Impairment Verification Monitoring
Biological and Habitat Components
Segment 2107, Atascosa River, Texas
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Ecological Communications Corporation
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Impairment Verification Monitoring-Volume 2: Biological and Habitat Components
Segment 2107, Atascosa River

By:
Jeremy Walther and Victor Palma

Ecological Communications Corporation
3355 Bee Caves Road
Suite 700
Austin, TX 78746
512/329-0031
www.ecommcorporation.com

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Texas Commission on Environmental Quality
P.O. Box 13087, MC - 150
Austin, Texas 78711-3087

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 exceedence 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.

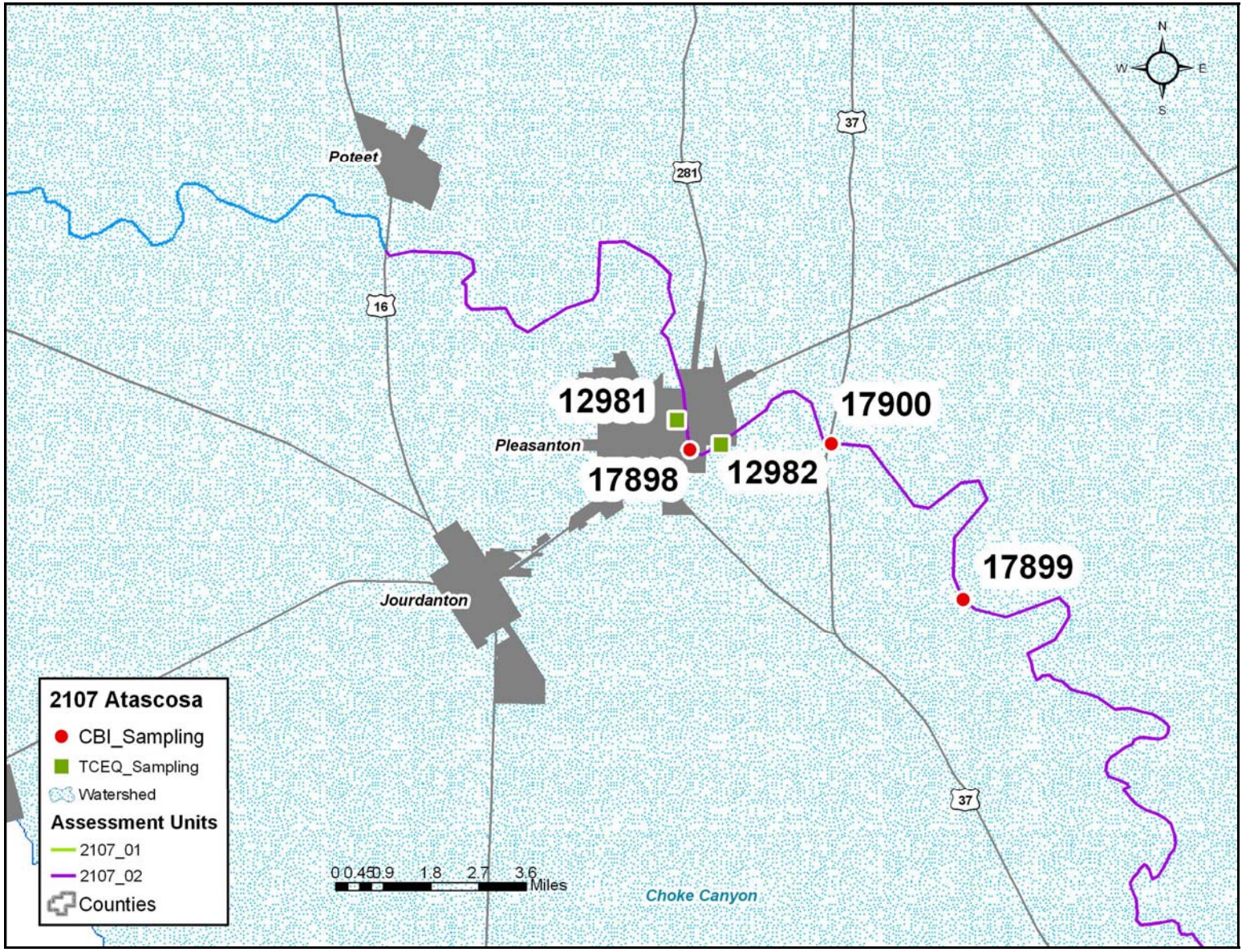

Figure 2. Map showing zoom view of sampling stations within Pleasanton city limits

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.

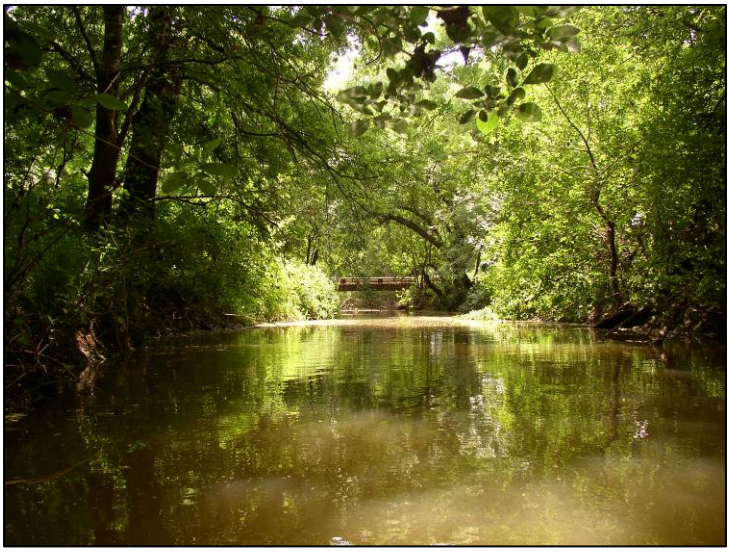

Figure 4. Station 17899

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

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

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

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

Benthic Macroinvertebrate Collections

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

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,

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
FY03				
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
FY04				
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

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.

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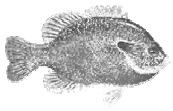
Appendix A
Complete Raw Data Set
Biological and Habitat Components
Segment 2107
Atascosa River, Texas
August 2002
April 2003
September 2003

Ecological Communications Corporation
Austin, TX

BIOTIC ASSESSMENT – FISH

Species Lists and Preliminary Data Manipulation



FISH COLLECTED

Stream	Date	ID	Species	N=	Type	Method	Tolerance	Trophic Gp
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
			Total	177			87%	

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
			Total	138				

**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
Atascosa	8/21/02	17899

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

Species	N=	Type	Method	Tolerance	Trophic Gp
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
Total	227				

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
	713				

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				

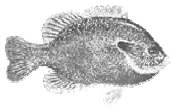
Atascosa Fish List

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
	244				

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:	**40**

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:	**38**

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

Stream: Atascosa	Date: 8/21/02	Location: 17899	County: Atascosa	
Category	**Metric**		**Value**	**Score**
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:	**44**

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

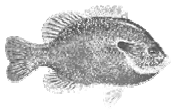
Stream: Atascosa	Date: 9/25/03	Location: 17898	County: Atascosa	
Category	**Metric**		**Value**	**Score**
Species Richness and Composition	1. Total # of fish species		14	3
	2. Number of darter species		0	1
	3. Number of sunfish species (exc. bass)		5	5
	4. Number of sucker species		0	1
	5. Number of 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: Atasscosa	
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. G. affinis)			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:	**37**

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. G. affinis)			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:	**30**

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. G. affinis)			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:	**40**

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. *G.affinis*)			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 hual			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. *G.affinis*)			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 hual			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.

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. *G.affinis*)			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 hual			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. *G.affinis*)		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 hual		44	5	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	

*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. *G.affinis*)		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 hual		7.67	1	2*
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	

*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. *G.affinis*)			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 hual			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

Stream	Date	ID
Atascosa	8/19/02	17898

Func.Gp	%
P	37.2727
SCR	5.75758
CG	32.5758
FC	23.6364
SHR	0.75758
	100

Taxa	N=	Func.Gp.	Tolerance	HBI
Odonata-Coenagrionidae-*Argia*	2	P	6	0.1100917
Odonata-Lestidae-*Lestes*	1	-	-	-
Odonata-Gomphidae-*Progomphus*	1	P	5	0.0458716
Ephemeroptera-Tricorythidae-*Tricorythodes*	2	CG	5	0.0917431
Ephemeroptera-Baetidae-*Baetis*	12	SCR/CG	4	0.440367
Coleoptera-Scirtidae-*Cyphon* (L)	1	CR/CG/SH	-	-
Diptera-Chironomidae	66	P/CG/FC	6	3.6330275
Diptera-Simulidae-*Simulium*	4	FC	4	0.146789
Diptera-Ceratopogonidae-*Probezzia*	1	P/CG	5	0.0458716
Diptera-Ceratopogonidae-*Ceratopogon*	1	P/CG	5	0.0458716
Hirudinea	15	P	8	1.1009174
Oligochaeta	4	CG	8	0.293578
Coleoptera-Scirtidae-Cyphon (L)	2	-	-	-
Amphipoda-Hyallelidae-Hyallela	1	CG/SHR	8	0.0733945
Total	110	109		6.0275229
Intolerant/Tolerant	0.24			

Stream	Date	ID
Atascosa	8/20/02	17900

Func.Gp	%
P	25.89
SCR	23.7864
CG	37.055
FC	12.2977
SHR	0.97087
	100

Taxa	N=	Func.Gp.	Tolerance	HBI
Odonata-Coenagrionidae-*Argia*	5	P	6	0.2912621
Odonata-Gomphidae-*Progomphus*	1	P	5	0.0485437
Odonata-Gomphidae-Erpetogomphus	17	P	1	0.1650485
Odonata-Gomphidae-*Arigomphus*	1	-	-	-
Odonata-Macromiidae-*Macromia*	1	P	3	0.0291262
Ephemeroptera-Tricorythidae-*Tricorythodes*	10	CG	5	0.4854369
Ephemeroptera-Tricorythidae-*Leptohypes*	1	CG	2	0.0194175
Ephemeroptera-Leptophlebiidae-*Farrodes*	6	CG/SCR	2	0.1165049
Ephemeroptera-Baetidae-*Baetis*	33	SCR/CG	4	1.2815534
Trichoptera-Hydropsychidae-*Cheumatopsyche*	1	FC	6	0.0582524
Trichoptera-Hydropsychidae-Smicridea	7	FC	4	0.2718447
Coeloptera-Elmidae-*Stenelmus* (A)	7	CG/SCR	7	0.4757282
Coeloptera-Elmidae-*Stenelmus* (L)	3	CG/SCR	7	0.2038835
Diptera-Chironomidae	5	P/CG/FC	6	0.2912621
Hydracarina	1	P	6	0.0582524
Bivalvia (Heterodonta)-Corbiculidae-*Corbiclua*	3	FC	6	0.1747573
Amphipoda-Hyallelidae-Hyallela	2	CG/SHR	8	0.1553398
Total	103			4.1262136
Intolerant/Tolerant	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.

Stream	Date	ID
Atascosa	8/21/02	17899

Func.Gp	%
P	32.3232
SCR	12.6263
CG	20.7071
FC	29.2929
SHR	5.05051
	100

Taxa	N=	Func.Gp.	Tolerance	HBI
Odonata-Coenagrionidae-*Argia*	1	P	6	0.2
Odonata-Gomphidae-*Progomphus*	4	P	5	0.6666667
Odonata-Gomphidae-*Arigomphus*	3	-	-	-
Odonata-Macromiidae-*Macromia*	3	P	3	0.3
Ephemeroptera-Baetidae-*Baetis*	1	SCR/CG	4	0.1333333
Trichoptera-Hydropsychidae-Smicridea	2	FC	4	0.2666667
Coleoptera-Elmidae-*Neoelmis*	4	CG/SCR	2	0.2666667
Coleoptera-Scirtidae-*Cyphon* (L)	5	CR/CG/SH	-	-
Diptera-Chironomidae	8	P/CG/FC	6	1.6
Bivalvia (Heterodonta)-Corbiculidae-*Corbiclua*	5	FC	6	1
Total	33	30		4.4333333
Intolerant/Tolerant	0.74			

Stream: Atascosa
Date: 4/7/03
Location: 17898

		Species	N=	Tolerance	FFG	HBI
		Argia sp.	5	6	P	0.256410256
		Arigomphus	1			0
	%	*Cheumatopsyche*	31	6	FC	1.58974359
P	12.820513	*Uvarus*	1	-	P	-
SCR	11.111111	Chironomidae	27	6	P/CG/FC	1.384615385
CG	13.675214	*Simulium*	27	4	FC	0.923076923
FC	58.119658	*Physella*	13	9	SCR	1
SHR	4.2735043	*Corbicula*	1	6	FC	0.051282051
	100	*Hyalella*	10	8	CG/SHR	0.683760684
		Palaemonetes	2	4	CG	0.068376068
			117	0.33333333		5.957264957

Stream: Atascosa
Date: 4/8/03
Location: 17900

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

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

			Species	N=	Tolerance	FFG	HBI
			Argia sp.	51	6	P	2.886792453
			Erpetogomphus	4	1	P	0.037735849
10010		%	*Caenis*	3	7	SCR/CG	0.198113208
	P	52.830189	*Stenacron*	2	4	SCR/CG	0.075471698
	SCR	12.735849	*Stenelmis* (A)	4	7	CG/SCR	0.264150943
	CG	7.5471698	**Tricladida**	1	7.5	P	0.070754717
	FC	24.528302	*Physella*	9	9	SCR	0.764150943
	SHR	2.3584906	*Corbicula*	26	6	FC	1.471698113
		100	*Hyalella*	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
		Argia	6	6	P	0.336448598
		Enallagma	11	6	P	0.61682243
	%	*Tricorythodes*	1	5	CG	0.046728972
P	22.741433	*Fallceon*	36	4	SCR/CG	1.345794393
SCR	18.068536	*Cheumatopsyche*	7	6	FC	0.392523364
CG	35.202492	*Helichus* (A)	2	4	SCR/CG	0.074766355
FC	22.741433	*Tropisternus* (L)	1	9	P	0.08411215
SHR	1.2461059	*Cyphon* (L)	1	-	SCR/CG/SHR	-
	100	Chironomidae	19	6	P/CG/FC	1.065420561
		Simulium	11	4	FC	0.411214953
		Hyalella	2	8	CG/SHR	0.14953271
		Palaemonetes	10	4	CG	0.373831776
			107	1.30434783		4.897196262

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

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

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

		Species	N=	Tolerance	FFG	HBI
		Argia	13	6	P	0.702702703
		Progomphus	5	5	P	0.225225225
		Erpetogomphus	9	1	P	0.081081081
P	29	*Tricorythodes*	24	5	CG	1.081081081
SCR	23	*Leptohypes*	2	2	CG/SCR	0.036036036
CG	47	*Farrodes*	15	2	CG/SCR	0.27027027
FC	12	*Fallceon*	20	4	SCR/CG	0.720720721
SHR	0	*Rhagovelia*	1	-	P	-
	111	*Cheumatopsyche*	5	6	FC	0.27027027
		Smicridea	5	4	FC	0.18018018
		Neoelmis (A)	5	2	CG/SCR	0.09009009
		Microcylloepus (A)	2	2	CG/SCR	0.036036036
		Stenelmis (A)	2	7	CG/SCR	0.126126126
		Gyrinus (L)	1	6	P	0.054054054
		Corbicula	2	6	FC	0.108108108
			111	3.7826087		3.981981982

BIOTIC ASSESSMENT – BENTHIC MACROINVERTEBRATES

Rapid Bioassessment Protocol

Stream: Atascosa	**Date: 8/19/02**	**Location: 17898**	**County: Atascosa**
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
Aqautic Life Use: LIMITED		Total Score:	18

Stream: Atascosa	**Date: 8/20/02**	**Location: 17900**	**County: Atascosa**
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
Aqautic Life Use: HIGH		Total Score:	29

Stream: Atascosa	**Date: 8/21/02**	**Location: 17899**	**County: Atascosa**
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
Aqautic Life Use: INTERMEDIATE ***(Total Sample Size = 36)***		Total Score:	25

Stream: Atascosa Date: 4/7/03 Location: 17898	**County: Atascosa**	
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
Aqautic Life Use: INTERMEDIATE	Total Score:	23

Stream: Atascosa Date: 4/8/03 Location: 17900	**County: Atascosa**	
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
Aqautic Life Use: INTERMEDIATE	Total Score:	25

Stream: Atascosa Date: 4/8/03 Location: 17899	**County: Atascosa**	
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
Aqautic Life Use: INTERMEDIATE	Total Score:	19

Stream: Atascosa	**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: INTERMEDIATE		Total Score:	22

Stream: Atascosa	**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: HIGH		Total Score:	35

Stream: Atascosa	**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: INTERMEDIATE		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: JB, SF, PG Date: 8/19 Time: 1705 Weather conditions: PC

Stream: Atascosa Location of site: 10009 Length of stream reach: 260m

Stream Segment No.: 2107 Observed Stream Uses: Fish, Pump 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 0; No. Moderately Defined 0; No. Poorly Defined 3

Channel Obstructions/Modifications: LWC, other No. of Riffles: 6 Channel Flow Status (circle one): **high moderate low no flow**

Riparian Vegetation (%):
Left Bank: Trees 0 Shrubs 1% Grasses, Forbs 20 Cult. Fields _ Other 79
Right Bank: Trees 3 Shrubs 5 Grasses, Forbs 25 Cult. Fields _ Other 67

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect (Thalweg Depth:)											Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
	11.8m	20	20%	0.05	0.28	0.37	0.38	0.42	0.37	0.38	0.32	0.10	0.05	-	15	10%	0%
U1	Habitat Type (Circle One) **Riffle Run Glide Pool**		Dominant Substrate Type: Gravel												Dominant Types Riparian Vegetation: Left Bank: 20% Grass/Forb; 80% Other. Right Bank: 10% Grass/Forb; 90% Other		% Gravel or Larger: 70%	
	Algae or Macrophytes (Circle One) **Abundant ✔ Common Rare Absent**		Width of Natural Buffer Vegetation (m) LB: >20 RB: 0												Instream Cover Types: Gravel; Cobble		% Instream Cover: 70%	

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect (Thalweg Depth:)											Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
	2.22m	55	25%	0.01	0.06	0.08	0.04	0.06	0.09	0.09	0.05	0.05	0.01	-	10	10%	0%
U2	Habitat Type (Circle One) **Riffle Run Glide Pool**		Dominant Substrate Type: Gravel												Dominant Types Riparian Vegetation: Left Bank: 40% Grass/Forb; 60% Other. Right Bank: 5% Tree; 40% Grass/Forb; 55% Other		% Gravel or Larger: 85%	
	Algae or Macrophytes (Circle One) **Abundant Common Rare Absent**		Width of Natural Buffer Vegetation (m) LB: >20 RB: >20												Instream Cover Types: Woody debris, Gravel, Cobble, Overhanging vegetation		% Instream Cover: 45%	

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect — Thalweg Depth:											Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
U3	4.74m	35	90%	0.04	0.30	0.44	0.48	0.52	0.46	0.46	0.36	0.12	0.02	-	45	10%	0%
	Habitat Type (Circle One) Riffle Run Glide Pool ✔		Dominant Substrate Type: Gravel												Dominant Types Riparian Vegetation: Left Bank: 10% Grass/Forb; 90% Other. Right Bank: 5% Tree; 40% Grass/Forb; 55% Other		% Gravel or Larger: 44%	
	Algae or Macrophytes (Circle One) Abundant Common Rare Absent		Width of Natural Buffer Vegetation (m) LB: >20 RB: >20												Instream Cover Types: 2 types		% Instream Cover: 10%	

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect — Thalweg Depth:											Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
U4	2.01m	40	30%	0.05	0.14	0.23	0.37	0.30	0.32	0.25	0.15	0.15	0.05	-	90	95%	0%
	Habitat Type (Circle One) Riffle Run Glide Pool ✔		Dominant Substrate Type: Silt												Dominant Types Riparian Vegetation: Left Bank: 40% Grass/Forb; 60% Other. Right Bank: 5% Grass/Forb; 95% Other		% Gravel or Larger: 0%	
	Algae or Macrophytes (Circle One) Abundant Common Rare Absent		Width of Natural Buffer Vegetation (m) LB: >20 RB: >20												Instream Cover Types: 2 types		% Instream Cover: 5%	

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect — Thalweg Depth:											Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
U5	2.22m	68	50%	0.11	0.30	0.38	0.48	0.47	0.44	0.38	0.37	0.15	0.06	-	45	25%	29%
	Habitat Type (Circle One) Riffle Run Glide Pool		Dominant Substrate Type: Silt												Dominant Types Riparian Vegetation: Left Bank: 5% Shrub; 50% Grass/Forb; 45% Other. Right Bank: 5% Tree; 25% Shrub; 5% Grass/Forb; 60% Other		% Gravel or Larger: 0%	
	Algae or Macrophytes (Circle One) Abundant Common Rare Absent		Width of Natural Buffer Vegetation (m) LB>20 RB: >20												Instream Cover Types: 2 types		% Instream Cover: 5%	

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect — Thalweg Depth:											Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
	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: JB, SF, PG Date: 8/19 Time: 1705 Weather conditions: PC

Stream: Atascosa Location of site: 10009 Length of stream reach: 260m

Stream Segment No.: 210 Observed Stream Uses: Fish, Pum 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 0; No. Moderately Defined 0; No. Poorly Defined 3

Channel Obstructions/Modifications: LWC, other No. of Riffles: 6 Channel Flow Status (circle one): **high moderate low no flow**

Riparian Vegetation (%):
Left Bank: Trees 0 Shrubs 1% Grasses, Forbs 20 Cult. Fields _ Other 79
Right Bank: Trees 3 Shrubs 5 Grasses, Forbs 25 Cult. Fields _ Other 67

Stream depths are right to left bank

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect (Thalweg Depth:)											Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
	11.8m	20	20%	0.05	0.28	0.37	0.38	0.42	0.37	0.38	0.32	0.10	0.05	-	15	10%	0%
U1	Habitat Type (Circle One) **Riffle Run Glide Pool**		Dominant Substrate Type: Gravel												Dominant Types Riparian Vegetation: Left Bank: 20% Grass/Forb; 80% Other. Right Bank: 10% Grass/Forb; 90% Other		% Gravel or Larger: 70%	
	Algae or Macrophytes (Circle One) **Abundant Common ✔ Rare Absent**		Width of Natural Buffer Vegetation (m) LB: >20 RB: 0												Instream Cover Types: Gravel; Cobble		% Instream Cover: 70%	

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect (Thalweg Depth:)											Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
	2.22m	55	25%	0.01	0.06	0.08	0.04	0.06	0.09	0.09	0.05	0.05	0.01	-	10	10%	0%
U2	Habitat Type (Circle One) **Riffle Run Glide Pool**		Dominant Substrate Type: Gravel												Dominant Types Riparian Vegetation: Left Bank: 40% Grass/Forb; 60% Other. Right Bank: 5% Tree; 40% Grass/Forb; 55% Other		% Gravel or Larger: 85%	
	Algae or Macrophytes (Circle One) **Abundant Common Rare ✔ Absent**		Width of Natural Buffer Vegetation (m) LB: >20 RB: >20												Instream Cover Types: Woody debris, Gravel, Cobble, Overhanging vegetation		% Instream Cover: 45%	

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect — Thalweg Depth:											Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
U3	4.74m	35	90%	0.04	0.30	0.44	0.48	0.52	0.46	0.46	0.36	0.12	0.02	-	45	10%	0%
	Habitat Type (Circle One) **Riffle** Run Glide Pool ✔		Dominant Substrate Type: Gravel												Dominant Types Riparian Vegetation: Left Bank: 10% Grass/Forb; 90% Other. Right Bank: 5% Tree; 40% Grass/Forb; 55% Other		% Gravel or Larger: 44%	
	Algae or Macrophytes (Circle One) **Abundant** Common Rare Absent		Width of Natural Buffer Vegetation (m) LB: >20 RB: >20												Instream Cover Types: 2 types		% Instream Cover: 10%	

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect — Thalweg Depth:											Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
U4	2.01m	40	30%	0.05	0.14	0.23	0.37	0.30	0.32	0.25	0.15	0.15	0.05	-	90	95%	0%
	Habitat Type (Circle One) **Riffle** Run Glide Pool		Dominant Substrate Type: Silt												Dominant Types Riparian Vegetation: Left Bank: 40% Grass/Forb; 60% Other. Right Bank: 5% Grass/Forb; 95% Other		% Gravel or Larger: 0%	
	Algae or Macrophytes (Circle One) **Abundant** Common Rare Absent		Width of Natural Buffer Vegetation (m) LB: >20 RB: >20												Instream Cover Types: 2 types		% Instream Cover: 5%	

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect — Thalweg Depth:											Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
U5	2.22m	68	50%	0.11	0.30	0.38	0.48	0.47	0.44	0.38	0.37	0.15	0.06	-	45	25%	29%
	Habitat Type (Circle One) **Riffle** Run Glide Pool		Dominant Substrate Type: Silt												Dominant Types Riparian Vegetation: Left Bank: 5% Shrub; 50% Grass/Forb; 45% Other. Right Bank: 5% Tree; 25% Shrub; 5% Grass/Forb; 60% Other		% Gravel or Larger: 0%	
	Algae or Macrophytes (Circle One) **Abundant** Common Rare Absent		Width of Natural Buffer Vegetation (m) LB>20 RB: >20												Instream Cover Types: 2 types		% Instream Cover: 5%	

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect — Thalweg Depth:											Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
	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: JB, SF, PG Date: 8/19 Time: 1705 Weather conditions: PC

Stream: Atascosa Location of site: 10009 Length of stream reach: 260m

Stream Segment No.: 210 Observed Stream Uses: Fish, Pum 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 0; No. Moderately Defined 0; No. Poorly Defined 3

Channel Obstructions/Modifications: LWC, other No. of Riffles: 6 Channel Flow Status (circle one): **high moderate low no flow**

Riparian Vegetation (%):
Left Bank: Trees 0 Shrubs 1% Grasses, Forbs 20 Cult. Fields _ Other 79
Right Bank: Trees 3 Shrubs 5 Grasses, Forbs 25 Cult. Fields _ Other 67

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect — Thalweg Depth:											Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
	11.8m	20	20%	0.05	0.28	0.37	0.38	0.42	0.37	0.38	0.32	0.10	0.05	-	15	10%	0%
U1	Habitat Type (Circle One) **Riffle Run Glide Pool** ✔		Dominant Substrate Type: Gravel												Dominant Types Riparian Vegetation: Left Bank: 20% Grass/Forb; 80% Other. Right Bank: 10% Grass/Forb; 90% Other		% Gravel or Larger: 70%	
	Algae or Macrophytes (Circle One) **Abundant Common** ✔ **Rare Absent**		Width of Natural Buffer Vegetation (m) LB: >20 RB: 0												Instream Cover Types: Gravel; Cobble		% Instream Cover: 70%	

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect — Thalweg Depth:											Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
	2.22m	55	25%	0.01	0.06	0.08	0.04	0.06	0.09	0.09	0.05	0.05	0.01	-	10	10%	0%
U2	Habitat Type (Circle One) **Riffle Run Glide Pool** ✔		Dominant Substrate Type: Gravel												Dominant Types Riparian Vegetation: Left Bank: 40% Grass/Forb; 60% Other. Right Bank: 5% Tree; 40% Grass/Forb; 55% Other		% Gravel or Larger: 85%	
	Algae or Macrophytes (Circle One) **Abundant Common** **Rare Absent**		Width of Natural Buffer Vegetation (m) LB: >20 RB: >20												Instream Cover Types: Woody debris, Gravel, Cobble, Overhanging vegetation		% Instream Cover: 45%	

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:													
U3	4.74m	35	90%	0.04	0.30	0.44	0.48	0.52	0.46	0.46	0.36	0.12	0.02	-	45	10%	0%
	Habitat Type (Circle One) **Riffle** Run Glide Pool		Dominant Substrate Type: Gravel												Dominant Types Riparian Vegetation: Left Bank: 10% Grass/Forb; 90% Other. Right Bank: 5% Tree; 40% Grass/Forb; 55% Other		% Gravel or Larger: 44%	
	Algae or Macrophytes (Circle One) **Abundant** Common Rare Absent		Width of Natural Buffer Vegetation (m) LB: >20 RB: >20												Instream Cover Types: 2 types		% Instream Cover: 10%	

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:													
U4	2.01m	40	30%	0.05	0.14	0.23	0.37	0.30	0.32	0.25	0.15	0.15	0.05	-	90	95%	0%
	Habitat Type (Circle One) **Riffle** Run Glide Pool		Dominant Substrate Type: Silt												Dominant Types Riparian Vegetation: Left Bank: 40% Grass/Forb; 60% Other. Right Bank: 5% Grass/Forb; 95% Other		% Gravel or Larger: 0%	
	Algae or Macrophytes (Circle One) **Abundant** Common Rare Absent		Width of Natural Buffer Vegetation (m) LB: >20 RB: >20												Instream Cover Types: 2 types		% Instream Cover: 5%	

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:													
U5	2.22m	68	50%	0.11	0.30	0.38	0.48	0.47	0.44	0.38	0.37	0.15	0.06	-	45	25%	29%
	Habitat Type (Circle One) **Riffle** Run Glide Pool		Dominant Substrate Type: Silt												Dominant Types Riparian Vegetation: Left Bank: 5% Shrub; 50% Grass/Forb; 45% Other. Right Bank: 5% Tree; 25% Shrub; 5% Grass/Forb; 60% Other		% Gravel or Larger: 0%	
	Algae or Macrophytes (Circle One) **Abundant** Common Rare Absent		Width of Natural Buffer Vegetation (m) LB>20 RB: >20												Instream Cover Types: 2 types		% Instream Cover: 5%	

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	

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	861km²
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^3/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	1,173km²
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^3/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	1,253km²
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^3/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	861km²
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	1,173km²
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	1,253km²
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	861km²
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	1,173km²
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	1,253km²
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	**Abundant** >50% of substrate favorable for colonization and fish cover; good mix of several stable (not new fall or transient) cover types such as snags, cobble, undercut banks, macrophytes	**Common** 30-50% of substrate supports a stable habitat; adequate habitat for maintenance of populations; may be limited in the number of different habitat types	**Rare** 10-29.9% of substrate supports stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed	**Absent** <10% of substrate supports stable habitat; lack of habitat is obvious; substrate unstable or lacking
Score: 2	**4**	**3**	**2**	**1**
Bottom Substrate Stability	**Stable** >50% gravel or larger substrate, i.e., gravel, cobble, boulders; dominant substrate type is gravel or larger	**Moderately Stable** 30-50% gravel or larger substrate; dominant substrate type is mix of gravel with some finer sediments	**Moderately Unstable** 10-29.9% gravel or larger substrate; dominant substrate type is finer than gravel, but may still be in mix of sizes	**Unstable** <10% gravel or larger substrate; substrate is uniform sand, silt, clay, or bedrock
Score: 3	**4**	**3**	**2**	**1**
Number of Riffles To be counted, riffles must extend >50% the width of the channel and be at least as long as the channel width	**Abundant** ≥5 riffles	**Common** 2-4 riffles	**Rare** 1 riffle	**Absent** No riffles
Score: 4	**4**	**3**	**2**	**1**
Dimensions of Largest Pool	**Large** Pool covers more than 50% of the channel width; maximum depth is > 1m	**Moderate** Pool covers approximately 50% or slightly less than the channel width; maximum depth is 0.5-1 meter	**Small** Pool covers approximately 25% of the channel width; maximum depth is <0.5 meter	**Absent** No existing pools; only shallow auxiliary pockets
Score: 1	**3**	**2**	**1**	**0**
Channel Flow Status	**High** Water reaches the base of both the lower banks; <5% of channel substrate is exposed	**Moderate** Water fills <75% of the channel; or <25% of channel substrate is exposed	**Low** Water fills 25-75% of the available channel and/or riffle substrates are mostly exposed	**No Flow** Very little water in the channel and mostly present in standing pools; or stream is dry
Score: 3	**3**	**2**	**1**	**0**
Bank Stability	**Stable** Little evidence (<10%) of erosion bank failure; bank angles average <30°	**Moderately Stable** Some evidence (10-29.9%) of erosion or bank failure; small areas of erosion mostly healed over; bank angles average 30-39.9°	**Moderately Unstable** Evidence of erosion bank failure is common (30-50%); high potential of erosion during flooding; bank angles average 40-60°	**Unstable** Large and frequent evidence (>50%) of erosion or bank failure; raw areas frequent along steep banks; bank angles average >60°
Score: 1	**3**	**2**	**1**	**0**
Channel Sinuosity	**High** ≥2 well-defined bends with deep outside areas (cut banks) and shallow inside areas (point bars) are present	**Moderate** 1 well-defined bend OR ≥3 moderately-defined bends present	**Low** <3 moderately-defined bends OR only poorly-defined bends present	**None** Straight channel; may be channelized
Score: 1	**3**	**2**	**1**	**0**
Riparian Buffer Vegetation	**Extensive** Width of natural buffer is >20 meters	**Wide** Width of natural buffer is 10.1-20 meters	**Moderate** Width of natural buffer is 5-10 meters	**Narrow** Width of natural buffer is <5 meters
Score: 3	**3**	**2**	**1**	**0**
Aesthetics of Reach	**Wilderness** Outstanding natural beauty; usually wooded or unpastured area; water clarity is usually exceptional	**Natural Area** Tree and/or native vegetation common; some development evident (from fields, pastures, dwellings); water clarity may be slightly turbid	**Common Setting** Not offensive; area is developed, but uncluttered such as in an urban park; water clarity may be turbid or discolored	**Offensive** Stream does not enhance the aesthetics of the area; cluttered; highly developed; may be a dumping area; water clarity is usually turbid or discolored
Score: 0	**3**	**2**	**1**	**0**
Total Score: 18	INTERMEDIATE			

Part III - Habitat Quality Index

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

Part III - Habitat Quality Index

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

Part III - Habitat Quality Index

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

Part III - Habitat Quality Index

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

Part III - Habitat Quality Index

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

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	861km²
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	1,173km²
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	1,253km²
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