

Impairment Verification Monitoring  
Biological and Habitat Components  
Segment 2107, Atascosa River, Texas  
June 2005



Ecological Communications Corporation  
Austin, TX



**Impairment Verification Monitoring-Volume 2: Biological and  
Habitat Components  
Segment 2107, Atascosa River**

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Impairment Verification Monitoring -Biological and Habitat Components  
Atascosa River

**ABSTRACT**

Ecological Communications Corporation (EComm) conducted biological data collection and analysis as part of an impairment verification monitoring project for the Atascosa River (Segment 2107). Segment 2107 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. It also appears on the list as impaired for contact recreation due to elevated bacteria concentrations. Due to an insufficient amount of data to support a re-assessment, the 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, the water body appears to indicate a lower aquatic life use than the "High" use assumed in the Texas Water Quality Standards (TCEQ 2000).

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**1.0 INTRODUCTION**



**Figure 1. Station 17898**

In 2000 the Texas Commission on Environmental Quality (TCEQ) initiated a study to investigate water quality impairments in 11 water bodies in Basin Groups D & E identified through the 1999 305(b) Water Quality Inventory as part of a total daily maximum load (TMDL) program. The segments were included on the 1999 State of Texas Clean Water Act 303(d) list as impaired due to concentrations of dissolved oxygen or bacteria or both which exceed established criteria. One of these water bodies was the Atascosa River (Segment 2107). The impairments to Segment 2107 were caused by an exceedance of the established dissolved oxygen criteria and an

exceedance in the bacteria 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 2107 remained on the impaired waters list. As an initial phase in TMDL development, the aquatic life use impairments to Segment 2107 were 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, 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 2107 begins at the confluence of the West Prong Atascosa River and the North Prong Atascosa River in Atascosa County and extends 103 miles to the confluence with the Frio River in Live Oak County. Site 17898 is located in the City of Pleasanton, approximately 150 meters downstream from Hunt Road. Site 17900 is located at IH 37. Site 17898 is located at Leal Road. A location map of the segment is provided in Figure 2.

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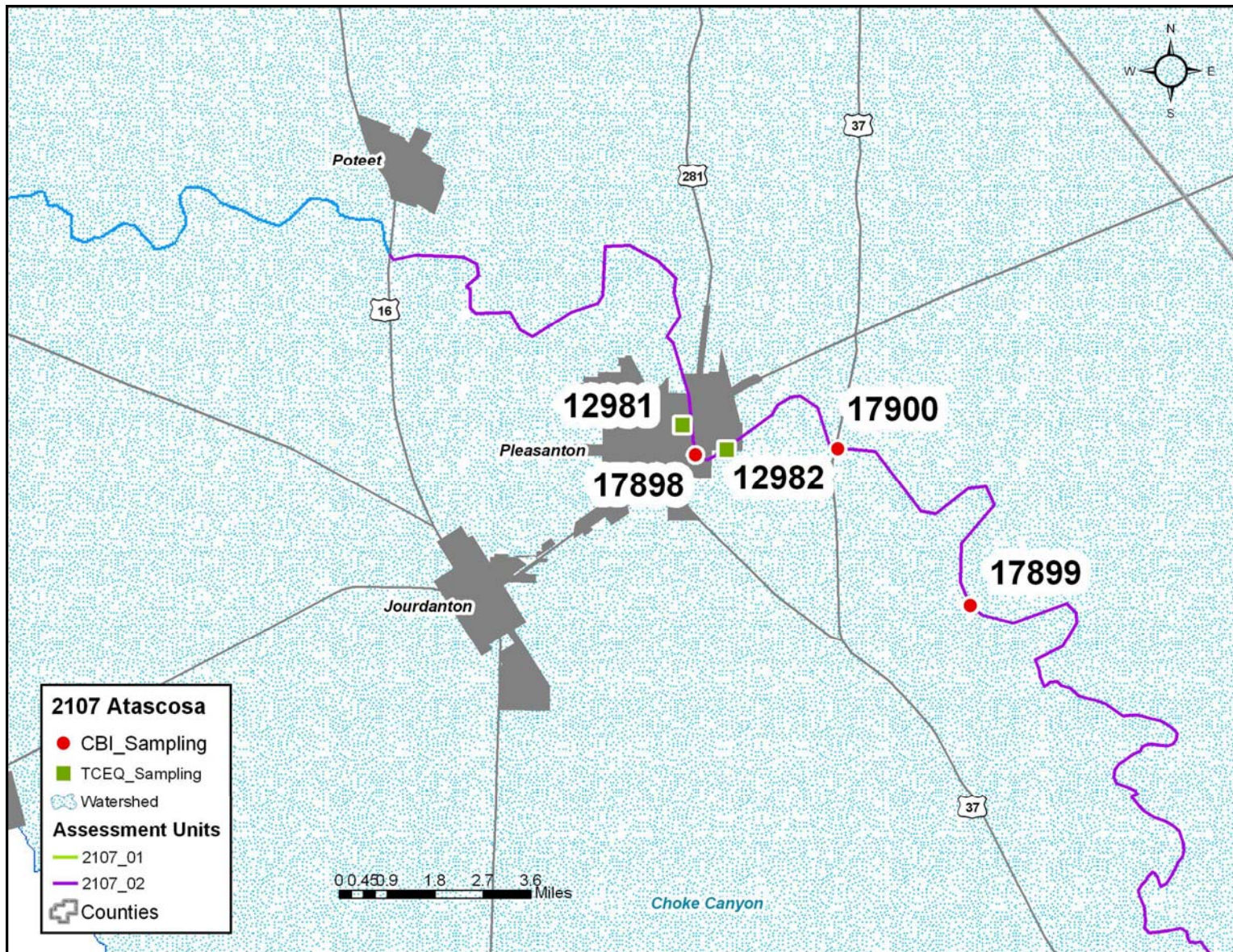


Figure 2. Map showing zoom view of sampling stations within Pleasanton city limits

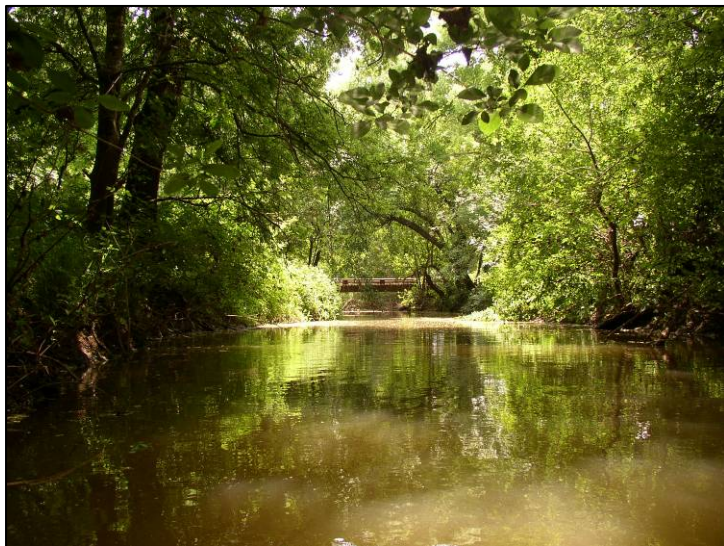
## 2.0 BIOLOGICAL AND HABITAT METHODOLOGY

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. Benthic Macroinvertebrate Sampling at Site 17900**

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.



**Figure 4. Station 17899**

Segment 2107 had not previously been designated as a segment requiring a standards change to reflect site specific conditions. Studies which examine site specific conditions and recommend changes to established or presumed uses are referred to as Use Attainability Analyses (UAA) and Aquatic Life Assessment (ALA), respectively. Although the main

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purpose of the physical/chemical component of the study was to verify the aquatic life impairment based upon exceedences of the dissolved oxygen and bacteria 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 2107 was conducted in August 2002, April 2003, and September 2003. Therefore, if it is determined that the aquatic life uses and criteria should be evaluated within a UAA, a sufficient amount of data was collected within the required temporal regime for this segment of the Atascosa River.

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

STORET Code	Description	STORET Code	Description
89832	Number of lateral transects	90008	EPT index
89847	Average bank slope	98009	Total number of sucker species
89846	Average bank erosion potential	98010	Total number of intolerant species
89845	Percent of substrate that is gravel or larger	98016	Percent individuals as tolerants (fish)
<i>800</i>	<i>Channel flow status</i>	98017	Percent individuals as omnivores
89844	Dominant substrate	98021	Percent individuals as insectivores
89843	Total number of riffles	98022	Percent individuals as piscivores
89842	Number of poorly defined stream bends	98023	Total number of individuals in fish sample
89841	Number of moderately defined stream bends	98024	Percent individuals as hybrid
89840	Number of well defined stream bends	98030	Percent with disease
<i>812</i>	<i>Statewide IBI</i>	98003	Number of fish species
<i>833</i>	<i>Habitat Quality Index</i>	89905	Number of minutes debris was sampled
84161	Stream order	89851	Percent grass
84159	Percent instream cover	89854	Percentage tree canopy
<i>813</i>	<i>Number of cyprinidae species</i>	89859	Drainage area
<i>814</i>	<i>Number of benthic invertebrates</i>	89860	Length of reach
72052	Streambed slope	89861	Average stream width
<i>816</i>	<i>Percent that are tolerant species, excluding G.affinis</i>	89862	Average stream depth
<i>817</i>	<i>Number of individuals per seine haul</i>	89864	Maximum pool width
<i>818</i>	<i>Number of individuals per minute electroshocking</i>	89865	Maximum pool depth
<i>819</i>	<i>Percentage of individuals as non-native</i>	89866	Average width of riparian vegetation
<i>820</i>	<i>Regional IBI</i>	90010	Dominant functional feeding group percentage
<i>832</i>	<i>Total RBP score</i>	89899	Biological rpt unit
89853	Percent other as riparian vegetation	90009	Number of functional feeding groups
89839	Total number of stream bends	89906	Number of individuals in RBA sample
98008	Total number of sunfish species	89941	Seine length
90025	Percentage benthic gatherers	89943	Electrofishing method
90030	Percentage benthic filterers	89944	Electrofishing duration
90035	Percentage benthic shredders	89946	Average mesh size
90036	Percentage benthic predators	89948	Number of seine hauls



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STORET Code	Description	STORET Code	Description
834	<i>Percentage benthic scrapers</i>	89950	Benthic sampling code
90042	Percentage benthic inverts individuals in dominant taxon	89961	Texas ecoregion
90050	Ratio of intolerant to tolerant taxa	89976	Area seined
90052	Number of non-insects	90007	Hilsenhoff biotic index
90054	Percentage of Elmidae	89849	Percent trees
92266	Percentage of Trichoptera that are Hydropsychidae	89867	Aesthetics
92491	Percent Chironomidae	835	<i>Benthic invertebrate taxa richness</i>
89850	Percent as shrubs	836	<i>Number instream cover types</i>
98004	Total number of darter species	89904	Minutes spent kicknetting

\* STORET Codes beginning with 8 have yet to be formally established

### Benthic Macroinvertebrate Collections

Biological sampling included fish and benthic macroinvertebrate data collection at each site within the segment. A location map of the segment, as well as the 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 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

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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 2107. 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,

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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 33)	RBP	HQI
Limited	<34	<36	<22	<14
Intermediate	40-44	36-41	22-28	14-19
High	48-52	42-51	29-36	20-25
Exceptional	58-60	>51	>36	26-31

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

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 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 assigned. A subcategory of “Exceptional” would be considered exceeding presumed standards for Segment 2107. Statewide IBI scores averaged approximately 39.2 (Limited-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 38.4 (Intermediate), and represented a higher agreement (22.2%; 0% above standard). RBP scores averaged 24.7 (Intermediate), a 22.2% agreement (77.8% below standard), while HQI averaged approximately 16.2 (Intermediate) in 0% agreement with the aquatic life use (100% below standard).

**Table 3. Results of Biological and Habitat Sampling for Segment 2107-Atascosa River**

FY02	Statewide IBI	Regional IBI	RBP	HQI
17898	40 – Intermediate	37 – Intermediate	18 – Limited	18 – Intermediate
17900	38 – Limited-Intermediate	30 - Limited	29 – High	19 – Intermediate
17899	44 – Intermediate	40 – Intermediate	25 - Intermediate	17 – Intermediate
<b>FY03</b>				
17898	43 – Intermediate	40 – Intermediate	23 – Intermediate	17 – Intermediate
17900	34 – Limited-Intermediate	42 – High	25 – Intermediate	14 – Intermediate
17899	36 – Limited-Intermediate	34 - Limited	19 - Intermediate	15 - Intermediate
<b>FY04</b>				
17898	38 – Limited-Intermediate	44 – High	22 – Intermediate	16 – Intermediate
17900	40 – Intermediate	41 – Intermediate	35 – High	15 – Intermediate
17899	40 – Intermediate	38 - Intermediate	26 - Intermediate	15 - Intermediate

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#### 4.0 DISCUSSION

Average scores of all biological components generally reflected lower values than the “High” aquatic life use designation for Segment 2107. The general trend in Statewide IBI scores is to underestimate the aquatic life use when compared to other assessment methods (TPWD 2002). Although Regional IBI scores were generally higher than Statewide IBI scores, they still were relatively poor for this segment. The lower Statewide and 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 were generally meeting standards during the physical and chemical data sampling performed on Segment 2107.

#### 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 standard assumed in the Texas Water Quality Standards.

#### REFERENCES

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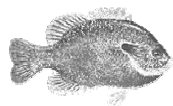
Appendix A  
Complete Raw Data Set  
Biological and Habitat Components  
Segment 2107  
Atascosa River, Texas  
August 2002  
April 2003  
September 2003



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## BIOTIC ASSESSMENT – FISH

### Species Lists and Preliminary Data Manipulation



## FISH COLLECTED

Stream	Date	ID	Species	N=	Type	Method	Tolerance	Trophic Gp
Atascosa	8/19/02	17898	Bluegill	18	SF	E	T	IF
			Bluegill	36	SF	S	T	IF
			Bullhead Minnow	1		S	-	IF
			Common Carp	1		S	T	O
			Flathead Catfish	1		S	-	P
			Gambusia affinis	4		E	T	IF
			Gambusia affinis	69		S	T	IF
			Gizzard Shad	4		E	T	O
			Gizzard Shad	7		S	T	O
			Green Sunfish	7	SF	E	T	P
			Largemouth Bass	1		E	-	P
			Largemouth Bass	1		S	-	P
			Red Shiner	3		S	T	IF
			Redbreast Sunfish	3	SF	E	-	IF
			Redear Sunfish	5	SF	S	-	IF
			Rio Grande Cichlid	6		E	-	IF
			Rio Grande Cichlid	1		S	-	IF
			Sailfin Molly	2		E	T	O
			Warmouth	2	SF	E	T	P
			Warmouth	1	SF	S	T	P
			Yellow Bullhead	4		E	-	O
<b>Total</b>				<b>177</b>			<b>87%</b>	

Stream	Date	ID	Species	N=	Type	Method	Tolerance	Trophic Gp
Atascosa	8/20/02	17900	Bluegill	1	SF	E	T	IF
	8/22/02		Bluegill	2	SF	S	T	IF
			Bullhead Minnow	2		E	-	IF
			Bullhead Minnow	7		S	-	IF
			Channel Catfish	1		S	T	O
			Gambusia affinis	11		E	T	IF
			Gambusia affinis	49		S	T	IF
			Green Sunfish	3	SF	E	T	P
			Largemouth Bass	1		S	-	P
			Longear Sunfish	5	SF	E	-	IF
			Longear Sunfish	5	SF	S	-	IF
			Red Shiner	22		S	T	IF
			Red Shiner	6		E	T	IF
			Redbreast Sunfish	2	SF	E	-	IF
			Redbreast Sunfish	1	SF	S	-	IF
			Rio Grande Cichlid	-		V	-	IF
			Sailfin Molly	4		E	T	O
			Sailfin Molly	11		S	T	O
			Spotted/Orange Spotted Sunfish	5	SF	S	-	IF
<b>Total</b>				<b>138</b>				

\*\*Abnormalities:  
 1 Rebreast with hole in operculum  
 1 Longear with tumor on right dorsal fin

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	Tolerance	Trophic Gp
Atascosa	8/21/02	17899	Black Crappie	2	SF	E	-	P
			Bluegill	6	SF	E	T	IF
			Bluegill	15	SF	S	T	IF
			Bullhead Minnow	42		E	-	IF
			Bullhead Minnow	29		S	-	IF
			Channel Catfish	2		E	T	O
			Gambusia affinis	2		E	T	IF
			Gambusia affinis	39		S	T	IF
			Green Sunfish	6	SF	E	T	P
			Green Sunfish	1	SF	S	T	P
			Largemouth Bass	3		S	-	P
			Longear Sunfish	8	SF	E	-	IF
			Longear Sunfish	19	SF	S	-	IF
			Pugnose or Pallid Shiner	1		S	-	IF
			Red Shiner	6		E	T	IF
			Red Shiner	13		S	T	IF
			Redbreast Sunfish	2	SF	S	-	IF
			Rio Grande Cichlid	-		V	-	IF
			Sailfin Molly	8		E	T	O
			Sailfin Molly	9		S	T	O
			Texas Shiner	9		E	-	IF
			Texas Shiner	2		S	-	IF
			White Crappie	1	SF	S	-	P
			Yellow Bullhead	2		E	-	O
<b>Total</b>				<b>227</b>				

\*\*Observed spawning nests:  
-Sunfish and Rio Grande  
Cichlid



Stream: Atascosa

Date: 4/7/03

Location: 17898

Species	N=	Type	Method	Tolerance	Trophic Gp.
Amazon molly	1		E	~	O
Amazon molly	3		S	~	O
Black bullhead	1		E	T	O
Bluegill	52	SF	E	T	IF
Bluegill	31	SF	S	T	IF
Bullhead minnow	7	CY	E	~	IF
Bullhead minnow	22	CY	S	~	IF
Gambusia affinis	3		E	T	IF
Gambusia affinis	8		S	T	IF
Green sunfish	26	SF	E	T	P
Grey redhorse	6	SK	E	~	IF
Grey redhorse	32	SK	S	~	IF
Longear sunfish	5	SF	E	~	IF
Longear sunfish	5	SF	S	~	IF
Mexican tetra	1		E	~	IF
Unknown minnow	24	CY	E	~	IF
Unknown minnow	29	CY	S	~	IF
Red shiner	21	CY	E	T	IF
Red shiner	383	CY	S	T	IF
Redbreast sunfish	2	SF	S	~	IF
Rio Grande cichlid	10		E	~	IF
Rio Grande cichlid	1		S	~	IF
Spotted bass	1		E	~	P
Spotted sunfish	3	SF	E	~	IF
Texas shiner	30	CY	S	~	IF
Warmouth	2	SF	E	T	P
Warmouth	2	SF	S	T	P
White crappie	2	SF	E	~	P

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Stream: Atascosa

Date: 4/8/03

Location: 17900

Species	N=	Type	Method	Tolerance	Trophic Gp.
Bluegill	2	SF	E	T	IF
Bluegill	5	SF	S	T	IF
Bullhead minnow	1	CY	E	~	IF
Bullhead minnow	1	CY	S	~	IF
Channel catfish	1		E	T	O
Gambusia affinis	3		S	~	IF
Green sunfish	11	SF	E	T	P
Longear sunfish	4	SF	E	~	IF
Longear sunfish	6	SF	S	~	IF
Longear/Bluegill hybrid	1	SF	S	~	IF
Unknown minnow	9	CY	S	~	IF
Red shiner	4	CY	S	T	IF
Rio Grande cichlid	1		E	~	IF
Spotted sunfish	2	SF	E	~	IF
Texas shiner	4	CY	S	~	IF
Warmouth	1	SF	E	T	P

56

Stream: Atascosa  
 Date: 4/8/03  
 Location: 17899

Species	N=	Type	Method	Tolerance	Trophic Gp.
Bluegill	3	SF	E	T	IF
Bluegill	3	SF	S	T	IF
Bullhead minnow	4	CY	S	~	IF
Freshwater drum	1		S	T	IF
Gambusia affinis	7		E	~	IF
Gambusia affinis	9		S	~	IF
Green sunfish	2	SF	E	T	IF
Longear sunfish	5	SF	E	~	IF
Longear sunfish	2	SF	S	~	IF
Unknown minnow	2	CY	S	~	IF
Red shiner	10	CY	S	T	IF
Sailfin molly	1		E	T	O
Spotted sunfish	4	SF	S	~	IF

53

Atascosa Fish List

Stream: Atascosa  
 Date: 9/25/03  
 Location: 17898

Species	N=	Type	Method	Tolerance	Trophic Gp.
Bluegill	14	SF	E	T	IF
Bluegill	2	SF	S	T	IF
Bullhead Minnow	4	CY	S	-	IF
Channel Catfish	1		E	T	O
Channel Catfish	2		S	T	O
Green Sunfish	10	SF	E	T	P
Lepomis sp.	10	SF	E	-	-
Lepomis sp.	6	SF	S	-	-
Lepomis sp. hybrid	1	SF	E	-	-
Longear Sunfish	12	SF	E	-	IF
Mexican Tetra	2		E	-	IF
Mexican Tetra	1		S	-	IF
Red Shiner	18	CY	E	T	IF
Red Shiner	20	CY	S	T	IF
Rio Grande Cichlid	57		E	-	IF
Rio Grande Cichlid	2		S	-	IF
Sailfin Molly	48		E	T	O
Sailfin Molly	9		S	T	O
Texas Shiner	1	CY	S	-	IF
Western Mosquitofish	265		E	T	IF
Western Mosquitofish	219		S	T	IF
Yellow bullhead	2		E	-	O
	706			0.17563739	

Stream: Atascosa  
 Date: 9/24/03  
 Location: 17900

Species	N=	Type	Method	Tolerance	Trophic Gp.
Bluegill	6	SF	E	T	IF
Bullhead Minnow	7	CY	E	-	IF
Green Sunfish	12	SF	E	T	P
Green Sunfish	2	SF	S	T	P
Lepomis sp.	2	SF	E	-	-
Longear Sunfish	9	SF	E	-	IF
Mexican Tetra	1		E	-	IF
Mexican Tetra	2		S	-	IF
Red Shiner	11	CY	S	T	IF
Redbreast Sunfish	2	SF	E	-	IF
Redear Sunfish	1	SF	E	-	IF
Rio Grande Cichlid	4		E	-	IF
Sailfin Molly	18		E	T	IF
Sailfin Molly	3		S	T	IF
Western Mosquitofish	34		E	T	IF
Western Mosquitofish	28		S	T	IF
	142				

Atascosa Fish List

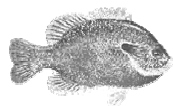
Stream: Atascosa  
 Date: 9/24/03  
 Location: 17899

Species	N=	Type	Method	Tolerance	Trophic Gp.
Bluegill	7	SF	E	T	IF
Bullhead Minnow	7	CY	E	-	IF
Bullhead Minnow	16	CY	S	-	IF
Channel Catfish	1		E	T	O
Green Sunfish	3	SF	E	T	P
Lepomis sp.	3	SF	E	-	-
Lepomis sp.	3	SF	S	-	-
Longear Sunfish	2	SF	E	-	IF
Mexican Tetra	2		E	-	IF
Red Shiner	3	CY	E	T	IF
Red Shiner	1	CY	S	T	IF
Rio Grande Cichlid	4		S	-	IF
Sailfin Molly	13		E	T	IF
Sailfin Molly	13		S	T	IF
Unknown Minnow	14	CY	S	-	IF
Western Mosquitofish	47		E	T	IF
Western Mosquitofish	105		S	T	IF

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## BIOTIC ASSESSMENT – FISH

### Indices of Biotic Integrity – Statewide Criteria



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

Stream: Atascosa		Date: 8/19/02	Location: 17898	County: Atascosa
Category	Metric	Value	Score	
Species Richness and Composition	1. Total number of fish species	15	3	
	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	87	1	
Trophic Composition	7. Percentage of individuals as omnivores	10	5	
	8. Percentage of individuals as insectivores	82	5	
	9. Percentage of individuals as piscivores	7	5	
Fish Abundance and Condition	10. Number of individuals in sample	177	3	
	11. Percentage of individuals as hybrids	0	5	
	12. Percentage of individuals with disease/anomalies	0	5	
Aquatic Life Use: INTERMEDIATE		Total Points:	<b>40</b>	

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

Stream: Atascosa		Date: 8/20/02	Location: 17900	County: Atascosa
Category	Metric	Value	Score	
Species Richness and Composition	1. Total number of fish species	12	3	
	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	80	1	
Trophic Composition	7. Percentage of individuals as omnivores	12	5	
	8. Percentage of individuals as insectivores	86	5	
	9. Percentage of individuals as piscivores	3	3	
Fish Abundance and Condition	10. Number of individuals in sample	138	3	
	11. Percentage of individuals as hybrids	0	5	
	12. Percentage of individuals with disease/anomalies	1.4	5	
		Aquatic Life Use: LIMITED-INTERMEDIATE	Total Points:	<b>38</b>

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

<b>Stream: Atascosa</b>		<b>Date: 8/21/02</b>	<b>Location: 17899</b>	<b>County: Atascosa</b>
<b>Category</b>	<b>Metric</b>	<b>Value</b>	<b>Score</b>	
Species Richness and Composition	1. 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	47	1	
Trophic Composition	7. Percentage of individuals as omnivores	9	5	
	8. Percentage of individuals as insectivores	85	5	
	9. Percentage of individuals as piscivores	6	5	
Fish Abundance and Condition	10. Number of individuals in sample	227	5	
	11. Percentage of individuals as hybrids	0	5	
	12. Percentage of individuals with disease/anomalies	0	5	
Aquatic Life Use: INTERMEDIATE		Total Points:	<b>44</b>	



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

Stream: Atascosa Date: 4/7/03 Location: 17898 County: Atascosa			
Category	Metric	Value	Score
Species Richness and Composition	1. Total # of fish species	18	5
	2. Number of darter species	0	1
	3. Number of sunfish species (exc. bass)	7	5
	4. Number of sucker species	1	3
	5. Number of intolerant species	0	1
	6. Percentage of individuals as tolerants	74	1
Trophic Composition	7. Percentage of individuals as omnivores	0.7	5
	8. Percentage of individuals as insectivores	94	5
	9. Percentage of individuals as piscivores	5	3
Fish Abundance and Condition	10. Number of individuals in sample	713	5
	11. Percentage of individuals as hybrids	0	5
	12. Percentage of individuals with disease/anomolies	0	5
Aquatic Life Use: INTERMEDIATE		Total Points:	43

Stream: Atascosa Date: 4/8/03 Location: 17900 County: Atascosa			
Category	Metric	Value	Score
Species Richness and Composition	1. Total # of fish species	12	3
	2. Number of darter species	0	1
	3. Number of sunfish species (exc. bass)	4	5
	4. Number of sucker species	0	1
	5. Number of intolerant species	0	1
	6. Percentage of individuals as tolerants	43	1
Trophic Composition	7. Percentage of individuals as omnivores	2	5
	8. Percentage of individuals as insectivores	77	3
	9. Percentage of individuals as piscivores	21	5
Fish Abundance and Condition	10. Number of individuals in sample	56	3
	11. Percentage of individuals as hybrids	2	1
	12. Percentage of individuals with disease/anomolies	0	5
Aquatic Life Use: LIMITED-INTERMEDIATE		Total Points:	34

Stream: Atascosa Date: 4/8/03 Location: 17899 County: Atascosa			
Category	Metric	Value	Score
Species Richness and Composition	1. Total # of fish species	10	3
	2. Number of darter species	0	1
	3. Number of sunfish species (exc. bass)	4	5
	4. Number of sucker species	0	1
	5. Number of intolerant species	0	1
	6. Percentage of individuals as tolerants	37	1
Trophic Composition	7. Percentage of individuals as omnivores	2	5
	8. Percentage of individuals as insectivores	98	5
	9. Percentage of individuals as piscivores	0	1
Fish Abundance and Condition	10. Number of individuals in sample	54	3
	11. Percentage of individuals as hybrids	0	5
	12. Percentage of individuals with disease/anomolies	0	5
Aquatic Life Use: LIMITED-INTERMEDIATE		Total Points:	36

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

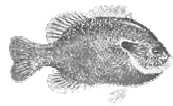
Stream: Atascosa Date: 9/25/03 Location: 17898 County: Atascosa			
Category	Metric	Value	Score
Species Richness and Composition	1. Total # of fish species	14	3
	2. Number of darter species	0	1
	3. Number of sunfish species (exc. bass)	5	5
	4. Number of sucker species	0	1
	5. Number of intolerant species	0	1
	6. Percentage of individuals as tolerants	88.1	1
Trophic Composition	7. Percentage of individuals as omnivores	9	5
	8. Percentage of individuals as insectivores	89.5	5
	9. Percentage of individuals as piscivores	1.5	3
Fish Abundance and Condition	10. Number of individuals in sample	706	5
	11. Percentage of individuals as hybrids	0.14	3
	12. Percentage of individuals with disease/anomolies	0	5
Aquatic Life Use: LIMITED-INTERMEDIATE		Total Points:	38

Stream: Atascosa Date: 9/24/03 Location: 17900 County: Atascosa			
Category	Metric	Value	Score
Species Richness and Composition	1. Total # of fish species	12	3
	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	0	1
	6. Percentage of individuals as tolerants	80.28	1
Trophic Composition	7. Percentage of individuals as omnivores	0	5
	8. Percentage of individuals as insectivores	90	5
	9. Percentage of individuals as piscivores	10	5
Fish Abundance and Condition	10. Number of individuals in sample	142	3
	11. Percentage of individuals as hybrids	0	5
	12. Percentage of individuals with disease/anomolies	0	5
Aquatic Life Use: INTERMEDIATE		Total Points:	40

Stream: Atascosa Date: 9/24/03 Location: 17899 County: Atascosa			
Category	Metric	Value	Score
Species Richness and Composition	1. Total # of fish species	12	3
	2. Number of darter species	0	1
	3. Number of sunfish species (exc. bass)	4	5
	4. Number of sucker species	0	1
	5. Number of intolerant species	0	1
	6. Percentage of individuals as tolerants	79.1	1
Trophic Composition	7. Percentage of individuals as omnivores	0.42	5
	8. Percentage of individuals as insectivores	98.31932773	5
	9. Percentage of individuals as piscivores	1.260504202	3
Fish Abundance and Condition	10. Number of individuals in sample	244	5
	11. Percentage of individuals as hybrids	0	5
	12. Percentage of individuals with disease/anomolies	0	5
Aquatic Life Use: INTERMEDIATE		Total Points:	40

## BIOTIC ASSESSMENT – FISH

### Indices of Biotic Integrity – Regional Criteria



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

Stream: Atascosa		Date: 08/19/02	Location: 17898	County: Atascosa
Metric	Value	Score		
1. Total number of fish species	15	3		
2. Number of native cyprinid species	3	3		
3. Number of benthic invertivore species	0	1		
4. Number of sunfish species	5	5		
5. Number of intolerant species	0	1		
6. Percentage of individuals as tolerants (exc. <i>G. affinis</i> )	46	3		
7. Percentage of individuals as omnivores	10	3		
8. Percentage of individuals as insectivores	82	5		
9. Percentage of individuals as piscivores	7	3		
10. Number of individuals in sample	177	-		
a. number of ind/seine haul	21	3		
b. number of ind/min electrofishing	3.4	1		
11. Percentage of ind. as non-native species	2.3	3		
12. Percentage of individuals with disease/anomalies	0	5		
Aquatic Life Use: INTERMEDIATE	Total Points:	<b>37</b>		

2\*

\*Average 10a and 10b

Drainage area upstream of 17898 ~ 861.3 sq. km.

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

Stream: Atascosa		Date: 08/20/02	Location: 17900	County: Atascosa
Metric	Value	Score		
1. Total number of fish species	12	3		
2. Number of native cyprinid species	2	2		
3. Number of benthic invertivore species	0	1		
4. Number of sunfish species	5	5		
5. Number of intolerant species	0	1		
6. Percentage of individuals as tolerants (exc. <i>G. affinis</i> )	42	3		
7. Percentage of individuals as omnivores	12	3		
8. Percentage of individuals as insectivores	86	5		
9. Percentage of individuals as piscivores	3	1		
10. Number of individuals in sample	138	-		
a. number of ind/seine haul	17	3		
b. number of ind/min electrofishing	2.3	1		
11. Percentage of ind. as non-native species	2.2	3		
12. Percentage of individuals with disease/anomalies	1.4	1		
Aquatic Life Use: LIMITED	Total Points:		<b>30</b>	

2\*

\*Average of 10a and 10b

Drainage area upstream of 17900 ~ 1,172.6 sq. km.

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

Stream: Atascosa		Date: 08/21/02	Location: 17899	County: Atascosa
Metric	Value	Score		
1. Total number of fish species	16	3		
2. Number of native cyprinid species	4	3		
3. Number of benthic invertivore species	0	1		
4. Number of sunfish species	6	5		
5. Number of intolerant species	0	1		
6. Percentage of individuals as tolerants (exc. <i>G. affinis</i> )	29	3		
7. Percentage of individuals as omnivores	9	3		
8. Percentage of individuals as insectivores	85	5		
9. Percentage of individuals as piscivores	6	3		
10. Number of individuals in sample	227	-		
a. number of ind/seine haul	22	3		
b. number of ind/min electrofishing	6.2	3		
11. Percentage of ind. as non-native species	0.89	5		
12. Percentage of individuals with disease/anomalies	0	5		
Aquatic Life Use: INTERMEDIATE	Total Points:	<b>40</b>		

3\*

\*Average of 10a and 10b

Drainage area above 17899 ~ 1,252.7 sq. km.

Stream: Atascosa (33)      Date: 4/7/03      Location: 17898      County: Atascosa		
Metric	Value	Score
1. Total # of fish species	18	3
2. Total Number of cyprinid species	4	3
3. Number of benthic invertivore species	1	1
4. Number of sunfish species (exc. bass)	7	5
5. Number of intolerant species	0	1
6. Percentage of individuals as tolerants (exc. <i>G.affinis</i> )	72.7	1
7. Percentage of individuals as omnivores	0.7	5
8. Percentage of individuals as insectivores	94.7	5
9. Percentage of individuals as piscivores	4.6	1
10. Number of individuals in sample	~	~
a. Number of individuals/seine haul	91.3	5
b. Number of individuals/min. electroshocking	11	5
11. Percentage of individuals as non-native species	0.3	5
12. Percentage of individuals with disease/anomolies	0	5
Aquatic Life Use: INTERMEDIATE	Total Points:	40

5\*

\*Average of 10a and 10b

Drainage area above 17898 ~ 861.3 sq. km.

Stream: Atascosa (33)      Date: 4/8/03      Location: 17900      County: Atascosa		
Metric	Value	Score
1. Total # of fish species	12	3
2. Total Number of cyprinid species	4	3
3. Number of benthic invertivore species	0	1
4. Number of sunfish species (exc. bass)	5	5
5. Number of intolerant species	0	1
6. Percentage of individuals as tolerants (exc. <i>G.affinis</i> )	42.9	3
7. Percentage of individuals as omnivores	1.8	5
8. Percentage of individuals as insectivores	76.8	5
9. Percentage of individuals as piscivores	21.4	5
10. Number of individuals in sample	~	~
a. Number of individuals/seine haul	5.5	1
b. Number of individuals/min. electroshocking	1.5	1
11. Percentage of individuals as non-native species	0	5
12. Percentage of individuals with disease/anomolies	0	5
Aquatic Life Use: HIGH	Total Points:	42

1\*

\*Average of 10a and 10b

Drainage area above 17900 ~ 1,172.6 sq. km.

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

Stream: Atascosa (33)      Date: 4/8/03      Location: 17899      County: Atascosa		
Metric	Value	Score
1. Total # of fish species	10	1
2. Total Number of cyprinid species	3	3
3. Number of benthic invertivore species	0	1
4. Number of sunfish species (exc. bass)	4	3
5. Number of intolerant species	0	1
6. Percentage of individuals as tolerants (exc. <i>G.affinis</i> )	37.7	3
7. Percentage of individuals as omnivores	1.9	5
8. Percentage of individuals as insectivores	98.1	5
9. Percentage of individuals as piscivores	0	1
10. Number of individuals in sample	~	~
a. Number of individuals/seine haul	5.8	1
b. Number of individuals/min. electroshocking	1.2	1
11. Percentage of individuals as non-native species	0	5
12. Percentage of individuals with disease/anomolies	0	5
Aquatic Life Use: LIMITED	Total Points:	34

1\*

\*Average of 10a and 10b

Drainage area above 17899 ~ 1,252.7 sq. km.



Stream: Atascosa (33)      Date: 9/25/03      Location: 17898      County: Bexar		
Metric	Value	Score
1. Total # of fish species	14	3
2. Total Number of cyprinid species	3	3
3. Number of benthic invertivore species	0	1
4. Number of sunfish species (exc. bass)	5	5
5. Number of intolerant species	0	1
6. Percentage of individuals as tolerants (exc. <i>G.affinis</i> )	17.56	5
7. Percentage of individuals as omnivores	8.78	5
8. Percentage of individuals as insectivores	87.39	5
9. Percentage of individuals as piscivores	1.416430595	1
10. Number of individuals in sample		~
a. Number of individuals/seine haul	44	5
b. Number of individuals/min. electroshocking	29.3	5
11. Percentage of individuals as non-native species	0	5
12. Percentage of individuals with disease/anomolies	0	5
Aquatic Life Use: HIGH	Total Points:	44

5\*

\*Average of 10a and 10b

Drainage area above 17898 ~ 861.3 sq. km.

Stream: Atascosa (33)      Date: 9/24/03      Location: 17900      County: Atascosa		
Metric	Value	Score
1. Total # of fish species	12	3
2. Total Number of cyprinid species	2	3
3. Number of benthic invertivore species	0	1
4. Number of sunfish species (exc. bass)	6	5
5. Number of intolerant species	0	1
6. Percentage of individuals as tolerants (exc. <i>G.affinis</i> )	36.61971831	3
7. Percentage of individuals as omnivores	0	5
8. Percentage of individuals as insectivores	90	5
9. Percentage of individuals as piscivores	10	5
10. Number of individuals in sample		~
a. Number of individuals/seine haul	7.67	1
b. Number of individuals/min. electroshocking	6.4	3
11. Percentage of individuals as non-native species	1.418439716	3
12. Percentage of individuals with disease/anomolies	0	5
Aquatic Life Use: INTERMEDIATE	Total Points:	41

2\*

\*Average of 10a and 10b

Drainage area above 17900 ~ 1,172.6 sq. km.

Stream: Atascosa (33)      Date: 9/24/03      Location: 17899      County: Atascosa		
Metric	Value	Score
1. Total # of fish species	12	1
2. Total Number of cyprinid species	3	3
3. Number of benthic invertivore species	0	1
4. Number of sunfish species (exc. bass)	4	3
5. Number of intolerant species	0	1
6. Percentage of individuals as tolerants (exc. <i>G.affinis</i> )	16.80327869	5
7. Percentage of individuals as omnivores	0.409836066	5
8. Percentage of individuals as insectivores	98.31932773	5
9. Percentage of individuals as piscivores	1.260504202	1
10. Number of individuals in sample		~
a. Number of individuals/seine haul	26	3
b. Number of individuals/min. electroshocking	5.87	3
11. Percentage of individuals as non-native species	0	5
12. Percentage of individuals with disease/anomolies	0	5
Aquatic Life Use: INTERMEDIATE	Total Points:	38

3\*

\*Average of 10a and 10b

Drainage area upstream of 17899 ~ 1,252.7 sq. km.

# BIOTIC ASSESSMENT – BENTHIC MACROINVERTEBRATES

## Species Lists and Preliminary Data Manipulation



Benthic Macroinvertebrates - Kick Sample (Qualitative)

Stream	Date	ID	Taxa	N=	Func.Gp.	Tolerance	HBI
Atascosa	8/19/02	17898	Odonata-Coenagrionidae- <i>Argia</i>	2	P	6	0.1100917
			Odonata-Lestidae- <i>Lestes</i>	1	-	-	-
			Odonata-Gomphidae- <i>Progomphus</i>	1	P	5	0.0458716
Func.Gp	%		Ephemeroptera-Tricorythidae- <i>Tricorythodes</i>	2	CG	5	0.0917431
P	37.2727		Ephemeroptera-Baetidae- <i>Baetis</i>	12	SCR/CG	4	0.440367
SCR	5.75758		Coleoptera-Scirtidae- <i>Cyphon</i> (L)	1	CR/CG/SH	-	-
CG	32.5758		Diptera-Chironomidae	66	P/CG/FC	6	3.6330275
FC	23.6364		Diptera-Simuliidae- <i>Simulium</i>	4	FC	4	0.146789
SHR	0.75758		Diptera-Ceratopogonidae- <i>Probezzia</i>	1	P/CG	5	0.0458716
	100		Diptera-Ceratopogonidae- <i>Ceratopogon</i>	1	P/CG	5	0.0458716
			Hirudinea	15	P	8	1.1009174
			Oligochaeta	4	CG	8	0.293578
			Coleoptera-Scirtidae- <i>Cyphon</i> (L)	2	-	-	-
			Amphipoda-Hyalloidea- <i>Hyalloidea</i>	1	CG/SHR	8	0.0733945
<b>Total</b>				110	109		6.0275229
<b>Intolerant/Tolerant</b>				0.24			

Stream	Date	ID	Taxa	N=	Func.Gp.	Tolerance	HBI
Atascosa	8/20/02	17900	Odonata-Coenagrionidae- <i>Argia</i>	5	P	6	0.2912621
			Odonata-Gomphidae- <i>Progomphus</i>	1	P	5	0.0485437
			Odonata-Gomphidae- <i>Erpetogomphus</i>	17	P	1	0.1650485
Func.Gp	%		Odonata-Gomphidae- <i>Arigomphus</i>	1	-	-	-
P	25.89		Odonata-Macromiidae- <i>Macromia</i>	1	P	3	0.0291262
SCR	23.7864		Ephemeroptera-Tricorythidae- <i>Tricorythodes</i>	10	CG	5	0.4854369
CG	37.055		Ephemeroptera-Tricorythidae- <i>Leptohypes</i>	1	CG	2	0.0194175
FC	12.2977		Ephemeroptera-Leptophlebiidae- <i>Farrodes</i>	6	CG/SCR	2	0.1165049
SHR	0.97087		Ephemeroptera-Baetidae- <i>Baetis</i>	33	SCR/CG	4	1.2815534
	100		Trichoptera-Hydropsychidae- <i>Cheumatopsyche</i>	1	FC	6	0.0582524
			Trichoptera-Hydropsychidae- <i>Smicridea</i>	7	FC	4	0.2718447
			Coeloptera-Elmidae- <i>Stenelmus</i> (A)	7	CG/SCR	7	0.4757282
			Coeloptera-Elmidae- <i>Stenelmus</i> (L)	3	CG/SCR	7	0.2038835
			Diptera-Chironomidae	5	P/CG/FC	6	0.2912621
			Hydracarina	1	P	6	0.0582524
			Bivalvia (Heterodonta)- <i>Corbiculidae-Corbiclua</i>	3	FC	6	0.1747573
			Amphipoda-Hyalloidea- <i>Hyalloidea</i>	2	CG/SHR	8	0.1553398
<b>Total</b>				103			4.1262136
<b>Intolerant/Tolerant</b>				2.81			

P-Predator  
 SCR-Scraper  
 CG-Collector/Gatherer  
 FC-Filtering Collector  
 SHR-Shredder

HBI-Hilsenhoff Biotic Index:  
 =sum(nt/N) where n=number  
 of ind. of a particular taxa,  
 t=tolerance value of that  
 taxon, N=number organisms  
 in sample.

Benthic Macroinvertebrates - Kick Sample (Qualitative)

Stream	Date	ID	Taxa	N=	Func.Gp.	Tolerance	HBI
Atascosa	8/21/02	17899	Odonata-Coenagrionidae- <i>Argia</i>	1	P	6	0.2
			Odonata-Gomphidae- <i>Progomphus</i>	4	P	5	0.6666667
			Odonata-Gomphidae- <i>Arigomphus</i>	3	-	-	-
Func.Gp	%		Odonata-Macromiidae- <i>Macromia</i>	3	P	3	0.3
P	32.3232		Ephemeroptera-Baetidae- <i>Baetis</i>	1	SCR/CG	4	0.1333333
SCR	12.6263		Trichoptera-Hydropsychidae-Smicridea	2	FC	4	0.2666667
CG	20.7071		Coleoptera-Elmidae- <i>Neelmis</i>	4	CG/SCR	2	0.2666667
FC	29.2929		Coleoptera-Scirtidae- <i>Cyphon</i> (L)	5	CR/CG/SH	-	-
SHR	5.05051		Diptera-Chironomidae	8	P/CG/FC	6	1.6
	100		Bivalvia (Heterodonta)-Corbiculidae- <i>Corbiclula</i>	5	FC	6	1
<b>Total</b>				33	30		4.4333333
<b>Intolerant/Tolerant</b>							0.74

Benthic Macroinvertebrates - Kick Sample (Qualitative)

Stream: Atascosa		Species	N=	Tolerance	FFG	HBI
Date: 4/7/03		<i>Argia sp.</i>	5	6	P	0.256410256
Location: 17898		<i>Argomphus</i>	1			0
	%	<i>Cheumatopsyche</i>	31	6	FC	1.58974359
P	12.820513	<i>Uvarus</i>	1	-	P	-
SCR	11.111111	Chironomidae	27	6	P/CG/FC	1.384615385
CG	13.675214	<i>Simulium</i>	27	4	FC	0.923076923
FC	58.119658	<i>Physella</i>	13	9	SCR	1
SHR	4.2735043	<i>Corbicula</i>	1	6	FC	0.051282051
	100	<i>Hyaella</i>	10	8	CG/SHR	0.683760684
		<i>Palaemonetes</i>	2	4	CG	0.068376068
			117	0.33333333		5.957264957

Stream: Atascosa		Species	N=	Tolerance	FFG	HBI
Date: 4/8/03		<i>Argia sp.</i>	9	6	P	0.495412844
Location: 17900		<i>Progomphus</i>	2	5	P	0.091743119
	%	<i>Erpetogomphus</i>	8	1	P	0.073394495
P	20.489297	<i>Hetaerina</i>	3	6	P	0.165137615
SCR	16.055046	<i>Thraulodes</i>	2	2	CG/SCR	0.036697248
CG	16.360856	<i>Stenacron</i>	1	4	SCR/CG	0.036697248
FC	47.094801	<i>Fallceon</i>	32	4	SCR/CG	1.174311927
SHR	0	<i>Cheumatopsyche</i>	38	6	FC	2.091743119
	100	Chironomidae	1	6	P/CG/FC	0.055045872
		<i>Simulium</i>	8	4	FC	0.293577982
		<i>Corbicula</i>	5	6	FC	0.275229358
			109	0.94642857		4.788990826

Stream: Atascosa		Species	N=	Tolerance	FFG	HBI
Date: 4/8/03		<i>Argia sp.</i>	51	6	P	2.886792453
Location: 17899		<i>Erpetogomphus</i>	4	1	P	0.037735849
10010	%	<i>Caenis</i>	3	7	SCR/CG	0.198113208
P	52.830189	<i>Stenacron</i>	2	4	SCR/CG	0.075471698
SCR	12.735849	<i>Stenelmis (A)</i>	4	7	CG/SCR	0.264150943
CG	7.5471698	<b>Tricladida</b>	1	7.5	P	0.070754717
FC	24.528302	<i>Physella</i>	9	9	SCR	0.764150943
SHR	2.3584906	<i>Corbicula</i>	26	6	FC	1.471698113
	100	<i>Hyaella</i>	5	8	CG/SHR	0.377358491
		Cambaridae	1	5	CG	0.047169811
			106	0.07070707		6.193396226

Stream: Atascosa  
Date: 9/25/03  
Location: 17898

		Species	N=	Tolerance	FFG	HBI
		<i>Argia</i>	6	6	P	0.336448598
		<i>Enallagma</i>	11	6	P	0.61682243
%		<i>Tricorythodes</i>	1	5	CG	0.046728972
P	22.741433	<i>Fallceon</i>	36	4	SCR/CG	1.345794393
SCR	18.068536	<i>Cheumatopsyche</i>	7	6	FC	0.392523364
CG	35.202492	<i>Helichus</i> (A)	2	4	SCR/CG	0.074766355
FC	22.741433	<i>Tropisternus</i> (L)	1	9	P	0.08411215
SHR	1.2461059	<i>Cyphon</i> (L)	1	-	SCR/CG/SHR	-
	100	Chironomidae	19	6	P/CG/FC	1.065420561
		<i>Simulium</i>	11	4	FC	0.411214953
		<i>Hyaella</i>	2	8	CG/SHR	0.14953271
		<i>Palaemonetes</i>	10	4	CG	0.373831776
			107	1.30434783		4.897196262

Stream: Atascosa  
Date: 9/24/03  
Location: 17900

		Species	N=	Tolerance	FFG	HBI
		<i>Progomphus</i>	7	5	P	0.327102804
		<i>Erpetogomphus</i>	13	1	P	0.121495327
%		<i>Arigomphus</i>	1			0
P	42.367601	<i>Hetaerina</i>	4	6	P	0.224299065
SCR	22.429907	<i>Macromia</i>	1	3	P	0.028037383
CG	30.218069	<i>Tricorythodes</i>	6	5	CG	0.280373832
FC	4.9844237	<i>Caenis</i>	2	7	CG/SCR	0.130841121
SHR	0	<i>Thraulodes</i>	4	2	CG/SCR	0.074766355
	100	<i>Farrodes</i>	12	2	CG/SCR	0.224299065
		<i>Fallceon</i>	22	4	CG/SCR	0.822429907
		<i>Belostoma</i>	1	10	P	0.093457944
		<i>Rhagovelia</i>	18	-	P	-
		<i>Smicridea</i>	3	4	FC	0.112149533
		<i>Neoelmis</i> (A)	1	2	CG/SCR	0.018691589
		<i>Helichus</i> (A)	7	4	SCR/CG	0.261682243
		<i>Dineutus</i> (L)	1	5	P	0.046728972
		Chironomidae	1	6	P/CG/FC	0.056074766
		<b>Oligochaeta</b>	1	8	CG	0.074766355
		<i>Corbicula</i>	2	6	FC	0.112149533
		<i>Palaemonetes</i>	1	4	CG	0.037383178
			107	7.09090909		3.046728972

Stream: Atascosa  
Date: 9/24/03  
Location: 17899

		Species	N=	Tolerance	FFG	HBI
		<i>Argia</i>	13	6	P	0.702702703
		<i>Progomphus</i>	5	5	P	0.225225225
		<i>Erpetogomphus</i>	9	1	P	0.081081081
P	29	<i>Tricorythodes</i>	24	5	CG	1.081081081
SCR	23	<i>Leptohypes</i>	2	2	CG/SCR	0.036036036
CG	47	<i>Farrodes</i>	15	2	CG/SCR	0.27027027
FC	12	<i>Fallceon</i>	20	4	SCR/CG	0.720270271
SHR	0	<i>Rhagovelia</i>	1	-	P	-
	111	<i>Cheumatopsyche</i>	5	6	FC	0.27027027
		<i>Smicridea</i>	5	4	FC	0.18018018
		<i>Neoelmis</i> (A)	5	2	CG/SCR	0.09009009
		<i>Microcylloepus</i> (A)	2	2	CG/SCR	0.036036036
		<i>Stenelmis</i> (A)	2	7	CG/SCR	0.126126126
		<i>Gyrinus</i> (L)	1	6	P	0.054054054
		<i>Corbicula</i>	2	6	FC	0.108108108
			111	3.7826087		3.981981982

# BIOTIC ASSESSMENT – BENTHIC MACROINVERTEBRATES

## Rapid Bioassessment Protocol





Stream: <b>Atascosa</b> Date: <b>8/19/02</b> Location: <b>17898</b> County: <b>Atascosa</b>		
Metric	Value	Score
1. Taxa Richness	14	2
2. EPT Taxa Abundance	2	1
3. Biotic Index (HBI)	6.03	1
4. % Chironomidae	60	1
5. % Dominant Taxon	60	1
6. % Dominant FFG	37.27272727	3
7. % Predators	37.27272727	1
8. Ratio of Intolerant:Tolerant Taxa	0.24	1
9. % of Total Trichoptera as Hydropsychidae	No Trichoptera	1
10. # of Non-insect Taxa	4	3
11. % Collector-Gatherers	32.57575455	2
12. % of Total Number as Elmidae	0	1
Aquatic Life Use: <b>LIMITED</b>	Total Score:	18

Stream: <b>Atascosa</b> Date: <b>8/20/02</b> Location: <b>17900</b> County: <b>Atascosa</b>		
Metric	Value	Score
1. Taxa Richness	17	3
2. EPT Taxa Abundance	6	2
3. Biotic Index (HBI)	4.13	3
4. % Chironomidae	4.854368932	3
5. % Dominant Taxon	32.03883495	2
6. % Dominant FFG	37.0550165	3
7. % Predators	25.89	2
8. Ratio of Intolerant:Tolerant Taxa	2.81	2
9. % of Total Trichoptera as Hydropsychidae	100	1
10. # of Non-insect Taxa	3	2
11. % Collector-Gatherers	37.0550165	2
12. % of Total Number as Elmidae	9.708737864	4
Aquatic Life Use: <b>HIGH</b>	Total Score:	29

Stream: <b>Atascosa</b> Date: <b>8/21/02</b> Location: <b>17899</b> County: <b>Atascosa</b>		
Metric	Value	Score
1. Taxa Richness	10	2
2. EPT Taxa Abundance	2	1
3. Biotic Index (HBI)	4.43	3
4. % Chironomidae	24.24242424	1
5. % Dominant Taxon	24.24242424	3
6. % Dominant FFG	32.32324242	4
7. % Predators	32.32324242	2
8. Ratio of Intolerant:Tolerant Taxa	0.74	1
9. % of Total Trichoptera as Hydropsychidae	100	1
10. # of Non-insect Taxa	1	1
11. % Collector-Gatherers	20.70706061	3
12. % of Total Number as Elmidae	12.12121212	3
Aquatic Life Use: <b>INTERMEDIATE</b> <b>***(Total Sample Size = 36)***</b>	Total Score:	25

Stream: <b>Atascosa</b> Date: 4/7/03 Location: 17898 County: <b>Atascosa</b>		
Metric	Value	Score
1. Taxa Richness	10	2
2. EPT Taxa Abundance	1	1
3. Biotic Index (HBI)	5.96	1
4. % Chironomidae	23.07692308	1
5. % Dominant Taxon	26.4957265	3
6. % Dominant FFG	58.11965812	1
7. % Predators	12.82051282	4
8. Ratio of Intolerant:Tolerant Taxa	0.33	1
9. % of Total Trichoptera as Hydropsychidae	100	1
10. # of Non-insect Taxa	4	3
11. % Collector-Gatherers	13.67521368	4
12. % of Total Number as Elmidae	0	1
Aquatic Life Use: <b>INTERMEDIATE</b>	Total Score:	23

Stream: <b>Atascosa</b> Date: 4/8/03 Location: 17900 County: <b>Atascosa</b>		
Metric	Value	Score
1. Taxa Richness	11	2
2. EPT Taxa Abundance	4	2
3. Biotic Index (HBI)	4.79	2
4. % Chironomidae	0.917431193	4
5. % Dominant Taxon	34.86238532	2
6. % Dominant FFG	47.09174312	2
7. % Predators	20.48623853	3
8. Ratio of Intolerant:Tolerant Taxa	0.97	1
9. % of Total Trichoptera as Hydropsychidae	100	1
10. # of Non-insect Taxa	1	1
11. % Collector-Gatherers	16.35779817	4
12. % of Total Number as Elmidae	0	1
Aquatic Life Use: <b>INTERMEDIATE</b>	Total Score:	25

Stream: <b>Atascosa</b> Date: 4/8/03 Location: 17899 County: <b>Atascosa</b>		
Metric	Value	Score
1. Taxa Richness	10	2
2. EPT Taxa Abundance	2	1
3. Biotic Index (HBI)	6.19	1
4. % Chironomidae	0	1
5. % Dominant Taxon	48.11320755	1
6. % Dominant FFG	52.83018868	2
7. % Predators	52.83018868	1
8. Ratio of Intolerant:Tolerant Taxa	0.07	1
9. % of Total Trichoptera as Hydropsychidae	No Trichoptera	1
10. # of Non-insect Taxa	4	3
11. % Collector-Gatherers	7.547169811	1
12. % of Total Number as Elmidae	3.773584906	4
Aquatic Life Use: <b>INTERMEDIATE</b>	Total Score:	19

Stream: <b>Atascosa</b> Date: 9/25/03 Location: 17898 County: Atascosa		
Metric	Value	Score
1. Taxa Richness	12	2
2. EPT Taxa Abundance	3	1
3. Biotic Index (HBI)	4.9	2
4. % Chironomidae	17.75700935	1
5. % Dominant Taxon	33.64485981	2
6. % Dominant FFG	35.20280374	4
7. % Predators	22.73831776	3
8. Ratio of Intolerant:Tolerant Taxa	1.3	1
9. % of Total Trichoptera as Hydropsychidae	100	1
10. # of Non-insect Taxa	2	2
11. % Collector-Gatherers	35.20280374	2
12. % of Total Number as Elmidae	0	1
Aqautic Life Use: <b>INTERMEDIATE</b>	Total Score:	22

Stream: <b>Atascosa</b> Date:9/24/03 Location: 17900 County: Atascosa		
Metric	Value	Score
1. Taxa Richness	20	3
2. EPT Taxa Abundance	6	2
3. Biotic Index (HBI)	3.05	4
4. % Chironomidae	0.925925926	4
5. % Dominant Taxon	20.37037037	4
6. % Dominant FFG	42.36448598	3
7. % Predators	42.36448598	1
8. Ratio of Intolerant:Tolerant Taxa	7.09	4
9. % of Total Trichoptera as Hydropsychidae	100	1
10. # of Non-insect Taxa	3	2
11. % Collector-Gatherers	30.21495327	3
12. % of Total Number as Elmidae	0.934579439	4
Aqautic Life Use: <b>HIGH</b>	Total Score:	35

Stream: <b>Atascosa</b> Date: 9/24/03 Location: 17899 County: Atascosa		
Metric	Value	Score
1. Taxa Richness	15	3
2. EPT Taxa Abundance	6	1
3. Biotic Index (HBI)	3.98	3
4. % Chironomidae	0	1
5. % Dominant Taxon	21.62162162	3
6. % Dominant FFG	42.34234234	4
7. % Predators	26.12612613	2
8. Ratio of Intolerant:Tolerant Taxa	3.78	1
9. % of Total Trichoptera as Hydropsychidae	100	1
10. # of Non-insect Taxa	1	1
11. % Collector-Gatherers	42.34234234	3
12. % of Total Number as Elmidae	8.108108108	3
Aqautic Life Use: <b>INTERMEDIATE</b>	Total Score:	26

# HABITAT ASSESSMENT

## Part I – Stream Physical Characteristics Worksheet

See Appendix B



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

Part I - Stream Physical Characteristics Worksheet

Observers: \_\_\_\_\_ Date: \_\_\_ Time: \_\_\_ Weather conditions: \_\_\_\_\_

Stream: \_\_\_\_\_ Location of site: \_\_\_\_\_ Length of stream reach: \_\_\_\_\_

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

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

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

Riparian Vegetation (%):

Left Bank: Trees\_ Shrubs\_ Grasses, Forbs\_ Cult. Fields\_ Other\_

Right Bank: Trees\_ Shrubs\_ Grasses, Forbs\_ Cult. Fields\_ Other\_

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

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

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

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

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

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

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

Part I - Stream Physical Characteristics Worksheet

Observers: \_\_\_\_\_ Date: \_\_\_ Time: \_\_\_ Weather conditions: \_\_\_\_\_

Stream: \_\_\_\_\_ Location of site: \_\_\_\_\_ Length of stream reach: \_\_\_\_\_

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

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

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

Riparian Vegetation (%):

Left Bank: Trees\_ Shrubs\_ Grasses, Forbs\_ Cult. Fields\_ Other\_

Right Bank: Trees\_ Shrubs\_ Grasses, Forbs\_ Cult. Fields\_ Other\_

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

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

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

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

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

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



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

Part I - Stream Physical Characteristics Worksheet

Observers: \_\_\_\_\_ Date: \_\_\_ Time: \_\_\_ Weather conditions: \_\_\_\_\_

Stream: \_\_\_\_\_ Location of site: \_\_\_\_\_ Length of stream reach: \_\_\_\_\_

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

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

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

Riparian Vegetation (%):

Left Bank: Trees\_ Shrubs\_ Grasses, Forbs\_ Cult. Fields\_ Other\_

Right Bank: Trees\_ Shrubs\_ Grasses, Forbs\_ Cult. Fields\_ Other\_

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

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

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

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

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

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

# HABITAT ASSESSMENT

## Part II – Summary of Physical Characteristics of Water Body



## Part II - Summary of Physical Characteristics of Water Body

Stream name	Atascosa 17898
Date of assessment	8/19/2002
Stream bed slope over evaluated reach	0.0012
Approximate drainage area above transect furthest downstream	861km <sup>2</sup>
Stream order	5
Length of stream evaluated	260m
Number of lateral transects made	5
Average stream width	8.8m
Average stream depth	0.23
Instantaneous flow	1.26 ft <sup>3</sup> /sec
Indicate flow measurement method	Current Meter
Channel flow status	High
Maximum pool width	11m
Maximum pool depth	<0.5m
Total number of stream bends	3
Number of well defined bends	0
Number of moderately defined bends	0
Number of poorly defined bends	3
Total number of riffles	6
Dominant substrate type	Gravel
Average percent of substrate gravel sized or larger	44%
Average percent instream cover	27%
Number of stream cover types	4
Average percent stream bank erosion potential	37%
Average stream bank slope	42°
Average width of vegetative buffer	27m
Average riparian vegetation percent composition by:	
Trees	1.50%
Shrubs	3%
Grasses/Forbes	29.50%
Cultivated Fields	
Other	66%
Average percent tree canopy coverage	5%
Overall aesthetic appraisal of stream	Offensive

## Part II - Summary of Physical Characteristics of Water Body

Stream name	Atascosa 17900
Date of assessment	8/20/2002
Stream bed slope over evaluated reach	0.0025
Approximate drainage area above transect furthest downstream	1,173km <sup>2</sup>
Stream order	5
Length of stream evaluated	244m
Number of lateral transects made	5
Average stream width	5.32
Average stream depth	0.45m
Instantaneous flow	3.4 ft <sup>3</sup> /sec
Indicate flow measurement method	Current Meter
Channel flow status	High
Maximum pool width	6m
Maximum pool depth	0.5 - 1m
Total number of stream bends	4
Number of well defined bends	1
Number of moderately defined bends	2
Number of poorly defined bends	1
Total number of riffles	3
Dominant substrate type	Sand
Average percent of substrate gravel sized or larger	13%
Average percent instream cover	15%
Number of stream cover types	5
Average percent stream bank erosion potential	70%
Average stream bank slope	77°
Average width of vegetative buffer	>20m
Average riparian vegetation percent composition by:	
Trees	4%
Shrubs	4%
Grasses/Forbes	5%
Cultivated Fields	
Other	87%
Average percent tree canopy coverage	88%
Overall aesthetic appraisal of stream	Natural

## Part II - Summary of Physical Characteristics of Water Body

Stream name	Atascosa 17899
Date of assessment	8/21/2002
Stream bed slope over evaluated reach	0.0022
Approximate drainage area above transect furthest downstream	1,253km <sup>2</sup>
Stream order	5
Length of stream evaluated	272m
Number of lateral transects made	5
Average stream width	5.78m
Average stream depth	0.49m
Instantaneous flow	3.35 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	1
Number of well defined bends	0
Number of moderately defined bends	0
Number of poorly defined bends	1
Total number of riffles	1
Dominant substrate type	Sand
Average percent of substrate gravel sized or larger	0%
Average percent instream cover	8.60%
Number of stream cover types	3
Average percent stream bank erosion potential	36%
Average stream bank slope	53°
Average width of vegetative buffer	>20m
Average riparian vegetation percent composition by:	
Trees	10%
Shrubs	3%
Grasses/Forbes	4%
Cultivated Fields	
Other	83%
Average percent tree canopy coverage	83%
Overall aesthetic appraisal of stream	Natural

## Part II - Summary of Physical Characteristics of Water Body

Stream name	Atascosa 17898
Date of assessment	4/7/2003
Stream bed slope over evaluated reach	0.0012
Approximate drainage area above transect furthest downstream	861km <sup>2</sup>
Stream order	5
Length of stream evaluated	260m
Number of lateral transects made	5
Average stream width	5.73m
Average stream depth	0.18m
Instantaneous flow	
Indicate flow measurement method	Current Meter
Channel flow status	High
Maximum pool width	18m
Maximum pool depth	0.5-1m
Total number of stream bends	3
Number of well defined bends	0
Number of moderately defined bends	0
Number of poorly defined bends	3
Total number of riffles	2
Dominant substrate type	Silt
Average percent of substrate gravel sized or larger	31%
Average percent instream cover	16%
Number of stream cover types	7
Average percent stream bank erosion potential	82%
Average stream bank slope	40°
Average width of vegetative buffer	2m
Average riparian vegetation percent composition by:	
Trees	1.00%
Shrubs	0%
Grasses/Forbes	94.00%
Cultivated Fields	
Other	5%
Average percent tree canopy coverage	0%
Overall aesthetic appraisal of stream	Common

## Part II - Summary of Physical Characteristics of Water Body

Stream name	Atascosa 17900
Date of assessment	4/8/2003
Stream bed slope over evaluated reach	0.0025
Approximate drainage area above transect furthest downstream	1,173km <sup>2</sup>
Stream order	5
Length of stream evaluated	244m
Number of lateral transects made	5
Average stream width	5.42m
Average stream depth	0.35m
Instantaneous flow	
Indicate flow measurement method	Current Meter
Channel flow status	High
Maximum pool width	6m
Maximum pool depth	0.5 - 1m
Total number of stream bends	2
Number of well defined bends	0
Number of moderately defined bends	0
Number of poorly defined bends	2
Total number of riffles	0
Dominant substrate type	Sand
Average percent of substrate gravel sized or larger	6%
Average percent instream cover	6%
Number of stream cover types	4
Average percent stream bank erosion potential	89%
Average stream bank slope	88°
Average width of vegetative buffer	>20m
Average riparian vegetation percent composition by:	
Trees	18%
Shrubs	1%
Grasses/Forbes	58%
Cultivated Fields	
Other	23%
Average percent tree canopy coverage	84%
Overall aesthetic appraisal of stream	Natural



## Part II - Summary of Physical Characteristics of Water Body

Stream name	Atascosa 17899
Date of assessment	4/8/2003
Stream bed slope over evaluated reach	0.0022
Approximate drainage area above transect furthest downstream	1,253km <sup>2</sup>
Stream order	5
Length of stream evaluated	272m
Number of lateral transects made	5
Average stream width	5.32m
Average stream depth	0.55m
Instantaneous flow	
Indicate flow measurement method	Current Meter
Channel flow status	High
Maximum pool width	6m
Maximum pool depth	>1m
Total number of stream bends	0
Number of well defined bends	0
Number of moderately defined bends	0
Number of poorly defined bends	0
Total number of riffles	0
Dominant substrate type	Silt
Average percent of substrate gravel sized or larger	2%
Average percent instream cover	12.80%
Number of stream cover types	5
Average percent stream bank erosion potential	89%
Average stream bank slope	62°
Average width of vegetative buffer	>20m
Average riparian vegetation percent composition by:	
Trees	13%
Shrubs	0%
Grasses/Forbes	73%
Cultivated Fields	
Other	14%
Average percent tree canopy coverage	100%
Overall aesthetic appraisal of stream	Natural

## Part II - Summary of Physical Characteristics of Water Body

Stream name	Atascosa 17898
Date of assessment	9/25/2003
Stream bed slope over evaluated reach	0.0012
Approximate drainage area above transect furthest downstream	861km <sup>2</sup>
Stream order	5
Length of stream evaluated	260m
Number of lateral transects made	5
Average stream width	6.02m
Average stream depth	0.279m
Instantaneous flow	
Indicate flow measurement method	Current Meter
Channel flow status	Moderate
Maximum pool width	16m
Maximum pool depth	0.5m - 1m
Total number of stream bends	1
Number of well defined bends	0
Number of moderately defined bends	0
Number of poorly defined bends	1
Total number of riffles	2
Dominant substrate type	Silt
Average percent of substrate gravel sized or larger	32%
Average percent instream cover	21%
Number of stream cover types	6
Average percent stream bank erosion potential	90%
Average stream bank slope	38.5°
Average width of vegetative buffer	0m
Average riparian vegetation percent composition by:	
Trees	0.00%
Shrubs	0%
Grasses/Forbes	80.00%
Cultivated Fields	
Other	20%
Average percent tree canopy coverage	0%
Overall aesthetic appraisal of stream	Common

## Part II - Summary of Physical Characteristics of Water Body

Stream name	Atascosa 17900
Date of assessment	9/24/2003
Stream bed slope over evaluated reach	0.0025
Approximate drainage area above transect furthest downstream	1,173km <sup>2</sup>
Stream order	5
Length of stream evaluated	244m
Number of lateral transects made	5
Average stream width	6.2m
Average stream depth	0.258
Instantaneous flow	
Indicate flow measurement method	Current Meter
Channel flow status	High
Maximum pool width	8m
Maximum pool depth	0.5m - 1m
Total number of stream bends	1
Number of well defined bends	0
Number of moderately defined bends	1
Number of poorly defined bends	0
Total number of riffles	0
Dominant substrate type	Sand
Average percent of substrate gravel sized or larger	2%
Average percent instream cover	29%
Number of stream cover types	6
Average percent stream bank erosion potential	90%
Average stream bank slope	77.8°
Average width of vegetative buffer	>20m
Average riparian vegetation percent composition by:	
Trees	12%
Shrubs	7%
Grasses/Forbes	28%
Cultivated Fields	0%
Other	53%
Average percent tree canopy coverage	93..5%
Overall aesthetic appraisal of stream	Natural

## Part II - Summary of Physical Characteristics of Water Body

Stream name	Atascosa 17899
Date of assessment	9/24/2003
Stream bed slope over evaluated reach	0.0022
Approximate drainage area above transect furthest downstream	1,253km <sup>2</sup>
Stream order	5
Length of stream evaluated	272m
Number of lateral transects made	5
Average stream width	8.42m
Average stream depth	0.51m
Instantaneous flow	
Indicate flow measurement method	Current Meter
Channel flow status	High
Maximum pool width	8m
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	1
Dominant substrate type	Sand
Average percent of substrate gravel sized or larger	0%
Average percent instream cover	20.00%
Number of stream cover types	6
Average percent stream bank erosion potential	87%
Average stream bank slope	56°
Average width of vegetative buffer	5m
Average riparian vegetation percent composition by:	
Trees	6%
Shrubs	0%
Grasses/Forbes	19%
Cultivated Fields	66%
Other	9%
Average percent tree canopy coverage	82%
Overall aesthetic appraisal of stream	Natural

# HABITAT ASSESSMENT

## Part III – Habitat Quality Indices



### Part III - Habitat Quality Index

Habitat Parameter	Scoring Category		Location: 17898	Date: 8/19/02
Available Instream Cover	<b>Abundant</b> >50% of substrate favorable for colonization and fish cover; good mix of several stable (not new fall or transient) cover types such as snags, cobble, undercut banks, macrophytes	<b>Common</b> 30-50% of substrate supports a stable habitat; adequate habitat for maintenance of populations; may be limited in the number of different habitat types	<b>Rare</b> 10-29.9% of substrate supports stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed	<b>Absent</b> <10% of substrate supports stable habitat; lack of habitat is obvious; substrate unstable or lacking
Score: 2	4	3	2	1
Bottom Substrate Stability	<b>Stable</b> >50% gravel or larger substrate, i.e., gravel, cobble, boulders; dominant substrate type is gravel or larger	<b>Moderately Stable</b> 30-50% gravel or larger substrate; dominant substrate type is mix of gravel with some finer sediments	<b>Moderately Unstable</b> 10-29.9% gravel or larger substrate; dominant substrate type is finer than gravel, but may still be in mix of sizes	<b>Unstable</b> <10% gravel or larger substrate; substrate is uniform sand, silt, clay, or bedrock
Score: 3	4	3	2	1
Number of Riffles To be counted, riffles must extend >50% the width of the channel and be at least as long as the channel width	<b>Abundant</b> ≥5 riffles	<b>Common</b> 2-4 riffles	<b>Rare</b> 1 riffle	<b>Absent</b> No riffles
Score: 4	4	3	2	1
Dimensions of Largest Pool	<b>Large</b> Pool covers more than 50% of the channel width; maximum depth is > 1m	<b>Moderate</b> Pool covers approximately 50% or slightly less than the channel width; maximum depth is 0.5-1 meter	<b>Small</b> Pool covers approximately 25% of the channel width; maximum depth is <0.5 meter	<b>Absent</b> No existing pools; only shallow auxiliary pockets
Score: 1	3	2	1	0
Channel Flow Status	<b>High</b> Water reaches the base of both the lower banks; <5% of channel substrate is exposed	<b>Moderate</b> Water fills <75% of the channel; or <25% of channel substrate is exposed	<b>Low</b> Water fills 25-75% of the available channel and/or riffle substrates are mostly exposed	<b>No Flow</b> Very little water in the channel and mostly present in standing pools; or stream is dry
Score: 3	3	2	1	0
Bank Stability	<b>Stable</b> Little evidence (<10%) of erosion bank failure; bank angles average <30°	<b>Moderately Stable</b> Some evidence (10-29.9%) of erosion or bank failure; small areas of erosion mostly healed over; bank angles average 30-39.9°	<b>Moderately Unstable</b> Evidence of erosion bank failure is common (30-50%); high potential of erosion during flooding; bank angles average 40-60°	<b>Unstable</b> Large and frequent evidence (>50%) of erosion or bank failure; raw areas frequent along steep banks; bank angles average >60°
Score: 1	3	2	1	0
Channel Sinuosity	<b>High</b> ≥2 well-defined bends with deep outside areas (cut banks) and shallow inside areas (point bars) are present	<b>Moderate</b> 1 well-defined bend OR ≥3 moderately-defined bends present	<b>Low</b> <3 moderately-defined bends OR only poorly-defined bends present	<b>None</b> Straight channel; may be channelized
Score: 1	3	2	1	0
Riparian Buffer Vegetation	<b>Extensive</b> Width of natural buffer is >20 meters	<b>Wide</b> Width of natural buffer is 10.1-20 meters	<b>Moderate</b> Width of natural buffer is 5-10 meters	<b>Narrow</b> Width of natural buffer is <5 meters
Score: 3	3	2	1	0
Aesthetics of Reach	<b>Wilderness</b> Outstanding natural beauty; usually wooded or unpastured area; water clarity is usually exceptional	<b>Natural Area</b> Tree and/or native vegetation common; some development evident (from fields, pastures, dwellings); water clarity may be slightly turbid	<b>Common Setting</b> Not offensive; area is developed, but uncluttered such as in an urban park; water clarity may be turbid or discolored	<b>Offensive</b> Stream does not enhance the aesthetics of the area; cluttered; highly developed; may be a dumping area; water clarity is usually turbid or discolored
Score: 0	3	2	1	0
<b>Total Score: 18</b>	<b>INTERMEDIATE</b>			

### Part III - Habitat Quality Index

Habitat Parameter	Scoring Category		Location: 17900	Date: 8/20/02
Available Instream Cover	<b>Abundant</b> >50% of substrate favorable for colonization and fish cover; good mix of several stable (not new fall or transient) cover types such as snags, cobble, undercut banks, macrophytes	<b>Common</b> 30-50% of substrate supports a stable habitat; adequate habitat for maintenance of populations; may be limited in the number of different habitat types	<b>Rare</b> 10-29.9% of substrate supports stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed	<b>Absent</b> <10% of substrate supports stable habitat; lack of habitat is obvious; substrate unstable or lacking
Score: 2	4	3	2	1
Bottom Substrate Stability	<b>Stable</b> >50% gravel or larger substrate, i.e., gravel, cobble, boulders; dominant substrate type is gravel or larger	<b>Moderately Stable</b> 30-50% gravel or larger substrate; dominant substrate type is mix of gravel with some finer sediments	<b>Moderately Unstable</b> 10-29.9% gravel or larger substrate; dominant substrate type is finer than gravel, but may still be in mix of sizes	<b>Unstable</b> <10% gravel or larger substrate; substrate is uniform sand, silt, clay, or bedrock
Score: 2	4	3	2	1
Number of Riffles To be counted, riffles must extend >50% the width of the channel and be at least as long as the channel width	<b>Abundant</b> ≥5 riffles	<b>Common</b> 2-4 riffles	<b>Rare</b> 1 riffle	<b>Absent</b> No riffles
Score: 3	4	3	2	1
Dimensions of Largest Pool	<b>Large</b> Pool covers more than 50% of the channel width; maximum depth is > 1m	<b>Moderate</b> Pool covers approximately 50% or slightly less than the channel width; maximum depth is 0.5-1 meter	<b>Small</b> Pool covers approximately 25% of the channel width; maximum depth is <0.5 meter	<b>Absent</b> No existing pools; only shallow auxiliary pockets
Score: 2	3	2	1	0
Channel Flow Status	<b>High</b> Water reaches the base of both the lower banks; <5% of channel substrate is exposed	<b>Moderate</b> Water fills <75% of the channel; or <25% of channel substrate is exposed	<b>Low</b> Water fills 25-75% of the available channel and/or riffle substrates are mostly exposed	<b>No Flow</b> Very little water in the channel and mostly present in standing pools; or stream is dry
Score: 3	3	2	1	0
Bank Stability	<b>Stable</b> Little evidence (<10%) of erosion bank failure; bank angles average <30°	<b>Moderately Stable</b> Some evidence (10-29.9%) of erosion or bank failure; small areas of erosion mostly healed over; bank angles average 30-39.9°	<b>Moderately Unstable</b> Evidence of erosion bank failure is common (30-50%); high potential of erosion during flooding; bank angles average 40-60°	<b>Unstable</b> Large and frequent evidence (>50%) of erosion or bank failure; raw areas frequent along steep banks; bank angles average >60°
Score: 0	3	2	1	0
Channel Sinuosity	<b>High</b> ≥2 well-defined bends with deep outside areas (cut banks) and shallow inside areas (point bars) are present	<b>Moderate</b> 1 well-defined bend OR ≥3 moderately-defined bends present	<b>Low</b> <3 moderately-defined bends OR only poorly-defined bends present	<b>None</b> Straight channel; may be channelized
Score: 2	3	2	1	0
Riparian Buffer Vegetation	<b>Extensive</b> Width of natural buffer is >20 meters	<b>Wide</b> Width of natural buffer is 10.1-20 meters	<b>Moderate</b> Width of natural buffer is 5-10 meters	<b>Narrow</b> Width of natural buffer is <5 meters
Score: 3	3	2	1	0
Aesthetics of Reach	<b>Wilderness</b> Outstanding natural beauty; usually wooded or unpastured area; water clarity is usually exceptional	<b>Natural Area</b> Tree and/or native vegetation common; some development evident (from fields, pastures, dwellings); water clarity may be slightly turbid	<b>Common Setting</b> Not offensive; area is developed, but uncluttered such as in an urban park; water clarity may be turbid or discolored	<b>Offensive</b> Stream does not enhance the aesthetics of the area; cluttered; highly developed; may be a dumping area; water clarity is usually turbid or discolored
Score: 2	3	2	1	0
<b>Total Score: 19</b>	<b>INTERMEDIATE</b>			

### Part III - Habitat Quality Index

Habitat Parameter	Scoring Category		Location: 17899	Date: 8/21/02
Available Instream Cover	<b>Abundant</b> >50% of substrate favorable for colonization and fish cover; good mix of several stable (not new fall or transient) cover types such as snags, cobble, undercut banks, macrophytes	<b>Common</b> 30-50% of substrate supports a stable habitat; adequate habitat for maintenance of populations; may be limited in the number of different habitat types	<b>Rare</b> 10-29.9% of substrate supports stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed	<b>Absent</b> <10% of substrate supports stable habitat; lack of habitat is obvious; substrate unstable or lacking
Score: 1	4	3	2	1
Bottom Substrate Stability	<b>Stable</b> >50% gravel or larger substrate, i.e., gravel, cobble, boulders; dominant substrate type is gravel or larger	<b>Moderately Stable</b> 30-50% gravel or larger substrate; dominant substrate type is mix of gravel with some finer sediments	<b>Moderately Unstable</b> 10-29.9% gravel or larger substrate; dominant substrate type is finer than gravel, but may still be in mix of sizes	<b>Unstable</b> <10% gravel or larger substrate; substrate is uniform sand, silt, clay, or bedrock
Score: 1	4	3	2	1
Number of Riffles To be counted, riffles must extend >50% the width of the channel and be at least as long as the channel width	<b>Abundant</b> ≥5 riffles	<b>Common</b> 2-4 riffles	<b>Rare</b> 1 riffle	<b>Absent</b> No riffles
Score: 2	4	3	2	1
Dimensions of Largest Pool	<b>Large</b> Pool covers more than 50% of the channel width; maximum depth is > 1m	<b>Moderate</b> Pool covers approximately 50% or slightly less than the channel width; maximum depth is 0.5-1 meter	<b>Small</b> Pool covers approximately 25% of the channel width; maximum depth is <0.5 meter	<b>Absent</b> No existing pools; only shallow auxiliary pockets
Score: 3	3	2	1	0
Channel Flow Status	<b>High</b> Water reaches the base of both the lower banks; <5% of channel substrate is exposed	<b>Moderate</b> Water fills <75% of the channel; or <25% of channel substrate is exposed	<b>Low</b> Water fills 25-75% of the available channel and/or riffle substrates are mostly exposed	<b>No Flow</b> Very little water in the channel and mostly present in standing pools; or stream is dry
Score: 3	3	2	1	0
Bank Stability	<b>Stable</b> Little evidence (<10%) of erosion bank failure; bank angles average <30°	<b>Moderately Stable</b> Some evidence (10-29.9%) of erosion or bank failure; small areas of erosion mostly healed over; bank angles average 30-39.9°	<b>Moderately Unstable</b> Evidence of erosion bank failure is common (30-50%); high potential of erosion during flooding; bank angles average 40-60°	<b>Unstable</b> Large and frequent evidence (>50%) of erosion or bank failure; raw areas frequent along steep banks; bank angles average >60°
Score: 1	3	2	1	0
Channel Sinuosity	<b>High</b> ≥2 well-defined bends with deep outside areas (cut banks) and shallow inside areas (point bars) are present	<b>Moderate</b> 1 well-defined bend OR ≥3 moderately-defined bends present	<b>Low</b> <3 moderately-defined bends OR only poorly-defined bends present	<b>None</b> Straight channel; may be channelized
Score: 1	3	2	1	0
Riparian Buffer Vegetation	<b>Extensive</b> Width of natural buffer is >20 meters	<b>Wide</b> Width of natural buffer is 10.1-20 meters	<b>Moderate</b> Width of natural buffer is 5-10 meters	<b>Narrow</b> Width of natural buffer is <5 meters
Score: 3	3	2	1	0
Aesthetics of Reach	<b>Wilderness</b> Outstanding natural beauty; usually wooded or unpastured area; water clarity is usually exceptional	<b>Natural Area</b> Tree and/or native vegetation common; some development evident (from fields, pastures, dwellings); water clarity may be slightly turbid	<b>Common Setting</b> Not offensive; area is developed, but uncluttered such as in an urban park; water clarity may be turbid or discolored	<b>Offensive</b> Stream does not enhance the aesthetics of the area; cluttered; highly developed; may be a dumping area; water clarity is usually turbid or discolored
Score: 2	3	2	1	0
<b>Total Score: 17</b>	<b>INTERMEDIATE</b>			



### Part III - Habitat Quality Index

Habitat Parameter	Scoring Category			Location: 17898	Date: 4/7/03
Available Instream Cover	<b>Abundant</b> >50% of substrate favorable for colonization and fish cover; good mix of several stable (not new fall or transient) cover types such as snags, cobble, undercut banks, macrophytes	<b>Common</b> 30-50% of substrate supports a stable habitat; adequate habitat for maintenance of populations; may be limited in the number of different habitat types	<b>Rare</b> 10-29.9% of substrate supports stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed	<b>Absent</b> <10% of substrate supports stable habitat; lack of habitat is obvious; substrate unstable or lacking	
Score: 2	4	3	2	1	
Bottom Substrate Stability	<b>Stable</b> >50% gravel or larger substrate, i.e., gravel, cobble, boulders; dominant substrate type is gravel or larger	<b>Moderately Stable</b> 30-50% gravel or larger substrate; dominant substrate type is mix of gravel with some finer sediments	<b>Moderately Unstable</b> 10-29.9% gravel or larger substrate; dominant substrate type is finer than gravel, but may still be in mix of sizes	<b>Unstable</b> <10% gravel or larger substrate; substrate is uniform sand, silt, clay, or bedrock	
Score: 3	4	3	2	1	
Number of Riffles To be counted, riffles must extend >50% the width of the channel and be at least as long as the channel width	<b>Abundant</b> ≥5 riffles	<b>Common</b> 2-4 riffles	<b>Rare</b> 1 riffle	<b>Absent</b> No riffles	
Score: 3	4	3	2	1	
Dimensions of Largest Pool	<b>Large</b> Pool covers more than 50% of the channel width; maximum depth is > 1m	<b>Moderate</b> Pool covers approximately 50% or slightly less than the channel width; maximum depth is 0.5-1 meter	<b>Small</b> Pool covers approximately 25% of the channel width; maximum depth is <0.5 meter	<b>Absent</b> No existing pools; only shallow auxiliary pockets	
Score: 2	3	2	1	0	
Channel Flow Status	<b>High</b> Water reaches the base of both the lower banks; <5% of channel substrate is exposed	<b>Moderate</b> Water fills <75% of the channel; or <25% of channel substrate is exposed	<b>Low</b> Water fills 25-75% of the available channel and/or riffle substrates are mostly exposed	<b>No Flow</b> Very little water in the channel and mostly present in standing pools; or stream is dry	
Score: 3	3	2	1	0	
Bank Stability	<b>Stable</b> Little evidence (<10%) of erosion bank failure; bank angles average <30°	<b>Moderately Stable</b> Some evidence (10-29.9%) of erosion or bank failure; small areas of erosion mostly healed over; bank angles average 30-39.9°	<b>Moderately Unstable</b> Evidence of erosion bank failure is common (30-50%); high potential of erosion during flooding; bank angles average 40-60°	<b>Unstable</b> Large and frequent evidence (>50%) of erosion or bank failure; raw areas frequent along steep banks; bank angles average >60°	
Score: 1	3	2	1	0	
Channel Sinuosity	<b>High</b> ≥2 well-defined bends with deep outside areas (cut banks) and shallow inside areas (point bars) are present	<b>Moderate</b> 1 well-defined bend OR ≥3 moderately-defined bends present	<b>Low</b> <3 moderately-defined bends OR only poorly-defined bends present	<b>None</b> Straight channel; may be channelized	
Score: 1	3	2	1	0	
Riparian Buffer Vegetation	<b>Extensive</b> Width of natural buffer is >20 meters	<b>Wide</b> Width of natural buffer is 10.1-20 meters	<b>Moderate</b> Width of natural buffer is 5-10 meters	<b>Narrow</b> Width of natural buffer is <5 meters	
Score: 0	3	2	1	0	
Aesthetics of Reach	<b>Wilderness</b> Outstanding natural beauty; usually wooded or unpastured area; water clarity is usually exceptional	<b>Natural Area</b> Tree and/or native vegetation common; some development evident (from fields, pastures, dwellings); water clarity may be slightly turbid	<b>Common Setting</b> Not offensive; area is developed, but uncluttered such as in an urban park; water clarity may be turbid or discolored	<b>Offensive</b> Stream does not enhance the aesthetics of the area; cluttered; highly developed; may be a dumping area; water clarity is usually turbid or discolored	
Score: 1	3	2	1	0	
<b>Total Score: 17</b>	<b>INTERMEDIATE</b>				

### Part III - Habitat Quality Index

Habitat Parameter	Scoring Category		Location: 17900	Date: 4/8/03
Available Instream Cover	<b>Abundant</b> >50% of substrate favorable for colonization and fish cover; good mix of several stable (not new fall or transient) cover types such as snags, cobble, undercut banks, macrophytes	<b>Common</b> 30-50% of substrate supports a stable habitat; adequate habitat for maintenance of populations; may be limited in the number of different habitat types	<b>Rare</b> 10-29.9% of substrate supports stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed	<b>Absent</b> <10% of substrate supports stable habitat; lack of habitat is obvious; substrate unstable or lacking
Score: 1	4	3	2	1
Bottom Substrate Stability	<b>Stable</b> >50% gravel or larger substrate, i.e., gravel, cobble, boulders; dominant substrate type is gravel or larger	<b>Moderately Stable</b> 30-50% gravel or larger substrate; dominant substrate type is mix of gravel with some finer sediments	<b>Moderately Unstable</b> 10-29.9% gravel or larger substrate; dominant substrate type is finer than gravel, but may still be in mix of sizes	<b>Unstable</b> <10% gravel or larger substrate; substrate is uniform sand, silt, clay, or bedrock
Score: 1	4	3	2	1
Number of Riffles To be counted, riffles must extend >50% the width of the channel and be at least as long as the channel width	<b>Abundant</b> ≥5 riffles	<b>Common</b> 2-4 riffles	<b>Rare</b> 1 riffle	<b>Absent</b> No riffles
Score: 1	4	3	2	1
Dimensions of Largest Pool	<b>Large</b> Pool covers more than 50% of the channel width; maximum depth is > 1m	<b>Moderate</b> Pool covers approximately 50% or slightly less than the channel width; maximum depth is 0.5-1 meter	<b>Small</b> Pool covers approximately 25% of the channel width; maximum depth is <0.5 meter	<b>Absent</b> No existing pools; only shallow auxiliary pockets
Score: 2	3	2	1	0
Channel Flow Status	<b>High</b> Water reaches the base of both the lower banks; <5% of channel substrate is exposed	<b>Moderate</b> Water fills <75% of the channel; or <25% of channel substrate is exposed	<b>Low</b> Water fills 25-75% of the available channel and/or riffle substrates are mostly exposed	<b>No Flow</b> Very little water in the channel and mostly present in standing pools; or stream is dry
Score: 3	3	2	1	0
Bank Stability	<b>Stable</b> Little evidence (<10%) of erosion bank failure; bank angles average <30°	<b>Moderately Stable</b> Some evidence (10-29.9%) of erosion or bank failure; small areas of erosion mostly healed over; bank angles average 30-39.9°	<b>Moderately Unstable</b> Evidence of erosion bank failure is common (30-50%); high potential of erosion during flooding; bank angles average 40-60°	<b>Unstable</b> Large and frequent evidence (>50%) of erosion or bank failure; raw areas frequent along steep banks; bank angles average >60°
Score: 0	3	2	1	0
Channel Sinuosity	<b>High</b> ≥2 well-defined bends with deep outside areas (cut banks) and shallow inside areas (point bars) are present	<b>Moderate</b> 1 well-defined bend OR ≥3 moderately-defined bends present	<b>Low</b> <3 moderately-defined bends OR only poorly-defined bends present	<b>None</b> Straight channel; may be channelized
Score: 1	3	2	1	0
Riparian Buffer Vegetation	<b>Extensive</b> Width of natural buffer is >20 meters	<b>Wide</b> Width of natural buffer is 10.1-20 meters	<b>Moderate</b> Width of natural buffer is 5-10 meters	<b>Narrow</b> Width of natural buffer is <5 meters
Score: 3	3	2	1	0
Aesthetics of Reach	<b>Wilderness</b> Outstanding natural beauty; usually wooded or unpastured area; water clarity is usually exceptional	<b>Natural Area</b> Tree and/or native vegetation common; some development evident (from fields, pastures, dwellings); water clarity may be slightly turbid	<b>Common Setting</b> Not offensive; area is developed, but uncluttered such as in an urban park; water clarity may be turbid or discolored	<b>Offensive</b> Stream does not enhance the aesthetics of the area; cluttered; highly developed; may be a dumping area; water clarity is usually turbid or discolored
Score: 2	3	2	1	0
<b>Total Score: 14</b>	<b>INTERMEDIATE</b>			

### Part III - Habitat Quality Index

Habitat Parameter	Scoring Category		Location: 17899	Date: 4/8/03
Available Instream Cover	<b>Abundant</b> >50% of substrate favorable for colonization and fish cover; good mix of several stable (not new fall or transient) cover types such as snags, cobble, undercut banks, macrophytes	<b>Common</b> 30-50% of substrate supports a stable habitat; adequate habitat for maintenance of populations; may be limited in the number of different habitat types	<b>Rare</b> 10-29.9% of substrate supports stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed	<b>Absent</b> <10% of substrate supports stable habitat; lack of habitat is obvious; substrate unstable or lacking
Score: 2	<b>2</b>	<b>3</b>	<b>2</b>	<b>1</b>
Bottom Substrate Stability	<b>Stable</b> >50% gravel or larger substrate, i.e., gravel, cobble, boulders; dominant substrate type is gravel or larger	<b>Moderately Stable</b> 30-50% gravel or larger substrate; dominant substrate type is mix of gravel with some finer sediments	<b>Moderately Unstable</b> 10-29.9% gravel or larger substrate; dominant substrate type is finer than gravel, but may still be in mix of sizes	<b>Unstable</b> <10% gravel or larger substrate; substrate is uniform sand, silt, clay, or bedrock
Score: 1	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>
Number of Riffles To be counted, riffles must extend >50% the width of the channel and be at least as long as the channel width	<b>Abundant</b> ≥5 riffles	<b>Common</b> 2-4 riffles	<b>Rare</b> 1 riffle	<b>Absent</b> No riffles
Score: 1	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>
Dimensions of Largest Pool	<b>Large</b> Pool covers more than 50% of the channel width; maximum depth is > 1m	<b>Moderate</b> Pool covers approximately 50% or slightly less than the channel width; maximum depth is 0.5-1 meter	<b>Small</b> Pool covers approximately 25% of the channel width; maximum depth is <0.5 meter	<b>Absent</b> No existing pools; only shallow auxiliary pockets
Score: 3	<b>3</b>	<b>2</b>	<b>1</b>	<b>0</b>
Channel Flow Status	<b>High</b> Water reaches the base of both the lower banks; <5% of channel substrate is exposed	<b>Moderate</b> Water fills <75% of the channel; or <25% of channel substrate is exposed	<b>Low</b> Water fills 25-75% of the available channel and/or riffle substrates are mostly exposed	<b>No Flow</b> Very little water in the channel and mostly present in standing pools; or stream is dry
Score: 3	<b>3</b>	<b>2</b>	<b>1</b>	<b>0</b>
Bank Stability	<b>Stable</b> Little evidence (<10%) of erosion bank failure; bank angles average <30°	<b>Moderately Stable</b> Some evidence (10-29.9%) of erosion or bank failure; small areas of erosion mostly healed over; bank angles average 30-39.9°	<b>Moderately Unstable</b> Evidence of erosion bank failure is common (30-50%); high potential of erosion during flooding; bank angles average 40-60°	<b>Unstable</b> Large and frequent evidence (>50%) of erosion or bank failure; raw areas frequent along steep banks; bank angles average >60°
Score: 0	<b>3</b>	<b>2</b>	<b>1</b>	<b>0</b>
Channel Sinuosity	<b>High</b> ≥2 well-defined bends with deep outside areas (cut banks) and shallow inside areas (point bars) are present	<b>Moderate</b> 1 well-defined bend OR ≥3 moderately-defined bends present	<b>Low</b> <3 moderately-defined bends OR only poorly-defined bends present	<b>None</b> Straight channel; may be channelized
Score: 0	<b>3</b>	<b>2</b>	<b>1</b>	<b>0</b>
Riparian Buffer Vegetation	<b>Extensive</b> Width of natural buffer is >20 meters	<b>Wide</b> Width of natural buffer is 10.1-20 meters	<b>Moderate</b> Width of natural buffer is 5-10 meters	<b>Narrow</b> Width of natural buffer is <5 meters
Score: 3	<b>3</b>	<b>2</b>	<b>1</b>	<b>0</b>
Aesthetics of Reach	<b>Wilderness</b> Outstanding natural beauty; usually wooded or unpastured area; water clarity is usually exceptional	<b>Natural Area</b> Tree and/or native vegetation common; some development evident (from fields, pastures, dwellings); water clarity may be slightly turbid	<b>Common Setting</b> Not offensive; area is developed, but uncluttered such as in an urban park; water clarity may be turbid or discolored	<b>Offensive</b> Stream does not enhance the aesthetics of the area; cluttered; highly developed; may be a dumping area; water clarity is usually turbid or discolored
Score: 2	<b>3</b>	<b>2</b>	<b>1</b>	<b>0</b>
<b>Total Score: 15</b>	<b>INTERMEDIATE</b>			

## Part II - Summary of Physical Characteristics of Water Body

Stream name	Atascosa 17898
Date of assessment	9/25/2003
Stream bed slope over evaluated reach	0.0012
Approximate drainage area above transect furthest downstream	861km <sup>2</sup>
Stream order	5
Length of stream evaluated	260m
Number of lateral transects made	5
Average stream width	6.02m
Average stream depth	0.279m
Instantaneous flow	
Indicate flow measurement method	Current Meter
Channel flow status	Moderate
Maximum pool width	16m
Maximum pool depth	0.5m - 1m
Total number of stream bends	1
Number of well defined bends	0
Number of moderately defined bends	0
Number of poorly defined bends	1
Total number of riffles	2
Dominant substrate type	Silt
Average percent of substrate gravel sized or larger	32%
Average percent instream cover	21%
Number of stream cover types	6
Average percent stream bank erosion potential	90%
Average stream bank slope	38.5°
Average width of vegetative buffer	0m
Average riparian vegetation percent composition by:	
Trees	0.00%
Shrubs	0%
Grasses/Forbes	80.00%
Cultivated Fields	
Other	20%
Average percent tree canopy coverage	0%
Overall aesthetic appraisal of stream	Common

## Part II - Summary of Physical Characteristics of Water Body

Stream name	Atascosa 17900
Date of assessment	9/24/2003
Stream bed slope over evaluated reach	0.0025
Approximate drainage area above transect furthest downstream	1,173km <sup>2</sup>
Stream order	5
Length of stream evaluated	244m
Number of lateral transects made	5
Average stream width	6.2m
Average stream depth	0.258
Instantaneous flow	
Indicate flow measurement method	Current Meter
Channel flow status	High
Maximum pool width	8m
Maximum pool depth	0.5m - 1m
Total number of stream bends	1
Number of well defined bends	0
Number of moderately defined bends	1
Number of poorly defined bends	0
Total number of riffles	0
Dominant substrate type	Sand
Average percent of substrate gravel sized or larger	2%
Average percent instream cover	29%
Number of stream cover types	6
Average percent stream bank erosion potential	90%
Average stream bank slope	77.8°
Average width of vegetative buffer	>20m
Average riparian vegetation percent composition by:	
Trees	12%
Shrubs	7%
Grasses/Forbes	28%
Cultivated Fields	0%
Other	53%
Average percent tree canopy coverage	93..5%
Overall aesthetic appraisal of stream	Natural

## Part II - Summary of Physical Characteristics of Water Body

Stream name	Atascosa 17899
Date of assessment	9/24/2003
Stream bed slope over evaluated reach	0.0022
Approximate drainage area above transect furthest downstream	1,253km <sup>2</sup>
Stream order	5
Length of stream evaluated	272m
Number of lateral transects made	5
Average stream width	8.42m
Average stream depth	0.51m
Instantaneous flow	
Indicate flow measurement method	Current Meter
Channel flow status	High
Maximum pool width	8m
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	1
Dominant substrate type	Sand
Average percent of substrate gravel sized or larger	0%
Average percent instream cover	20.00%
Number of stream cover types	6
Average percent stream bank erosion potential	87%
Average stream bank slope	56°
Average width of vegetative buffer	5m
Average riparian vegetation percent composition by:	
Trees	6%
Shrubs	0%
Grasses/Forbes	19%
Cultivated Fields	66%
Other	9%
Average percent tree canopy coverage	82%
Overall aesthetic appraisal of stream	Natural