riparian Buffer Vegetation  Score: 2	3 High ≥2 well-defined bends with deep outside areas (cut banks) and shallow inside areas (point bars) are present  3 Extensive Width of natural buffer is >20 meters 3 Wilderness Outstanding natural beauty; usually wooded or unpastured area; water clarity is usually	39.9°  2  Moderate 1 well-defined bend OR ≥3 moderately-defined bends present  2  Wide Width of natural buffer is 10.1- 20 meters  2  Natural Area  Tree and/or native vegetation common; some development evident (from fields, pastures,	average 40-60°  1  Low <3 moderately-defined bends OR only poorly-defined bends present  1  Moderate Width of natural buffer is 5-10 meters 1  Common Setting Not offensive; area is developed, but uncluttered such as in an urban park;	frequent along steep banks; bank angles average >60°  O None Straight channel; may be channelized  O Narrow Width of natural buffer is <5 meters  O Offensive Stream does not enhance the aesthetics of the area; cluttered; highly developed;
Channel Sinuosity  Score: 1 Riparian Buffer Vegetation  Score: 2	3 High ≥2 well-defined bends with deep outside areas (cut banks) and shallow inside areas (point bars) are present  3 Extensive Width of natural buffer is >20 meters 3 Wilderness Outstanding natural beauty; usually wooded or unpastured	39.9°  2  Moderate 1 well-defined bend OR ≥3 moderately-defined bends present  2  Wide Width of natural buffer is 10.1- 20 meters  2  Natural Area Tree and/or native vegetation common; some development evident (from fields, pastures, dwellings); water clarity may be	average 40-60°  1  Low <3 moderately-defined bends OR only poorly-defined bends present  1  Moderate 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 may be turbid or	frequent along steep banks; bank angles average >60°  ONone Straight channel; may be channelized  ONarrow Width of natural buffer is <5 meters  OOffensive Stream does not enhance the aesthetics of the area; cluttered; highly developed; may be a dumping area;
Channel Sinuosity  Score: 1 Riparian Buffer Vegetation  Score: 2	3 High ≥2 well-defined bends with deep outside areas (cut banks) and shallow inside areas (point bars) are present  3 Extensive Width of natural buffer is >20 meters 3 Wilderness Outstanding natural beauty; usually wooded or unpastured area; water clarity is usually	39.9°  2  Moderate 1 well-defined bend OR ≥3 moderately-defined bends present  2  Wide Width of natural buffer is 10.1- 20 meters  2  Natural Area  Tree and/or native vegetation common; some development evident (from fields, pastures,	average 40-60°  1  Low <3 moderately-defined bends OR only poorly-defined bends present  1  Moderate Width of natural buffer is 5-10 meters 1  Common Setting Not offensive; area is developed, but uncluttered such as in an urban park;	frequent along steep banks; bank angles average >60°  ONONE Straight channel; may be channelized  ONArrow Width of natural buffer is <5 meters  OOffensive Stream does not enhance the aesthetics of the area; cluttered; highly developed; may be a dumping area; water clarity is usually turbid
Channel Sinuosity  Score: 1 Riparian Buffer Vegetation  Score: 2	3 High ≥2 well-defined bends with deep outside areas (cut banks) and shallow inside areas (point bars) are present  3 Extensive Width of natural buffer is >20 meters 3 Wilderness Outstanding natural beauty; usually wooded or unpastured area; water clarity is usually	39.9°  2  Moderate 1 well-defined bend OR ≥3 moderately-defined bends present  2  Wide Width of natural buffer is 10.1- 20 meters  2  Natural Area Tree and/or native vegetation common; some development evident (from fields, pastures, dwellings); water clarity may be	average 40-60°  1  Low <3 moderately-defined bends OR only poorly-defined bends present  1  Moderate 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 may be turbid or	frequent along steep banks; bank angles average >60°  ONone Straight channel; may be channelized  ONarrow Width of natural buffer is <5 meters  OOffensive Stream does not enhance the aesthetics of the area; cluttered; highly developed; may be a dumping area;
Channel Sinuosity  Score: 1 Riparian Buffer Vegetation  Score: 2	3 High ≥2 well-defined bends with deep outside areas (cut banks) and shallow inside areas (point bars) are present  3 Extensive Width of natural buffer is >20 meters 3 Wilderness Outstanding natural beauty; usually wooded or unpastured area; water clarity is usually	39.9°  2  Moderate 1 well-defined bend OR ≥3 moderately-defined bends present  2  Wide Width of natural buffer is 10.1- 20 meters  2  Natural Area Tree and/or native vegetation common; some development evident (from fields, pastures, dwellings); water clarity may be	average 40-60°  1  Low <3 moderately-defined bends OR only poorly-defined bends present  1  Moderate 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 may be turbid or	frequent along steep banks; bank angles average >60°  ONONE Straight channel; may be channelized  ONArrow Width of natural buffer is <5 meters  OOffensive Stream does not enhance the aesthetics of the area; cluttered; highly developed; may be a dumping area; water clarity is usually turbid

Habitat Parameter Available Instream Cover				
Available Instream Cover	Scoring Category		Location: 14198	Date: 9/20/03
1	Abundant	Common	Rare	Absent
	>50% of substrate favorable	30-50% of substrate supports	10-29.9% of substrate	<10% of substrate supports
	for colonization and fish cover;		supports stable habitat;	stable habitat; lack of habitat is obvious; substrate
	good mix of several stable (not new fall or transient)	habitat for maintenance of populations; may be limited in	habitat availability less than desirable: substrate	unstable or lacking
	cover types such as snags,		frequently disturbed or	unstable of lacking
	cobble, undercut banks,	types	removed	
	macrophytes	types	Terrioved	
	macrophytes			
Score: 3	4	3	2	1
Bottom Substrate Stability	Stable	Moderately Stable	Moderately Unstable	Unstable
	>50% gravel or larger	30-50% gravel or larger	10-29.9% gravel or larger	<10% gravel or larger
	, , , , , , , , , , , , , , , , , , , ,	substrate; dominant substrate	substrate; dominant	substrate; substrate is
	boulders; dominant substrate	type is mix of gravel with some		uniform sand, silt, clay, or
	type is gravel or larger	finer sediments	gravel, but may still be in mix	bedrock
Score: 3	4	3	of sizes 2	1
Number of Riffles	Abundant	Common	Rare	Absent
To be counted, riffles must extend	≥5 riffles	2-4 riffles	1 riffle	No riffles
>50% the width of the channel and				
be at least as long as the channel				
width				
Score: 2	4	3	2	1
Dimensions of Largest Pool	Large	Moderate	Small	Absent
	Pool covers more than 50% of		Pool covers approximately	No existing pools; only
	•	50% or slightly less than the	25% of the channel width;	shallow auxillary pockets
	depth is > 1m	channel width; maximum depth	· ·	
Score: 3	3	is 0.5-1 meter <b>2</b>	meter 1	0
Channel Flow Status	High	Moderate	Low	No Flow
	Water reaches the base of	Water fills <75% of the	Water fills 25-75% of the	Very little water in the
	both the lower banks; <5% of	channel; or <25% of channel	available channel and/or	channel and mostly present
	channel substrate is exposed	substrate is exposed	riffle substrates are mostly	in standing pools; or stream
I		•	exposed	is dry
Score: 3	3	2	1	0
Bank Stability	Stable	Moderately Stable	Moderately Unstable	Unstable
	Little evidence (<10%) of	Some evidence (10-29.9%) of	Evidence of erosion bank	Large and frequent
	erosion bank failure; bank	erosion or bank failure; small	failure is common (30-50%); high potential of erosion	evidence (>50%) of erosion or bank failure; raw areas
	angles average <30°	areas of erosion mostly healed over; bank angles average 30-	during flooding; bank angles	frequent along steep banks;
		39.9°	average 40-60°	bank angles average >60°
		39.9	average 40-00	bank angles average >00
Score: 0	3	2	1	0
Channel Sinuosity	High	Moderate	Low	None
	≥2 well-defined bends with	1 well-defined bend OR ≥3	<3 moderately-defined	Straight channel; may be
	deep outside areas (cut	moderately-defined bends	bends OR only poorly-	channelized
	banks) and shallow inside	present	defined bends present	
	areas (point bars) are present			
Score: 1	3	2	1	0
Riparian Buffer Vegetation	Extensive	Wide	Moderate	Narrow
	Width of natural buffer is >20	Width of natural buffer is 10.1-	Width of natural buffer is 5-	Width of natural buffer is <5
	meters	20 meters	10 meters	meters
i	3	2	1	0
Score: 3	Wilderness	Natural Area	Common Setting	Offensive
Score: 3 Aesthetics of Reach	Outstanding natural beauty;	Tree and/or native vegetation	Not offensive; area is	Stream does not enhance
		Icamman, cama davalanment	developed, but uncluttered	the aesthetics of the area;
	usually wooded or unpastured		•	
	area; water clarity is usually	evident (from fields, pastures,	such as in an urban park;	cluttered; highly developed;
	'	evident (from fields, pastures, dwellings); water clarity may be	such as in an urban park; water clarity may be turbid or	cluttered; highly developed; may be a dumping area;
	area; water clarity is usually	evident (from fields, pastures,	such as in an urban park;	cluttered; highly developed; may be a dumping area; water clarity is usually turbid
	area; water clarity is usually	evident (from fields, pastures, dwellings); water clarity may be	such as in an urban park; water clarity may be turbid or	cluttered; highly developed; may be a dumping area;
	area; water clarity is usually	evident (from fields, pastures, dwellings); water clarity may be	such as in an urban park; water clarity may be turbid or	cluttered; highly developed; may be a dumping area; water clarity is usually turbid