Impairment Verification Monitoring
Biological and Habitat Components
Segments 1803A and 1803B, Elm and Sandies Creeks, Texas
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Impairment Verification Monitoring-Volume 2: Biological and Habitat Components
Segments 1803A and 1803B, Elm and Sandies Creeks

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ABSTRACT

Ecological Communications Corporation (EComm) conducted biological data collection and analysis as part of an impairment verification monitoring project for Elm and Sandies Creeks (Segments 1803A and 1803B). Segments 1803A and 1803B appear 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 bodies remained on the draft 2002 303(d) list. The objective of EComm's data assessment was to assemble enough information on the water bodies 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 segments. 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 bodies 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, these water bodies appear to indicate a lower aquatic life use than the "High" use presumed due to perennial flow in the Texas Water Quality Standards (TCEQ 2000).

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

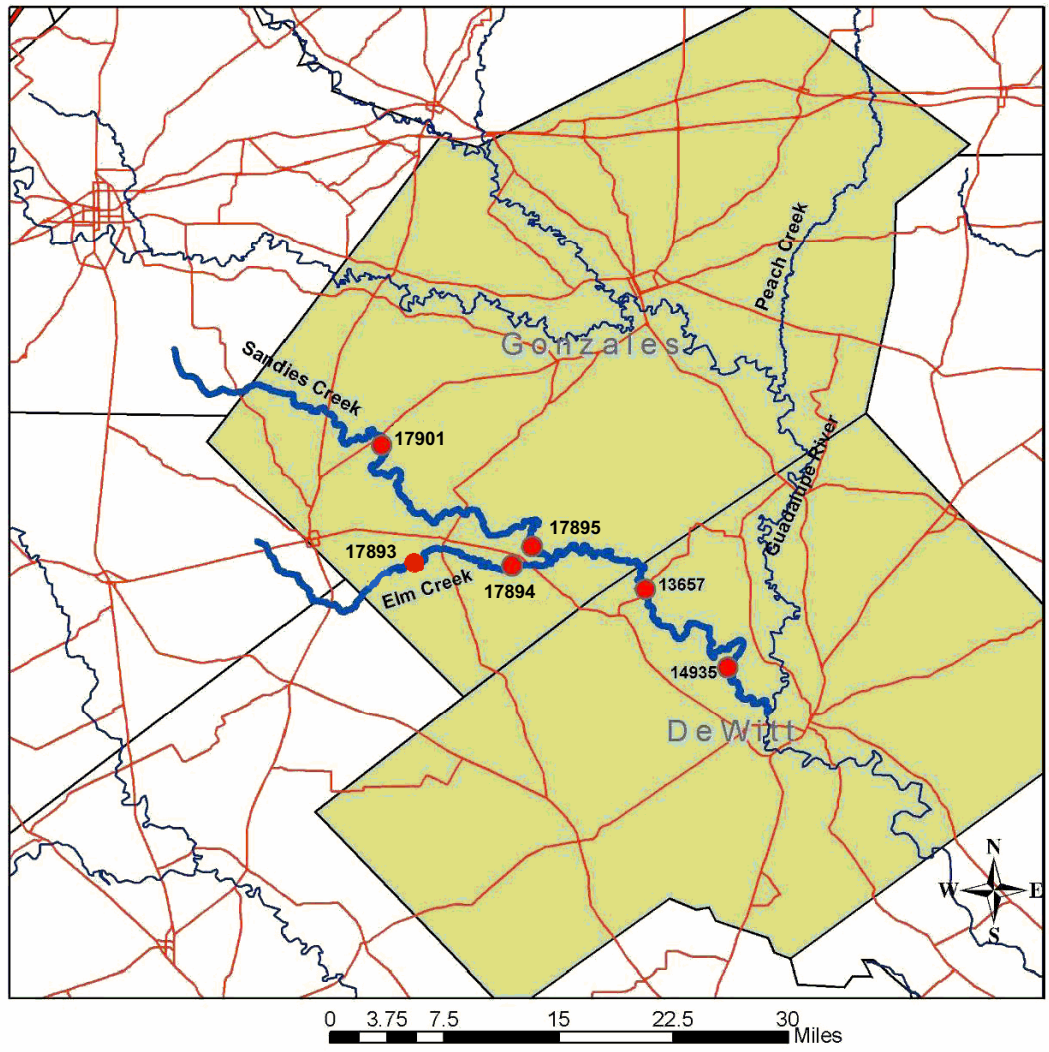
APPENDICES

1.0 INTRODUCTION

In 2000 the Texas Commission on Environmental Quality (TCEQ) initiated a study to investigate water quality impairments in 11 water bodies in Basin Groups D & E identified through the 1999 305(b) Water Quality Inventory as part of a total daily maximum load (TMDL) program. The segments were included on the 1999 State of Texas Clean Water Act 303(d) list as impaired due to concentrations of dissolved oxygen or bacteria or both which exceed established criteria. Two of these water bodies were Elm and Sandies Creeks (Segments 1803A and 1803B). The impairments to Segments 1803A and 1803B were caused by an exceedance of the established dissolved oxygen criteria and an exceedance in the bacteria criteria as indicated by data collected through the statewide monitoring program. Because an insufficient number of 24-hour dissolved oxygen values were available in 2002 to determine if the aquatic life use criterion is supported, Segments 1803A and 1803B remained on the impaired waters list. As an initial phase in TMDL development, the aquatic life use impairments to Segments 1803A and 1803B 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 six sites within the segments 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 bodies 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.

Figure 1. Station 17901

Segment 1803A begins in the upstream perennial portion of the stream southwest of Smiley in Gonzales County. It flows approximately 24 miles prior to the confluence with Sandies Creek in Gonzales County. Site 17893 is located on the Patillo Ranch in Gonzales County. Site 17894 is located on the Lazy F Ranch in Gonzales County. Segment 1803B begins in the upstream perennial portion of the stream northwest of Smiley in Gonzales County. It flows for approximately 65 miles before the confluence of the Guadalupe River West of Cuero in DeWitt County. Site 17901 is located on the Martin Ranch in Gonzales County. Site 17895 is located on the Lazy F Ranch. Site 13657 is located 2.0 miles Northeast of Westhoff, and 1.9 miles upstream from Birds Creek in DeWitt County. Site 14935 is located at CR 953 in DeWitt County. A location map of the segment is provided in Figure 2.



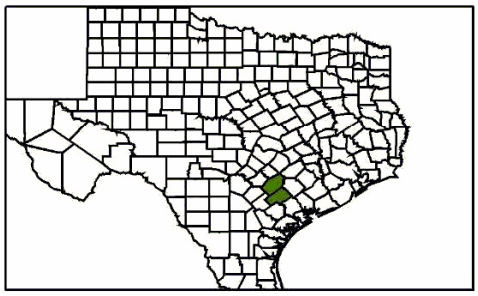


Figure 2. Segment 1803A and 1803B Location Map

2.0 BIOLOGICAL AND HABITAT METHODOLOGY

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

Figure 3. Station 17895

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 13657

Segments 1803A and 1803B, both unclassified water bodies, had not previously been designated as segments 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 ALA data requirements for biological data was conducted. Biological ALA requirements include at least four complete sampling events over two consecutive index periods. Nekton, benthos, and habitat data are collected and analyzed for each sampling event. Two events must be conducted during Year 1 and two events must be conducted during Year 2. Each year, one event must be from the Critical

Period (July 1 – September 30), and one from outside the Critical Period, but during the Index Period (March 15 – October 15). Biological sampling for Segment 1803A was conducted in August 2002, September 2002, April 2003, and July 2003. Biological sampling for Segment 1803B was conducted in August 2002, September 2002, April 2003, and September 2003. Therefore, if it is determined that the aquatic life uses and criteria should be evaluated within a UAA, more data would be required to make the determination.

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

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

STORET Code	Description	STORET Code	Description
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 six 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.

Figure 5. Station 14935

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.

Figure 6. Station 17893

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.

Figure 7. Station 17894

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 Segments 1803A and 1803B. The fish component resulted in Statewide and Regional IBI scores, the macroinvertebrate component resulted in a RBP score, and the habitat resulted in a HQI score. The scores from each of these calculations in turn relates to a specific Aquatic Life Use designation: limited, intermediate, high, or exceptional (Table 2). The Aquatic Life Use designation is used to assess existing uses according to the health of the sampled biological communities as compared to established water quality standards. It should be noted that the calculated scores of the Statewide IBI may fall in between two range subcategories (see ranges in Table 2). In these cases, subcategories were assigned as an intermediary between the two subcategories. For example, if a site received a Statewide IBI score of 38, it would fall between the "Limited" and "Intermediate" subcategories, and would be considered to have a "Limited-Intermediate" Aquatic Life Use subcategory.

Table 2. Ranges and Subcategories for each component

Subcategory	Statewide IBI	Regional IBI (Region 32)	Regional IBI (Region 33)	RBP	HQI
Limited	<34	<35	<36	<22	<14
Intermediate	40-44	35-40	36-41	22-28	14-19
High	48-52	41-48	42-51	29-36	20-25
Exceptional	58-60	>48	>51	>36	26-31

Results of the biological and habitat analyses for the six sites over four 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 presumed 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 presumed. A subcategory of "Exceptional" would be considered exceeding presumed standards for Segments 1803A and 1803B. Statewide IBI scores averaged approximately 39.75 (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 38.25 for stations in ecoregion 33 (Intermediate), and 36.75 for stations in ecoregion 32 (Intermediate), representing a higher agreement (16.7%; 0% above standard). RBP scores averaged 26.9 (Intermediate), a 45.8%

agreement (54.2% below standard), while HQI averaged approximately 16.1 (Intermediate) in 0% agreement with the aquatic life use (100% below standard).

Table 3. Results of Biological and Habitat Sampling for Segments 1803A and 1803B-Elm and Sandies Creeks

FY02	Creek	Statewide IBI	Ecoregion	Regional IBI	RBP	HQI
17901	Sandies	40 – Intermediate	33	40 – Intermediate	30 – High	16 – Intermediate
17895	Sandies	38 – Limited-Intermediate	32	31 – Limited	32 – High	17 – Intermediate
13657	Sandies	38 – Limited-Intermediate	32	35 – Intermediate	27 – Intermediate	16 – Intermediate
14935	Sandies	36 – Limited-Intermediate	32	29 – Limited	29 – High	15 – Intermediate
17893	Elm	42 – Intermediate	33	45 – High	24 – Intermediate	16 – Intermediate
17894	Elm	42 – Intermediate	32	39 – Intermediate	29 – High	18 – Intermediate
17901	Sandies	44 – Intermediate	33	34 – Limited	25 – Intermediate	15 – Intermediate
17895	Sandies	36 – Limited-Intermediate	32	33 – Limited	33 – High	17 – Intermediate
13657	Sandies	40 – Intermediate	32	39 – Intermediate	31 – High	16 – Intermediate
14935	Sandies	40 – Intermediate	32	41 – High	24 – Intermediate	16 – Intermediate
17893	Elm	36 – Limited-Intermediate	33	34 – Limited	22 – Intermediate	14 – Intermediate
17894	Elm	44 – Intermediate	32	44 - High	30 - High	16 - Intermediate
FY03						
17901	Sandies	44 – Intermediate	33	40 – Intermediate	28 – Intermediate	18 – Intermediate
17895	Sandies	40 – Intermediate	32	35 – Intermediate	20 – Limited	17 – Intermediate
13657	Sandies	38 – Limited-Intermediate	32	35 – Intermediate	27 – Intermediate	18 – Intermediate
14935	Sandies	38 – Limited-Intermediate	32	43 - High	22 – Intermediate	15 – Intermediate
17893	Elm	40 – Intermediate	33	36 – Intermediate	22 -Intermediate	15 – Intermediate
17894	Elm	40 – Intermediate	32	39 – Intermediate	30 – High	17 – Intermediate
17893	Elm	44 – Intermediate	33	38 – Intermediate	23 – Intermediate	15 – Intermediate
17894	Elm	40 – Intermediate	32	40 – Intermediate	26 – Intermediate	16 – Intermediate
FY04						
17901	Sandies	40 – Intermediate	33	39 – Intermediate	28 – High	15 – Intermediate
17895	Sandies	38 – Limited-Intermediate	32	37 – Intermediate	24 – Intermediate	17 – Intermediate
13657	Sandies	36 – Limited-Intermediate	32	35 – Intermediate	31 – High	15 – Intermediate
14935	Sandies	40 – Intermediate	32	33 - Limited	29 - High	16 – Intermediate

4.0 DISCUSSION

Average scores of all biological components generally reflected lower values than the high aquatic life use designation for Segments 1803A and 1803B. The general trend in Statewide IBI scores is to underestimate the aquatic life use when compared to other assessment methods (TPWD 2002). Therefore, the lower Statewide IBI scores generated from data collected for this study are most likely not indicative of the true aquatic life use of this segment. Low Regional IBI scores may be attributed to various biological parameters analyzed for each particular sampling event, including low species diversity, low abundance, unbalanced trophic structure, and limited presence of certain indicative species. Dissolved oxygen and bacteria concentrations throughout the study frequently exceeded the established criteria.

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 presumed based upon a perennial flow regime.

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Appendix A
Complete Raw Data Set
Biological and Habitat Components
Segments 1803A and 1803B
Elm and Sandies Creeks, Texas
Augst 2002
September 2002
April 2003
July 2003
September 2003

Ecological Communications Corporation
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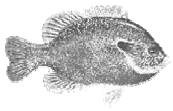
BIOTIC ASSESSMENT – FISH

Species Lists and Preliminary Data Manipulation



FISH COLLECTED

Stream	Date	ID	Species	N=	Type	Method	Tolerance	Trophic Gp
Sandies	8/27/02	17901	Bluegill	21	SF	E	T	IF
			Bluegill	23	SF	S	T	IF
			Bullhead Minnow	1		S	-	IF
			Gambusia affinis	25		E	T	IF
			Gambusia affinis	40		S	T	IF
			Green Sunfish	1	SF	S	T	P
			Golden topminnow	3		S	-	IF
			Largemouth Bass	1		S	-	P
			Longear Sunfish	8	SF	E	-	IF
			Longear Sunfish	6	SF	S	-	IF
			Pugnose Minnow	1		E	-	IF
			Pugnose Minnow	5		S	-	IF
			Red Shiner	1		S	T	IF
			Red Shiner	2		E	T	IF
			Sailfin Molly	10		E	T	O
			Sailfin Molly	5		S	T	O
			Spotted Bass	1		E	-	P
			Warmouth	4	SF	E	T	P
			Warmouth	1	SF	S	T	P
			Yellow Bullhead	2		E	-	O
			Total	161				

Stream	Date	ID	Species	N=	Type	Method	Tolerance	Trophic Gp
Sandies	8/31/02	17895	Bluegill	11	SF	E	T	IF
			Gizzard Shad	2		E	T	O
			Green Sunfish	6	SF	E	T	P
			Longear Sunfish	12	SF	E	-	IF
			Redbreast Sunfish	2	SF	E	-	IF
			Smallmouth Bass	1		E	I	P
			Texas Shiner	2		E	-	IF
			Warmouth	7	SF	E	T	P
			Total	43				

KEY:

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

FISH COLLECTED

Stream	Date	ID	Species	N=	Type	Method	Tolerance	Trophic Gp
Sandies	8/26/02	13657	Bluegill	1	SF	S	T	IF
			Bullhead Minnow	2		E	-	IF
			Bullhead Minnow	4		S	-	IF
			Channel Catfish	1		E	T	O
			Gambusia affinis	8		E	T	IF
			Gambusia affinis	83		S	T	IF
			Green Sunfish	1	SF	E	T	P
			Longear Sunfish	3	SF	E	-	IF
			Longear Sunfish	5	SF	S	-	IF
			Sailfin Molly	9		S	T	O
			Texas Shiner	5		S	-	IF
			Total	122				

KEY:

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

Stream	Date	ID	Species	N=	Type	Method	Tolerance	Trophic Gp
Sandies	8/31/02	14935	Bluegill	9	SF	E	T	IF
			Bass (unknown)	1		V		P
			Gar	-		V	T	P
			Gizzard Shad	3		E	T	O
			Green Sunfish	1	SF	E	T	P
			Largemouth Bass	4		E	-	P
			Longear Sunfish	9	SF	E	-	IF
			Redbreast Sunfish	6	SF	E	-	IF
			Smallmouth Bass	1		E	I	P
			Warmouth	6	SF	E	T	P
			Total	40				

**Abnormalities:
1 Longear with growth on gill

FISH COLLECTED

Stream	Date	ID	Species	N=	Type	Method	Tolerance	Trophic Gp
Elm	8/28/02	17893	Black Bullhead	2		E	T	O
			Bluegill	9	SF	E	T	IF
			Bluegill	4	SF	S	T	IF
			Bluntnose Darter	2	D	E	-	IF
			Channel Catfish	1		S	T	O
			Gambusia affinis	7		E	T	IF
			Gambusia affinis	46		S	T	IF
			Golden Shiner	1		E	T	IF
			Green Sunfish	13	SF	E	T	P
			Green Sunfish	2	SF	S	T	P
			Largemouth Bass	1		E	-	P
			Longear Sunfish	3	SF	S	-	IF
			Orangespotted Sunfish	1	SF	S	-	IF
			Red shiner	1		S	T	IF
			Sailfin Molly	1		S	T	O
			Warmouth	1	SF	S	T	P
			Warmouth	3	SF	E	T	P
			Total	98				

Stream	Date	ID	Species	N=	Type	Method	Tolerance	Trophic Gp
Elm	8/29/02	17894	Blacktail shiner	1		S	-	IF
			Bluegill	13	SF	E	T	IF
			Bullhead minnow	1		S	-	IF
			Bullhead minnow	1		E	-	IF
			Channel Catfish	15		E	T	O
			Common Carp	1		S	T	O
			Gambusia affinis	95		E	T	IF
			Gambusia affinis	90		S	T	IF
			Green Sunfish	6	SF	E	T	P
			Green Sunfish	5	SF	S	T	P
			Guadalupe Bass	1		S	I	P
			Longear Sunfish	8	SF	E	-	IF
			Red Shiner	5		E	T	IF
			Red Shiner	6		S	T	IF
			Redbreast Sunfish	11	SF	S	-	IF
			Redbreast Sunfish	3	SF	E	-	IF
			Sailfin Molly	28		E	T	O
			Sailfin Molly	4		S	T	O
			Spotted Bass	2		E	-	IF
			Spotted Sunfish	1	SF	S	-	IF
			Tadpole madtom	1		E	I	IF
			Texas Shiner	4		S	-	IF
			Warmouth	1	SF	E	T	P
			Yellow Bullhead	2		E	-	O
			Total	305				

KEY:

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

FISH COLLECTED

Stream	Date	ID	Species	N=	Type	Method	Tolerance	Trophic Gp
Sandies 2	9/26/02	17901	Bluegill	9	SF	E	T	IF
			Bluegill	16	SF	S	T	IF
			Gambusia affinis	59		E	T	IF
			Gambusia affinis	39		S	T	IF
			Greenthroat Darter	1	D	E	I	IF
			Greenthroat Darter	3	D	S	I	IF
			Largemouth Bass	1		E	-	P
			Largemouth Bass	1		S	-	P
			Longear Sunfish	4	SF	E	-	IF
			Longear Sunfish	10	SF	S	-	IF
			Orange-spotted Sunfish	2	SF	E	-	IF
			Redear Sunfish	2	SF	E	-	IF
			Sailfin Molly	13		E	T	O
			Sailfin Molly	12		S	T	O
			Spotted Gar	1		E	T	P
			Texas Shiner	6		E	-	IF
			Texas Shiner	15		S	-	IF
			Total	194				

KEY:

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

Stream	Date	ID	Species	N=	Type	Method	Tolerance	Trophic Gp
Sandies 2	9/24/02	17895	Longear Sunfish	11	SF	E	-	IF
			Texas Shiner	2		E	-	IF
			Bluegill	4	SF	E	T	IF
			Warmouth	1	SF	E	T	P
			Total	18				

FISH COLLECTED

Stream	Date	ID	Species	N=	Type	Method	Tolerance	Trophic Gp
Sandies 2	9/25/02	13657	Bluegill	5	SF	E	T	IF
			Bluegill	7	SF	S	T	IF
			Bullhead Minnow	2		E	-	IF
			Gambusia affinis	73		S	T	IF
			Largemouth Bass	1		E	-	P
			Longear Sunfish	6	SF	E	-	IF
			Longear Sunfish	3	SF	S	-	IF
			Red Shiner	1		S	T	IF
			Sailfin Molly	1		E	T	O
			Sailfin Molly	6		S	T	O
			Shortnose Gar	1		S	T	P
			Texas Shiner	12		E	-	IF
			Texas Shiner	17		S	-	IF
			Warmouth	1	SF	E	T	P
			White Crappie	1	SF	S	-	P
			Yellow Bullhead	1		E	-	O
			Total	138				

Stream	Date	ID	Species	N=	Type	Method	Tolerance	Trophic Gp
Sandies 2	9/24/02	14935	Bluegill	24	SF	E	T	IF
			Bullhead Minnow	2		E	-	IF
			Green Sunfish	2	SF	E	T	P
			Largemouth Bass	15		E	-	P
			Longear Sunfish	13	SF	E	-	IF
			Longnose Gar	1		E	T	P
			Orange Spotted Sunfish	4	SF	E	-	IF
			Redbreast Sunfish	2	SF	E	-	IF
			Rio Grande Cichlid	2		E	-	IF
			Spotted Sunfish	14	SF	E	-	IF
			Texas Shiner	1		E	-	IF
			Warmouth	4	SF	E	T	P
			Total	84				

FISH COLLECTED

Stream	Date	ID	Species	N=	Type	Method	Tolerance	Trophic Gp
Elm 2	9/26/02	17893	Black Bullhead	2		E	T	O
			Bluegill	5	SF	E	T	IF
			Gambusia (affinis?)	19		E	T	IF
			Green Sunfish	6	SF	E	T	P
			Longear Sunfish	6	SF	E	-	IF
			Orange-spotted Sunfish	1	SF	E	-	IF
			Sailfin Molly	3		E	T	O
			Spotted Gar	1		E	T	P
			Yellow Bullhead	1		E	-	O
			Total	44				
Elm 2	9/25/02	17894	Bluegill	16	SF	E	T	IF
			Bullhead Minnow	1		E	-	IF
			Channel Catfish	1		E	T	O
			Gambusia affinis	6		E	T	IF
			Gambusia affinis	19		S	T	IF
			Green Sunfish	5	SF	E	T	P
			Largemouth Bass	2		E	-	P
			Longear Sunfish	9	SF	E	-	IF
			Red Shiner	4		E	T	IF
			Tadpole Madtom	2		S	I	IF
			Sailfin Molly	1		E	T	O
			Sailfin Molly	1		S	T	O
			Texas Shiner	10		E	-	IF
			Texas Shiner	4		S	-	IF
			Warmouth	1	SF	E	T	P
			Total	82				

KEY:

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

Stream: Sandies Date: 4/15/03 Location: 13657	Species	N=	Type	Method	Tolerance	Trophic Gp.
	Bluegill	2	SF	E	T	IF
	Bluegill	1	SF	S	T	IF
	Bullhead minnow	1	CY	S	~	IF
	Gambusia affinis	3		E	T	IF
	Gambusia affinis	49		S	T	IF
	Green sunfish	2	SF	E	T	P
	Longear sunfish	2	SF	E	~	IF
	Longear sunfish	3	SF	S	~	IF
	Texas shiner	22	CY	S	~	IF
	Notropis sp.	4	CY	E		IF
	Notropis sp.	13	CY	S		IF
		102				

Stream: Sandies Date: 4/16/03 Location: 17901	Species	N=	Type	Method	Tolerance	Trophic Gp.
	Amazon molly	2		S	~	IF
	Bluegill	10	SF	E	T	IF
	Bluegill	5	SF	S	T	IF
	Common Carp	1	CY	V	T	O
	Gambusia affinis	3		E	T	IF
	Gambusia affinis	29		S	T	IF
	Gar	1		V	T	P
	Green sunfish	1	SF	E	T	P
	Grey redhorse	1	SK	S	~	IF
	Largemouth bass	1		S	~	P
	Lepomis hybrid	1	SF	S	~	IF
	Longear sunfish	6	SF	E	~	IF
	Longear sunfish	21	SF	S	~	IF
	Notropis sp.	2	CY	S		IF
	Red shiner	8	CY	S	T	IF
	Redbreast sunfish	1	SF	E	~	IF
	Redbreast sunfish	2	SF	S	~	IF
	Redear sunfish	2	SF	S	~	IF
	Lepomis sp.	4	SF	S	~	IF
	Warmouth	10	SF	E	T	P
	Warmouth	2	SF	S	T	P
		113				

Stream: Sandies Date: 4/17/03 Location: 14935	Species	N=	Type	Method	Tolerance	Trophic Gp.
	Bluegill	1	SF	E	T	IF
	Bluegill	1	SF	S	T	IF
	Gambusia affinis	2		S	T	IF
	Longear sunfish	2	SF	E	~	IF
	Longear sunfish	7	SF	S	~	IF
	Notropis sp.	5	CY	S		IF
	Spotted bass	2		E	~	P
	Lepomis sp.	1	SF	E	~	IF
	Texas shiner	2	CY	S	~	IF
	Warmouth	1	SF	E	T	P
		24				

Stream: Sandies Date: 4/17/03 Location: 17895	Species	N=	Type	Method	Tolerance	Trophic Gp.
	Bluegill	1	SF	E	T	IF
	Common carp	1	CY	E	T	O
	Gambusia affinis	3		S	T	IF
	Guadalupe bass	2		E	I	P
	Longear sunfish	4	SF	E	~	IF
	Texas shiner	12	CY	S	~	IF
	Warmouth	1	SF	E	T	P
		24				

Stream: Elm
Date: 4/16/03
Location: 17893

Species	N=	Type	Method	Tolerance	Trophic Gp.
Black bullhead	1		E	T	O
Bluegill	26	SF	E	T	IF
Bluegill	3	SF	S	T	IF
Gambusia affinis	1		E	T	IF
Gambusia affinis	1		S	T	IF
Green sunfish	4	SF	E	T	P
Longear sunfish	12	SF	E	~	IF
Longear sunfish	2	SF	S	~	IF
Slough darter	1	D	S	~	IF
Warmouth	7	SF	E	T	P
Warmouth	1	SF	S	T	P
White crappie	1	SF	E	~	P
White crappie	1	SF	S	~	P
	61				

Stream: Elm
Date: 4/17/03
Location: 17894

Species	N=	Type	Method	Tolerance	Trophic Gp.
Bluegill	5	SF	E	T	IF
Bluegill	3	SF	S	T	IF
Bullhead minnow	2	CY	E	~	IF
Bullhead minnow	1	CY	S	~	IF
Channel catfish	2		E	T	O
Gambusia affinins	1		E	T	IF
Gambusia affinins	45		S	T	IF
Green sunfish	2	SF	E	T	P
Green sunfish	1	SF	S	T	P
Longear sunfish	18	SF	E	~	IF
Longear sunfish	2	SF	S	~	IF
Red shiner	1	CY	E	T	IF
Red shiner	16	CY	S	T	IF
Redbreast sunfish	1	SF	S	~	IF
Spotted gar	1		E	T	P
Lepomis sp.	1	SF	E	~	IF
Texas shiner	1	CY	E	~	IF
Texas shiner	10	CY	S	~	IF
Warmouth	1	SF	E	T	P
	114				

FISH COLLECTED

Stream: Sandies
Date: 9/28/03
Location: 13657

Species	N=	Type	Method	Tolerance	Trophic Gp.
Bluegill	1	SF	E	T	IF
Bullhead Minnow	1	CY	S		IF
Guadalupe Bass	1		S	I	P
Longear Sunfish	2	SF	E		IF
Sailfin Molly	7		S	T	O
Spotted Bass	2		E		P
Texas Shiner	2	CY	S		IF
Western Mosquitofish	6		E	T	IF
Western Mosquitofish	21		S	T	IF
	43			35	33

* 1 Sailfin with abnormal growth

Stream: Sandies
Date: 9/28/03
Location: 17901

Species	N=	Type	Method	Tolerance	Trophic Gp.
Amazon Molly	15		S		O
Bluegill	31	SF	E	T	IF
Bluegill	7	SF	S	T	IF
Bullhead Minnow	7	CY	S		IF
Green Sunfish	2	SF	E	T	P
Longear Sunfish	17	SF	E		IF
Longear/Bluegill hybrid	1	SF	E		
Redbreast/Bluegill hybrid	1	SF	S		
Redear Sunfish	2	SF	E		IF
Sailfin Molly	13		E	T	O
Sailfin Molly	51		S	T	O
Spotted Bass	2		S		P
Texas Shiner	1	CY	S		IF
Warmouth	1	SF	E	T	P
Western Mosquitofish	24		E	T	IF
Western Mosquitofish	284		S	T	IF
White Crappie	2	SF	E		P
White Crappie	1	SF	S		P
	462		369	105	79
			93		373

Stream: Sandies
Date: 9/29/03
Location: 14935

Species	N=	Type	Method	Tolerance	Trophic Gp.
Bullhead Minnow	1	CY	E		IF
Bullhead Minnow	18	CY	S		IF
Guadalupe Bass	1		E	I	P
Lepomis sp	3	SF	E		
Longear Sunfish	8	SF	E		IF
Longear Sunfish	1	SF	S		IF
Sailfin Molly	1		E	T	O
Sailfin Molly	1		S	T	O
Spotted Bass	1		E		P
Western Mosquitofish	25		S	T	IF
	60				53

Stream: Sandies
Date: 9/29/03
Location: 17895

Species	N=	Type	Method	Tolerance	Trophic Gp.
Longear Sunfish	13	SF	E		IF
Sailfin Molly	2		E	T	O
Spotted Bass	3		E		P
Texas Shiner	1	CY	E		IF
Texas Shiner	5	CY	S		IF
Warmouth	1	SF	E	T	P
Western Mosquitofish	1		E	T	IF
Western Mosquitofish	1		S	T	IF
	27				

Stream: Elm
Date: 7/29/03
Location: 17893

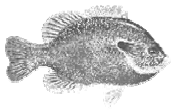
Species	N=	Type	Method	Tolerance	Trophic Gp.
Black bullhead	2		E	T	O
Bluegill	19	SF	E	~	IF
Bluegill	4	SF	S	~	IF
Bullhead minnow	1	CY	E	~	IF
Gambusia	1		E	T	IF
Gambusia	17		S	T	IF
Green sunfish	2	SF	E	T	P
Green sunfish	1	SF	S	T	P
Longear sunfish	12	SF	E	~	IF
Slough darter	1	D	S	~	IF
Tadpole madtom	1		E	I	IF
Tadpole madtom	3		S	I	IF
Warmouth	5	SF	E	T	P
	69				

Stream: Elm
Date: 7/29/03
Location: 17894

Species	N=	Type	Method	Tolerance	Trophic Gp.
Bluegill	5	SF	E	~	IF
Bluegill	1	SF	S	~	IF
Bullhead minnow	12	CY	E	~	IF
Bullhead minnow	5	CY	S	~	IF
Gambusia	3		E	T	IF
Gambusia	12		S	T	IF
Largemouth bass	2		E	~	P
Longear sunfish	34	SF	E	~	IF
Red shiner	2	CY	E	T	IF
Red shiner	5	CY	S	T	IF
Spotted bass	2		E	~	P
Warmouth	3	SF	E	T	P
Yellow bullhead	2		E	~	O
	88				

BIOTIC ASSESSMENT – FISH

Indices of Biotic Integrity – Statewide Criteria



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

Stream: Sandies	Date: 8/27/02 Location: 17901	County: Gonzales	
Category	**Metric**	**Value**	**Score**
Species Richness and Composition	1. Total number of fish species	13	5
	2. Number of darter species	0	1
	3. Number of sunfish species (exc. bass)	4	5
	4. Number of sucker speices	0	1
	5. Number of intolerant species	0	1
	6. Percentage of individuals as tolerants	83	1
Trophic Composition	7. Percentage of individuals as omnivores	11	5
	8. Percentage of individuals as insectivores	85	5
	9. Percentage of individuals as piscivores	5	3
Fish Abundance and Condition	10. Number of individuals in sample	161	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 Regional Criteria

Stream:Sandies	Date: 8/31/02	Location: 17895	County: Gonzales	
Metric			**Value**	**Score**
1. Total number of fish species			8	3
2. Number of native cyprinid species			1	1
3. Number of benthic invertivore species			0	1
4. Number of sunfish species			5	5
5. % of ind as tolerant species (exc. G. affinis)			60	1
6. Percentage of individuals as omnivores			5	5
7. Percentage of individuals as insectivores			63	3
8. Percentage of individuals as piscivores			32	5
9. Number of individuals in sample			43	-
a. number of ind/seine haul			no seine	1
b. number of ind/min electrofishing			2.9	1
10. % of individuals as non-native species			7	1
12. Percentage of individuals with disease/anomalies			0	5
Aquatic Life Use: LIMITED			Total Points:	**31**

1*

*Average of 9a and 9b

Drainage area above 17895 ~ 549.84 sq. km.

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

Stream: Sandies	Date: 8/26/02	Location: 13657	County: Dewitt	
Category	**Metric**		**Value**	**Score**
Species Richness and Composition	1. Total number of fish species		8	3
	2. Number of darter species		0	1
	3. Number of sunfish species (exc. bass)		3	5
	4. Number of sucker speices		0	1
	5. Number of intolerant species		0	1
	6. Percentage of individuals as tolerants		84	1
Trophic Composition	7. Percentage of individuals as omnivores		8	5
	8. Percentage of individuals as insectivores		91	5
	9. Percentage of individuals as piscivores		1	3
Fish Abundance and Condition	10. Number of individuals in sample		122	3
	11. Percentage of individuals as hybrids		0	5
	12. Percentage of individuals with disease/anomalies		0	5
	Aquatic Life Use: LIMITED-INTERMEDIATE		Total Points:	**38**

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

Stream: Sandies	Date: 8/31/02	Location: 14935	County: Dewitt	
Category	**Metric**		**Value**	**Score**
Species Richness and Composition	1. Total number of fish species		9	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		1	3
	6. Percentage of individuals as tolerants		48	1
Trophic Composition	7. Percentage of individuals as omnivores		8	5
	8. Percentage of individuals as insectivores		60	3
	9. Percentage of individuals as piscivores		33	5
Fish Abundance and Condition	10. Number of individuals in sample		40	1
	11. Percentage of individuals as hybrids		0	5
	12. Percentage of individuals with disease/anomalies		3	3
	Aquatic Life Use: LIMITED-INTERMEDIATE		Total Points:	**36**

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

Stream: Elm	Date: 8/28/02	Location: 17893	County: Gonzales	
Category	**Metric**		**Value**	**Score**
Species Richness and Composition	1. Total number of fish species		13	5
	2. Number of darter species		1	3
	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		93	1
Trophic Composition	7. Percentage of individuals as omnivores		4	5
	8. Percentage of individuals as insectivores		76	3
	9. Percentage of individuals as piscivores		20	5
Fish Abundance and Condition	10. Number of individuals in sample		98	3
	11. Percentage of individuals as hybrids		0	5
	12. Percentage of individuals with disease/anomalies		0	5
	Aquatic Life Use: INTERMEDIATE		Total Points:	**42**

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

Stream: Elm	Date: 8/29/02	Location: 10004	County: Gonzales	
Category	**Metric**		**Value**	**Score**
Species Richness and Composition	1. Total number of fish species		18	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		2	3
	6. Percentage of individuals as tolerants		88	1
Trophic Composition	7. Percentage of individuals as omnivores		16	5
	8. Percentage of individuals as insectivores		79	3
	9. Percentage of individuals as piscivores		4	3
Fish Abundance and Condition	10. Number of individuals in sample		305	5
	11. Percentage of individuals as hybrids		0	5
	12. Percentage of individuals with disease/anomalies		0	5
	Aquatic Life Use: INTERMEDIATE		Total Points:	**42**

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

Stream: Sandies	Date: 9/26/02	Location: 17901	County: Gonzales	
Category	**Metric**		**Value**	**Score**
Species Richness and Composition	1. Total number of fish species		10	5
	2. Number of darter species		1	3
	3. Number of sunfish species (exc. bass)		4	5
	4. Number of sucker speices		0	1
	5. Number of intolerant species		1	3
	6. Percentage of individuals as tolerants		77	1
Trophic Composition	7. Percentage of individuals as omnivores		13	5
	8. Percentage of individuals as insectivores		85	5
	9. Percentage of individuals as piscivores		2	3
Fish Abundance and Condition	10. Number of individuals in sample		194	3
	11. Percentage of individuals as hybrids		0	5
	12. Percentage of individuals with disease/anomalies		0	5
	Aquatic Life Use: INTERMEDIATE		Total Points:	**44**

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

Stream: Sandies2	Date: 9/24/02 Location: 17895	County: Gonzales	
Category	**Metric**	**Value**	**Score**
Species Richness and Composition	1. Total number of fish species	4	1
	2. Number of darter species	0	1
	3. Number of sunfish species (exc. bass)	3	5
	4. Number of sucker speices	0	1
	5. Number of intolerant species	0	1
	6. Percentage of individuals as tolerants	27.8	1
Trophic Composition	7. Percentage of individuals as omnivores	0	5
	8. Percentage of individuals as insectivores	94.4	5
	9. Percentage of individuals as piscivores	5.6	5
Fish Abundance and Condition	10. Number of individuals in sample	18	1
	11. Percentage of individuals as hybrids	0	5
	12. Percentage of individuals with disease/anomalies	0	5
	Aquatic Life Use: LIMITED-INTERMEDIATE	Total Points:	**36**

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

Stream: Sandies	Date: 9/25/02	Location: 13657	County: Dewitt	
Category	**Metric**		**Value**	**Score**
Species Richness and Composition	1. Total number of fish species		12	5
	2. Number of darter species		0	1
	3. Number of sunfish species (exc. bass)		4	5
	4. Number of sucker speices		0	1
	5. Number of intolerant species		0	1
	6. Percentage of individuals as tolerants		69	1
Trophic Composition	7. Percentage of individuals as omnivores		6	5
	8. Percentage of individuals as insectivores		91	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		0	5
	Aquatic Life Use: INTERMEDIATE		Total Points:	**40**

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

Stream: Sandies	Date: 9/25/02	Location: 14935	County: Dewitt	
Category	**Metric**		**Value**	**Score**
Species Richness and Composition	1. Total number of fish species		12	5
	2. Number of darter species		0	1
	3. Number of sunfish species (exc. bass)		7	5
	4. Number of sucker speices		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		0	5
	8. Percentage of individuals as insectivores		74	3
	9. Percentage of individuals as piscivores		26	5
Fish Abundance and Condition	10. Number of individuals in sample		84	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: Elm2	Date: 9/26/02	Location: 17893	County: Gonzales	
Category	**Metric**		**Value**	**Score**
Species Richness and Composition	1. Total number of fish species		9	3
	2. Number of darter species		0	1
	3. Number of sunfish species (exc. bass)		4	5
	4. Number of sucker speices		0	1
	5. Number of intolerant species		0	1
	6. Percentage of individuals as tolerants		82	1
Trophic Composition	7. Percentage of individuals as omnivores		14	5
	8. Percentage of individuals as insectivores		70	3
	9. Percentage of individuals as piscivores		16	5
Fish Abundance and Condition	10. Number of individuals in sample		44	1
	11. Percentage of individuals as hybrids		0	5
	12. Percentage of individuals with disease/anomalies		0	5
	Aquatic Life Use: LIMITED-INTERMEDIATE		Total Points:	**36**

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

Stream: Elm 2	Date: 9/25/02	Location: 17894	County: Gonzales	
Category	**Metric**		**Value**	**Score**
Species Richness and Composition	1. Total number of fish species		12	5
	2. Number of darter species		0	1
	3. Number of sunfish species (exc. bass)		4	5
	4. Number of sucker speices		0	1
	5. Number of intolerant species		1	3
	6. Percentage of individuals as tolerants		66	1
Trophic Composition	7. Percentage of individuals as omnivores		3.7	5
	8. Percentage of individuals as insectivores		86	5
	9. Percentage of individuals as piscivores		10	5
Fish Abundance and Condition	10. Number of individuals in sample		82	3
	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: Sandies	Date: 4/15/03	Location: 13657	County: Dewitt	
Category	**Metric**		**Value**	**Score**
Species Richness and Composition	1. Total # of fish species		7	3
	2. Number of darter species		0	1
	3. Number of sunfish species (exc. bass)		3	5
	4. Number of sucker species		0	1
	5. Number of intolerant species		0	1
	6. Percentage of individuals as tolerants		56	1
Trophic Composition	7. Percentage of individuals as omnivores		0	5
	8. Percentage of individuals as insectivores		98	5
	9. Percentage of individuals as piscivores		2	3
Fish Abundance and Condition	10. Number of individuals in sample		102	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:	38

Stream: Sandies	Date: 4/16/03	Location: 17901	County: Gonzales	
Category	**Metric**		**Value**	**Score**
Species Richness and Composition	1. Total # of fish species		15	5
	2. Number of darter species		0	1
	3. Number of sunfish species (exc. bass)		8	5
	4. Number of sucker species		1	3
	5. Number of intolerant species		0	1
	6. Percentage of individuals as tolerants		62	1
Trophic Composition	7. Percentage of individuals as omnivores		0.9	5
	8. Percentage of individuals as insectivores		86	5
	9. Percentage of individuals as piscivores		13	5
Fish Abundance and Condition	10. Number of individuals in sample		113	3
	11. Percentage of individuals as hybrids		0	5
	12. Percentage of individuals with disease/anomolies		0	5
	Aquatic Life Use: INTERMEDIATE		Total Points:	44

Stream: Sandies	Date: 4/17/03	Location: 14935	County: Dewitt	
Category	**Metric**		**Value**	**Score**
Species Richness and Composition	1. Total # of fish species		8	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		21	1
Trophic Composition	7. Percentage of individuals as omnivores		0	5
	8. Percentage of individuals as insectivores		88	5
	9. Percentage of individuals as piscivores		12	5
Fish Abundance and Condition	10. Number of individuals in sample		24	1
	11. Percentage of individuals as hybrids		0	5
	12. Percentage of individuals with disease/anomolies		0	5
	Aquatic Life Use: LIMITED-INTERMEDIATE		Total Points:	38

Stream: Sandies	**Date: 4/17/03**	**Location: 17895**	**County: Gonzales**
Category	**Metric**	**Value**	**Score**
Species Richness and Composition	1. Total # of fish species	7	3
	2. Number of darter species	0	1
	3. Number of sunfish species (exc. bass)	3	5
	4. Number of sucker species	0	1
	5. Number of intolerant species	1	3
	6. Percentage of individuals as tolerants	25	1
Trophic Composition	7. Percentage of individuals as omnivores	4	5
	8. Percentage of individuals as insectivores	83	5
	9. Percentage of individuals as piscivores	13	5
Fish Abundance and Condition	10. Number of individuals in sample	24	1
	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: Elm	**Date: 4/16/03**	**Location: 17893**	**County: Gonzales**
Category	**Metric**	**Value**	**Score**
Species Richness and Composition	1. Total # of fish species	8	3
	2. Number of darter species	1	3
	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	72	1
Trophic Composition	7. Percentage of individuals as omnivores	2	5
	8. Percentage of individuals as insectivores	75	3
	9. Percentage of individuals as piscivores	23	5
Fish Abundance and Condition	10. Number of individuals in sample	61	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: Elm	**Date: 4/16/03**	**Location: 17894**	**County: Gonzales**
Category	**Metric**	**Value**	**Score**
Species Richness and Composition	1. Total # of fish species	12	5
	2. Number of darter species	0	1
	3. Number of sunfish species (exc. bass)	6	5
	4. Number of sucker species	0	1
	5. Number of intolerant species	0	1
	6. Percentage of individuals as tolerants	60	1
Trophic Composition	7. Percentage of individuals as omnivores	2	5
	8. Percentage of individuals as insectivores	94	5
	9. Percentage of individuals as piscivores	4	3
Fish Abundance and Condition	10. Number of individuals in sample	114	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: Elm	**Date: 7/29/03**	**Location: 17893**	**County: Gonzales**
Category	**Metric**	**Value**	**Score**
Species Richness and Composition	1. Total # of fish species	9	3
	2. Number of darter species	1	3
	3. Number of sunfish species (exc. bass)	4	5
	4. Number of sucker species	0	1
	5. Number of intolerant species	1	3
	6. Percentage of individuals as tolerants	40.6	1
Trophic Composition	7. Percentage of individuals as omnivores	2.9	5
	8. Percentage of individuals as insectivores	85.5	5
	9. Percentage of individuals as piscivores	11.59	5
Fish Abundance and Condition	10. Number of individuals in sample	69	3
	11. Percentage of individuals as hybrids	0	5
	12. Percentage of individuals with disease/anomolies	0	5
	Aquatic Life Use: INTERMEDIATE	Total Points:	44

Stream: Elm	**Date: 7/29/03**	**Location: 17894**	**County: Gonzales**
Category	**Metric**	**Value**	**Score**
Species Richness and Composition	1. Total # of fish species	9	3
	2. Number of darter species	0	1
	3. Number of sunfish species (exc. bass)	3	5
	4. Number of sucker species	0	1
	5. Number of intolerant species	0	1
	6. Percentage of individuals as tolerants	28.4	1
Trophic Composition	7. Percentage of individuals as omnivores	2.27	5
	8. Percentage of individuals as insectivores	89.8	5
	9. Percentage of individuals as piscivores	8	5
Fish Abundance and Condition	10. Number of individuals in sample	88	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: Sandies	Date: 9/28/03	Location: 13657	County: Dewitt
Category	**Metric**	**Value**	**Score**
Species Richness and Composition	1. Total # of fish species	8	3
	2. Number of darter species	0	1
	3. Number of sunfish species (exc. bass)	1	3
	4. Number of sucker species	0	1
	5. Number of intolerant species	1	3
	6. Percentage of individuals as tolerants	81.39534884	1
	7. Percentage of individuals as omnivores	16.27906977	5
Trophic Composition	8. Percentage of individuals as insectivores	76.74418605	3
	9. Percentage of individuals as piscivores	6.976744186	5
	10. Number of individuals in sample	43	1
Fish Abundance and Condition	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

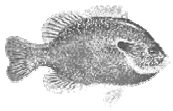
Stream: Sandies	Date: 9/28/03	Location: 17901	County: Gonzales
Category	**Metric**	**Value**	**Score**
Species Richness and Composition	1. Total # of fish species	15	5
	2. Number of darter species	0	1
	3. Number of sunfish species (exc. bass)	8	5
	4. Number of sucker species	0	1
	5. Number of intolerant species	0	1
	6. Percentage of individuals as tolerants	89.7826087	1
	7. Percentage of individuals as omnivores	17.17391304	5
Trophic Composition	8. Percentage of individuals as insectivores	81.08695652	5
	9. Percentage of individuals as piscivores	1.739130435	3
	10. Number of individuals in sample	462	5
Fish Abundance and Condition	11. Percentage of individuals as hybrids	0.432900433	3
	12. Percentage of individuals with disease/anomolies	0	5
	Aquatic Life Use: INTERMEDIATE	Total Points:	40

Stream: Sandies	Date: 9/29/03	Location: 14935	County: Dewitt
Category	**Metric**	**Value**	**Score**
Species Richness and Composition	1. Total # of fish species	7	3
	2. Number of darter species	0	1
	3. Number of sunfish species (exc. bass)	2	5
	4. Number of sucker species	0	1
	5. Number of intolerant species	1	3
	6. Percentage of individuals as tolerants	47.36842105	1
	7. Percentage of individuals as omnivores	3.50877193	5
Trophic Composition	8. Percentage of individuals as insectivores	92.98245614	5
	9. Percentage of individuals as piscivores	3.50877193	3
	10. Number of individuals in sample	60	3
Fish Abundance and Condition	11. Percentage of individuals as hybrids	0	5
	12. Percentage of individuals with disease/anomolies	0	5
	Aquatic Life Use: INTERMEDIATE	Total Points:	40

Stream: Sandies	**Date: 9/29/03**	**Location: 17895**	**County: Gonzales**
Category	**Metric**	**Value**	**Score**
Species Richness and Composition	1. Total # of fish species	6	3
	2. Number of darter species	0	1
	3. Number of sunfish species (exc. bass)	2	5
	4. Number of sucker species	0	1
	5. Number of intolerant species	0	1
	6. Percentage of individuals as tolerants	18.51851852	3
Trophic Composition	7. Percentage of individuals as omnivores	7.407407407	5
	8. Percentage of individuals as insectivores	77.77777778	3
	9. Percentage of individuals as piscivores	14.81481481	5
Fish Abundance and Condition	10. Number of individuals in sample	27	1
	11. Percentage of individuals as hybrids	0	5
	12. Percentage of individuals with disease/anomolies	0	5
	Aquatic Life Use: LIMITED-INTERMEDIATE	Total Points:	38

BIOTIC ASSESSMENT – FISH

Indices of Biotic Integrity – Regional Criteria



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

Stream: Sandies	Date: 8/27/02	Location: 10013	County: Gonzales	
Metric			**Value**	**Score**
1. Total number of fish species			13	3
2. Number of native cyprinid species			3	3
3. Number of benthic invertevore species			0	1
4. Number of sunfish species			4	3
5. Number of intolerant species			0	1
6. Percentage of individuals as tolerants (exc. G.affinis)			42.2	3
7. Percentage of individuals as omnivores			11	5
8. Percentage of individuals as invertivores			85	5
9. Percentage of individuals as piscivores			5	3
10. Number of individuals in sample			161	-
a. number of ind/seine haul			14.3	3
b. number of ind/min electrofishing			4.9	3
11. % of individuals as non-native species			0	5
12. % of individuals with disease or other anomaly			0	5
Aquatic Life Use: INTERMEDIATE			Total Points:	**40**

3*

*Average of 10a and 10b

Drainage area above 17901 ~ 150.90 sq. km.

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

Stream:Sandies	Date: 8/31/02	Location: 17895	County: Gonzales	
Metric			**Value**	**Score**
1. Total number of fish species			8	3
2. Number of native cyprinid species			1	1
3. Number of benthic invertivore species			0	1
4. Number of sunfish species			5	5
5. % of ind as tolerant species (exc. G. affinis)			60	1
6. Percentage of individuals as omnivores			5	5
7. Percentage of individuals as insectivores			63	3
8. Percentage of individuals as piscivores			32	5
9. Number of individuals in sample			43	-
a. number of ind/seine haul			no seine	1
b. number of ind/min electrofishing			2.9	1
10. % of individuals as non-native species			7	1
12. Percentage of individuals with disease/anomalies			0	5
Aquatic Life Use: LIMITED			Total Points:	**31**

1*

*Average of 9a and 9b

Drainage area above 17895 ~ 549.84 sq. km.

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

Stream:Sandies	Date: 8/26/02	Location: 13657	County: Dewitt	
Metric			**Value**	**Score**
1. Total number of fish species			8	1
2. Number of native cyprinid species			2	3
3. Number of benthic invertevore species			0	1
4. Number of sunfish species			3	3
5. Percentage of individuals as tolerant species (exc. G. affinis)			9.8	5
6. Percentage of individuals as omnivores			8	5
7. Percentage of individuals as invertivores			91	5
8. Percentage of individuals as piscivores			1	1
9. Number of individuals in sample			122	-
a. number of ind/seine haul			17.8	1
b. number of ind/min electrofishing			1	1
10. Percentage of individuals as non-native species			0	5
12. Percentage of individuals with disease/anomalies			0	5
Aquatic Life Use: INTERMEDIATE			Total Points:	**35**

1*

*Average 9a and 9b

Drainage area above 13657 ~ 1417.38 sq. km.

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

Stream:Sandies	Date: 8/31/02	Location: 14935	County: Dewitt	
Metric			**Value**	**Score**
1. Total number of fish species			9	3
2. Number of native cyprinid species			0	1
3. Number of benthic invertevore species			0	1
4. Number of sunfish species			5	5
5. Percentage of individuals as tolerant species (exc. G. affinis)			47.5	3
6. Percentage of individuals as omnivores			8	5
7. Percentage of individuals as invertivores			60	3
8. Percentage of individuals as piscivores			33	5
9. Number of individuals in sample			40	-
a. number of ind/seine haul			no seine	1
b. number of ind/min electrofishing			2.6	1
10. Percentage of individuals as non-native species			17.5	1
11. Percentage of individuals with disease/anomalies			3	1
Aquatic Life Use: LIMITED			Total Points:	**29**

1*

*Average of 9a and 9b

Drainage area above 14935 ~ 1752.62 sq. km.

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

Stream: Elm	Date: 8/28/02	Location: 17893	County: Gonzales	
REGION 33******	Metric		Value	Score
1. Total number of fish species			13	3
2. Number of native cyprinid species			2	3
3. Number of benthic invertivore species			1	1
4. Number of sunfish species			5	5
5. Number of intolerant species			0	1
6. Percentage of individuals as tolerants (exc. G. affinis)			39	3
7. Percentage of individuals as omnivores			4	5
8. Percentage of individuals as insectivores			76	5
9. Percentage of individuals as piscivores			20	5
10. Number of individuals in sample			98	-
a. number of ind/seine haul			10	1
b. number of ind/min electrofishing			2.5	1
11. Percentage of individuals as non-native species			0	5
12. Percentage of individuals with disease/anomalies			0	5
Aquatic Life Use: HIGH			Total Points:	45

1*

*Average of 10a and 10b

Drainage area above 17893 ~ 228.47 sq. km.

Stream: Elm	Date: 8/28/02	Location: 17893	County: Gonzales	
REGION 32**********	Metric		Value	Score
1. Total number of fish species			13	5
2. Number of native cyprinid species			2	3
3. Number of benthic invertivore species			1	3
4. Number of sunfish species			5	5
5. Percentage of individuals as tolerants (exc. G. affinis)			39	3
6. Percentage of individuals as omnivores			4	5
7. Percentage of individuals as insectivores			76	5
8. Percentage of individuals as piscivores			20	5
9. Number of individuals in sample			98	
a. number of ind/seine haul			10	1
b. number of ind/min electrofishing			2.5	1
10. Percentage of individuals as non-native species			0	5
11. Percentage of individuals with disease/anomalies			0	5
Aquatic Life Use: HIGH			Total Points:	45

1*

*Average of 10a and 10b

Drainage area above 17893 ~ 228.47 sq. km.

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

Stream:Elm	Date: 8/29/02	Location: 17894	County: Gonzales	
Metric			**Value**	**Score**
1. Total number of fish species			18	5
2. Number of native cyprinid species			5	5
3. Number of benthic invertivore species			1	3
4. Number of sunfish species			6	5
5. Percentage of individuals as tolerants (exc. G. affinis)			27.5	3
6. Percentage of individuals as omnivores			16	3
7. Percentage of individuals as insectivores			79	5
8. Percentage of individuals as piscivores			4	1
9. Number of individuals in sample			305	-
a. number of ind/seine haul			20.8	1
b. number of ind/min electrofishing			12	5
10. Percentage of ind. as non-native species			4.9	1
12. Percentage of individuals with disease/anomalies			0	5
Aquatic Life Use:	INTERMEDIATE		Total Points:	**39**

3*

*Average of 9a and 9b

Drainage area above 17894 ~ 349.68 sq. km.

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

Stream: Sandies2	Date: 9/26/02	Location: 17901	County: Gonzales	
Metric			**Value**	**Score**
1. Total number of fish species			10	3
2. Number of native cyprinid species			1	1
3. Number of benthic invertivore species			1	1
4. Number of sunfish species			4	3
5. Number of intolerant species			1	1
6. Percentage of individuals as tolerants (exc. G. affinis)			26.2	3
7. Percentage of individuals as omnivores			13	3
8. Percentage of individuals as insectivores			85	5
9. Percentage of individuals as piscivores			2	1
10. Number of individuals in sample			194	-
a. number of ind/seine haul			16	3
b. number of ind/min electrofishing			6.5	3
11. % of individuals as non-native species			0	5
12. % of individuals with disease or other anomaly			0	5
Aquatic Life Use:	LIMITED		Total Points:	**34**

3*

*Average of 10a and 10b

Drainage area above 17901 ~ 150.90 sq. km.

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

Stream:Sandies2	Date: 9/24/02	Location: 17895	County: Gonzales	
Metric			**Value**	**Score**
1. Total number of fish species			4	1
2. Number of native cyprinid species			1	1
3. Number of benthic invertivore species			0	1
4. Number of sunfish species			3	3
5. % of ind as tolerant species (exc. G. affinis)			27.8	3
6. Percentage of individuals as omnivores			0	5
7. Percentage of individuals as invertivores			94	5
8. Percentage of individuals as piscivores			6	3
9. Number of individuals in sample			18	-
a. number of ind/seine haul			no seine	1
b. number of ind/min electrofishing			1.2	1
10. % of individuals as non-native species			0	5
11. Percentage of individuals with disease/anomalies			0	5
Aquatic Life Use:	LIMITED		Total Points:	**33**

1*

*Average of 9a and 9b

Drainage area above 17895

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

Stream:Sandies2	Date: 9/25/02	Location: 13657	County: Dewitt	
Metric			**Value**	**Score**
1. Total number of fish species			12	3
2. Number of native cyprinid species			3	3
3. Number of benthic invertivore species			0	1
4. Number of sunfish species			4	5
5. Percentage of individuals as tolerant species (exc. G. affinis)			15.9	5
6. Percentage of individuals as omnivores			6	5
7. Percentage of individuals as insectivores			91	5
8. Percentage of individuals as piscivores			3	1
9. Number of individuals in sample			138	-
a. number of ind/seine haul			18.1	1
b. number of ind/min electrofishing			1.93	1
10. Percentage of individuals as non-native species			0	5
11. Percentage of individuals with disease/anomalies			0	5
Aquatic Life Use: INTERMEDIATE			Total Points:	**39**

1*

*Average of 9a and 9b

Drainage area above 13657 ~ 1417.38 sq. km.

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

Stream:Sandies2	Date: 9/24/02	Location: 14935	County: Dewitt	
Metric			**Value**	**Score**
1. Total number of fish species			12	3
2. Number of native cyprinid species			2	3
3. Number of benthic invertivore species			0	1
4. Number of sunfish species			7	5
5. Percentage of individuals as tolerant species (exc. G. affinis)			36.9	3
6. Percentage of individuals as omnivores			0	5
7. Percentage of individuals as insectivores			74	5
8. Percentage of individuals as piscivores			26	5
9. Number of individuals in sample			84	-
a. number of ind/seine haul			no seine	3
b. number of ind/min electrofishing			5.6	3
10. Percentage of individuals as non-native species			2.4	3
11. Percentage of individuals with disease/anomalies			0	5
Aquatic Life Use: HIGH			Total Points:	**41**

3*

*Average 9a and 9b

Drainage area above 14935 ~ 1752.62 sq. km.

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

Stream: Elm2	Date: 9/26/02	Location: 10002	County: Gonzales		
REGION 33**********	Metric		Value	Score	
1. Total number of fish species			9	1	
2. Number of native cyprinid species			0	1	
3. Number of benthic invertevore species			0	1	
4. Number of sunfish species			4	3	
5. Number of intolerant species			0	1	
6. Percentage of individuals as tolerants (exc. G. affinis)			38.6	3	
7. Percentage of individuals as omnivores			14	3	
8. Percentage of individuals as invertivores			70	5	
9. Percentage of individuals as piscivores			16	5	
10. Number of individuals in sample			44	-	
a. number of ind/seine haul			no seine	1	1*
b. number of ind/min electrofishing			2.9	1	
11. Percentage of individuals as non-native species			0	5	
12. Percentage of individuals with disease/anomalies			0	5	
Aquatic Life Use: LIMITED			Total Points:	34	

*Average 10a and 10b

Drainage area above 17893 ~ 228.47 sq. km.

Stream: Elm2	Date: 9/26/02	Location: 10002	County: Gonzales		
REGION 32**********	Metric		Value	Score	
1. Total number of fish species			9	3	
2. Number of native cyprinid species			0	1	
3. Number of benthic invertevore species			0	1	
4. Number of sunfish species			4	5	
5. Percentage of individuals as tolerants (exc. G. affinis)			38.6	3	
6. Percentage of individuals as omnivores			14	3	
7. Percentage of individuals as invertivores			70	5	
8. Percentage of individuals as piscivores			16	5	
9. Number of individuals in sample			44	-	
a. number of ind/seine haul			no seine	1	1*
b. number of ind/min electrofishing			2.9	1	
10. Percentage of individuals as non-native species			0	5	
11. Percentage of individuals with disease/anomalies			0	5	
Aquatic Life Use: INTERMEDIATE			Total Points:	37	

*Average 10a and 10b

Drainage area above 17893 ~ 228.47 sq. km.

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

Stream:Elm2	Date: 9/25/02	Location: 17984	County: Gonzales	
Metric			**Value**	**Score**
1. Total number of fish species			12	3
2. Number of native cyprinid species			3	3
3. Number of benthic invertevore species			1	3
4. Number of sunfish species			4	5
5. Percentage of individuals as tolerants (exc. G. affinis)			35.4	3
6. Percentage of individuals as omnivores			3.7	5
7. Percentage of individuals as invertivores			86	5
8. Percentage of individuals as piscivores			10	5
9. Number of individuals in sample			82	-
a. number of ind/seine haul			4.3	1
b. number of ind/min electrofishing			3.7	3
10. Percentage of ind. as non-native species			0	5
12. Percentage of individuals with disease/anomalies			0	5
Aquatic Life Use:	HIGH		Total Points:	**44**

2*

*Average of 9a and 9b

Drainage area above 17894 ~ 349.68 sq. km.

Stream: Sandies (33)	**Date: 4/16/03**	**Location: 17901**	**County: Gonzales**	
Metric			**Value**	**Score**
1. Total # of fish species			14	5
2.Total Number of cyprinid species			3	3
3. Number of benthic invertivore species			1	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*)			34	3
7. Percentage of individuals as omnivores			0.9	5
8. Percentage of individuals as insectivores			86	5
9. Percentage of individuals as piscivores			13	5
10. Number of individuals in sample			~	~
a. Number of individuals/seine hual			13.3	1
b. Number of individuals/min. electroshocking			2.1	1
11. Percentage of individuals as non-native species			3.5	1
12. Percentage of individuals with disease/anomolies			0	5
Aquatic Life Use: INTERMEDIATE			Total Points:	40

1*

*Average of 10a and 10b

Drainage area above 17901 ~ 150.90 sq. km.

Stream: Sandies (32)	**Date: 4/17/03**	**Location: 17895**	**County: Gonzales**	
Metric			**Value**	**Score**
1. Total # of fish species			7	1
2.Total Number of cyprinid species			2	3
3. Number of benthic invertivore species			0	1
4. Number of sunfish species (exc. bass)			3	3
5. Percentage of individuals as tolerants (exc. *G.affinis*)			12.5	5
6. Percentage of individuals as omnivores			4.1	5
7. Percentage of individuals as insectivores			83	5
8. Percentage of individuals as piscivores			12.5	5
9.. Number of individuals in sample			~	~
a. Number of individuals/seine hual			2.5	1
b. Number of individuals/min. electroshocking			0.6	1
10. Percentage of individuals as non-native species			4.1	1
11. Percentage of individuals with disease/anomolies			0	5
Aquatic Life Use: INTERMEDIATE			Total Points:	35

1*

*Average of 9a and 9b

Drainage area above 17895 ~ 549.84 sq. km.

Stream: Sandies (32)	Date: 4/15/03	Location: 13657	County: Dewitt	
Metric			**Value**	**Score**
1. Total # of fish species			7	1
2.Total Number of cyprinid species			3	3
3. Number of benthic invertivore species			0	1
4. Number of sunfish species (exc. bass)			3	3
5. Percentage of individuals as tolerants (exc. *G.affinis*)			4.9	5
6. Percentage of individuals as omnivores			0	5
7. Percentage of individuals as insectivores			98	5
8. Percentage of individuals as piscivores			2	1
9.. Number of individuals in sample			~	~
a. Number of individuals/seine hual			14.8	1
b. Number of individuals/min. electroshocking			0.87	1
10. Percentage of individuals as non-native species			0	5
11. Percentage of individuals with disease/anomolies			0	5
Aquatic Life Use: INTERMEDIATE			Total Points:	35

1*

*Average of 9a and 9b

Drainage area above 13657 ~ 1417.38 sq. km.

Stream: Sandies (32)	Date: 4/17/03	Location 14935	County: Dewitt	
Metric			**Value**	**Score**
1. Total # of fish species			8	3
2.Total Number of cyprinid species			2	3
3. Number of benthic invertivore species			0	1
4. Number of sunfish species (exc. bass)			4	5
5. Percentage of individuals as tolerants (exc. *G.affinis*)			12.5	5
6. Percentage of individuals as omnivores			0	5
7. Percentage of individuals as insectivores			87.5	5
8. Percentage of individuals as piscivores			12.5	5
9.. Number of individuals in sample			~	~
a. Number of individuals/seine hual			2.8	1
b. Number of individuals/min. electroshocking			0.47	1
10. Percentage of individuals as non-native species			0	5
11. Percentage of individuals with disease/anomolies			0	5
Aquatic Life Use: HIGH			Total Points:	43

1*

*Average of 9a and 9b

Drainage area above 14935 ~ 1752.62 sq. km.

Stream: Elm (32)	**Date: 4/16/03**	**Location: 17893**	**County: Gonzales**	
Metric			**Value**	**Score**
1. Total # of fish species			8	3
2.Total Number of cyprinid species			0	1
3. Number of benthic invertivore species			1	3
4. Number of sunfish species (exc. bass)			5	5
5. Percentage of individuals as tolerants (exc. *G.affinis*)			68.9	1
6. Percentage of individuals as omnivores			1.6	5
7. Percentage of individuals as insectivores			75.4	5
8. Percentage of individuals as piscivores			23	5
9.. Number of individuals in sample			~	~
a. Number of individuals/seine hual			1.5	1
b. Number of individuals/min. electroshocking			3.47	3
10. Percentage of individuals as non-native species			0	5
11. Percentage of individuals with disease/anomolies			0	5
Aquatic Life Use: INTERMEDIATE			Total Points:	40

2*

*Average of 9a and 9b

Drainage area above 17893 ~ 228.47 sq. km.

Stream: Elm (33)	**Date: 4/16/03**	**Location: 17893**	**County: Gonzales**	
Metric			**Value**	**Score**
1. Total # of fish species			8	1
2.Total Number of cyprinid species			0	1
3. Number of benthic invertivore species			1	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*)			68.9	1
7. Percentage of individuals as omnivores			1.6	5
8. Percentage of individuals as insectivores			75.4	5
9. Percentage of individuals as piscivores			23	5
10. Number of individuals in sample			~	~
a. Number of individuals/seine hual			1.5	1
b. Number of individuals/min. electroshocking			3.47	1
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:	36

1*

*Average of 9a and 9b

Drainagea area above 17893 ~ 228.47 sq. km

Stream: Elm (32)	**Date: 4/17/03**	**Location: 17894**	**County: Gonzales**	
Metric			**Value**	**Score**
1. Total # of fish species			12	5
2.Total Number of cyprinid species			3	3
3. Number of benthic invertivore species			0	1
4. Number of sunfish species (exc. bass)			6	5
5. Percentage of individuals as tolerants (exc. *G.affinis*)			28	3
6. Percentage of individuals as omnivores			1.8	5
7. Percentage of individuals as insectivores			93.9	5
8. Percentage of individuals as piscivores			4.4	1
9.. Number of individuals in sample			~	~
a. Number of individuals/seine hual			13.2	1
b. Number of individuals/min. electroshocking			2.3	1
10. Percentage of individuals as non-native species			0.9	5
11. Percentage of individuals with disease/anomolies			0	5
Aquatic Life Use: INTERMEDIATE			Total Points:	39
*Average of 9a and 9b				
Drainage area above 17894 ~ 349.68 sq. km.				

1*

Stream: Elm (32)	Date: 7/29/03	Location: 17893	County: Gonzales	
Metric			**Value**	**Score**
1. Total # of fish species			9	3
2.Total Number of cyprinid species			1	1
3. Number of benthic invertivore species			2	5
4. Number of sunfish species (exc. bass)			4	5
5. Percentage of individuals as tolerants (exc. *G.affinis*)			14.5	5
6. Percentage of individuals as omnivores			2.9	5
7. Percentage of individuals as insectivores			85.6	5
8. Percentage of individuals as piscivores			11.6	5
9.. Number of individuals in sample			~	~
a. Number of individuals/seine hual			4.3	1
b. Number of individuals/min. electroshocking			2.87	1
10. Percentage of individuals as non-native species			0	5
11. Percentage of individuals with disease/anomolies			0	5
Aquatic Life Use: HIGH			Total Points:	45

1*

*Average of 9a and 9b

Drainage area above 17893 ~ 228.47 sq. km.

Stream: Elm (33)	Date: 7/29/03	Location: 17893	County: Gonzales	
Metric			**Value**	**Score**
1. Total # of fish species			9	1
2.Total Number of cyprinid species			1	1
3. Number of benthic invertivore species			2	1
4. Number of sunfish species (exc. bass)			4	3
5. Number of intolerant species			1	1
6. Percentage of individuals as tolerants (exc. *G.affinis*)			14.5	5
7. Percentage of individuals as omnivores			2.9	5
8. Percentage of individuals as insectivores			85.6	5
9. Percentage of individuals as piscivores			11.6	5
10. Number of individuals in sample				~
a. Number of individuals/seine hual			4.3	1
b. Number of individuals/min. electroshocking			2.87	1
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

1*

Average of 10a and 10b

Drainage area above 17893 ~ 228.47 sq. km.

Stream: Elm (32)	**Date:7/29/03**	**Location: 17894**	**County: Gonzales**	
Metric			**Value**	**Score**
1. Total # of fish species			9	3
2.Total Number of cyprinid species			2	3
3. Number of benthic invertivore species			0	1
4. Number of sunfish species (exc. bass)			3	3
5. Percentage of individuals as tolerants (exc. *G.affinis*)			11.4	5
6. Percentage of individuals as omnivores			2.27	5
7. Percentage of individuals as insectivores			89.8	5
8. Percentage of individuals as piscivores			8	3
9.. Number of individuals in sample				~
a. Number of individuals/seine hual			3.8	1
b. Number of individuals/min. electroshocking			4.3	3
10. Percentage of individuals as non-native species			0	5
11. Percentage of individuals with disease/anomolies			0	5
Aquatic Life Use: INTERMEDIATE			Total Points:	40
*Average of 9a and 9b				
Drainage area above 17894 ~ 349.68 sq. km.				

2*

Stream: Sandies (33)	Date: 9/28/03	Location: 17901	County: Gonzales	
Metric		**Value**	**Score**	
1. Total # of fish species		14	3	
2.Total Number of cyprinid species		2	3	
3. Number of benthic invertivore species		0	1	
4. Number of sunfish species (exc. bass)		8	5	
5. Number of intolerant species		0	1	
6. Percentage of individuals as tolerants (exc. *G.affinis*)		22.82608696	5	
7. Percentage of individuals as omnivores		17.17391304	1	
8. Percentage of individuals as insectivores		81.08695652	5	
9. Percentage of individuals as piscivores		1.739130435	1	
10. Number of individuals in sample			~	
a. Number of individuals/seine hual		61.5	5	4*
b. Number of individuals/min. electroshocking		6.2	3	
11. Percentage of individuals as non-native species		0.216450216	5	
12. Percentage of individuals with disease/anomolies		0	5	
Aquatic Life Use: INTERMEDIATE		Total Points:	39	

*Average of 10a and 10b

Drainage area above 17901 ~ 150.90 sq. km

Stream: Sandies (32)	Date: 9/29/03	Location: 17895	County: Gonzales	
Metric		**Value**	**Score**	
1. Total # of fish species		6	1	
2.Total Number of cyprinid species		1	1	
3. Number of benthic invertivore species		0	1	
4. Number of sunfish species (exc. bass)		2	3	
5. Percentage of individuals as tolerants (exc. *G.affinis*)		11.11111111	5	
6. Percentage of individuals as omnivores		7.407407407	5	
7. Percentage of individuals as insectivores		77.77777778	5	
8. Percentage of individuals as piscivores		14.81481481	5	
9.. Number of individuals in sample			~	
a. Number of individuals/seine hual		1	1	1*
b. Number of individuals/min. electroshocking		1.4	1	
10. Percentage of individuals as non-native species		0	5	
11. Percentage of individuals with disease/anomolies		0	5	
Aquatic Life Use: INTERMEDIATE		Total Points:	37	

*Average of 9a and 9b

Drainage area above 17895 ~ 549.84 sq. km.

Stream: Sandies (32)	Date: 9/28/03	Location: 13657	County: Dewitt	
Metric		**Value**	**Score**	
1. Total # of fish species		8	3	
2.Total Number of cyprinid species		2	3	
3. Number of benthic invertivore species		0	1	
4. Number of sunfish species (exc. bass)		2	3	
5. Percentage of individuals as tolerants (exc. *G.affinis*)		18.60465116	5	
6. Percentage of individuals as omnivores		16.27906977	1	
7. Percentage of individuals as insectivores		76.74418605	5	
8. Percentage of individuals as piscivores		6.976744186	3	
9.. Number of individuals in sample			~	
a. Number of individuals/seine hual		5.333333333	1	1*
b. Number of individuals/min. electroshocking		0.733333333	1	
10. Percentage of individuals as non-native species		0	5	
11. Percentage of individuals with disease/anomolies		0	5	
Aquatic Life Use: INTERMEDIATE		Total Points:	35	

*Average of 9a and 9b

Drainage area above 13657 ~ 1417.38 sq. km.

Stream: Sandies (32)	Date:9/29/03	Location 14935	County: Dewitt	
Metric		**Value**	**Score**	
1. Total # of fish species		7	1	
2.Total Number of cyprinid species		1	1	
3. Number of benthic invertivore species		0	1	
4. Number of sunfish species (exc. bass)		2	3	
5. Percentage of individuals as tolerants (exc. *G.affinis*)		3.50877193	5	
6. Percentage of individuals as omnivores		3.50877193	5	
7. Percentage of individuals as insectivores		92.98245614	5	
8. Percentage of individuals as piscivores		3.50877193	1	
9.. Number of individuals in sample			~	
a. Number of individuals/seine hual		7.5	1	1*
b. Number of individuals/min. electroshocking		1	1	
10. Percentage of individuals as non-native species		0	5	
11. Percentage of individuals with disease/anomolies		0	5	
Aquatic Life Use: LIMITED		Total Points:	33	
*Average of 9a and 9b				
Drainage area above 14935 ~ 1752.62 sq. km.				

BIOTIC ASSESSMENT – BENTHIC MACROINVERTEBRATES

Species Lists and Preliminary Data Manipulation

Stream	Date	ID
Sandies	8/27/02	17901

Func.Gp	%
P	19.7917
SCR	25.3472
CG	50.3472
FC	2.08333
SHR	2.43056
	100

Taxa	N=	Func.Gp.	Tolerance	HBI
Odonata-Coenagrionidae-*Argia*	2	P	6	0.15
Odonata-Lestidae-*Lestes*	5	-	-	-
Ephemeroptera-Tricorythidae-Tricorythodes	5	CG	5	0.3125
Ephemeroptera-Heptageniidae-*Stenacron*	2	SCR/CG	4	0.1
Ephemeroptera-Baetidae-*Centroptilum*	17	SCR/CG	2	0.425
Ephemeroptera-Baetidae-*Apobaetis*	1	-	-	-
Hemiptera-Belostomatidae-*Belostoma*	2	P	10	0.25
Megaloptera-Corydalidae-Corydalus	1	P	6	0.075
Trichoptera-Hydropsychidae-*Cheumatopsyche*	1	FC	6	0.075
Coleoptera-Gyrinidae-*Dineutus* (A)	3	P	5	0.1875
Coleoptera-Hydrophilidae-*Berosus* (A)	3	P	9	0.3375
Coleoptera-Hydrophilidae-*Tropisternus* (L) *(Berosus)*	1	P	9	0.1125
Coleoptera-Elmidae-*Stenelmis* (A)	6	CG/SCR	7	0.525
Coleoptera-Scirtidae-*Cyphon* (L)	7	CR/CG/SH	-	-
Coleoptera-Hydrochidae (Hyrdophilidae)-*Hydrochus* (A)	7	CG	-	-
Coleoptera-Dytiscidae-*Laccodytes* (A)	2	P	-	-
Coleoptera-Dryopidae-Helichus (A)	1	SCR/CG	4	0.05
Coleoptera-Noteridae-*Hydrocanthus* (L)	1	-	-	-
Diptera-Chironomidae	3	P/CG/FC	6	0.225
Hirudinea	3	P	8	0.3
Hydracarina	1	P	6	0.075
Gastropoda (Limniophila)-Physidae-*Physella*	9	SCR	9	1.0125
Amphipoda-Hyallelidae-Hyallela (CG-8)	16	CG	8	1.6
Decapoda-Palemonidae-Paleomonetes	4	CG	4	0.2
Total	96	80		6.0125
Intolerant/Tolerant	0.67			

Stream	Date	ID
Sandies	8/27/02	17895

Func.Gp	%
P	14.8148
SCR	19.5988
CG	23.3025
FC	38.8889
SHR	3.39506
	100

Taxa	N=	Func.Gp.	Tolerance	HBI
Odonata-Coenagrionidae-*Argia*	3	P	6	0.1956522
Odonata-Macromiidae-*Macromia*	1	P	3	0.0326087
Odonata-Gomphidae-*Erpetogomphus*	2	P	1	0.0217391
Ephemeroptera-Tricorythidae-Tricorythodes	1	CG	5	0.0543478
Ephemeroptera-Isonychidae (Oligoneuriidae)-*Isonychia*	1	FC	3	0.0326087
Ephemeroptera-Heptageniidae-*Stenacron*	6	SCR/CG	4	0.2608696
Ephemeroptera-Baetidae-*Baetis*	12	SCR/CG	4	0.5217391
Hemiptera-Veliidae-*Rhagovelia*	4	P	-	-
Megaloptera-Corydalidae-Corydalus	3	P	6	0.1956522
Trichoptera-Hydropsychidae-*Cheumatopsyche*	29	FC	6	1.8913043
Trichoptera-Hydrophilidae (Hydropsychidae)-*Hydropsyche*	2	FC	5	0.1086957
Trichoptera-Hydropsychidae-*Smicridea*	10	FC	4	0.4347826
Coleoptera-Gyrinidae-*Dineutus* (L)	3	P	5	0.1630435
Coleoptera-Elmidae-*Hexacylloepus* (A)	3	CG/SCR	2	0.0652174
Coleoptera-Elmidae-*Microcylloepus* (A)	2	CG/SCR	2	0.0434783
Coleoptera-Elmidae-*Neoelmis* (A)	12	CG/SCR	2	0.2608696
Coleoptera-Scirtidae-*Cyphon* (L)	11	CR/CG/SH	-	-
Coleoptera-Hydrochidae (Hydrophilidae)-*Hydrochus* (A)	1	CG	-	-
Amphipoda-Hyallelidae-Hyallela (CG-8)	1	CG	8	0.0869565
Decapoda-Cambaridae	1	CG	5	0.0543478
Total	108	92		4.423913
Intolerant/Tolerant	1.56			

Stream	Date	ID
Sandies	8/26/02	13657

Func.Gp	%
P	16.8285
SCR	38.9968
CG	42.233
FC	0.32362
SHR	1.61812
	100

Taxa	N=	Func.Gp.	Tolerance	HBI
Odonata-Coenagrionidae-*Argia*	8	P	6	0.4948454
Ephemeroptera-Tricorythidae-Tricorythodes	1	CG	5	0.0515464
Ephemeroptera-Leptophlebiidae-*Thraulodes*	1	CG/SCR	2	0.0206186
Ephemeroptera-Heptageniidae-*Stenacron*	66	SCR/CG	4	2.7216495
Hemiptera-Hydrometridae-*Hydrometra*	2	-	-	-
Megaloptera-Corydalidae-Corydalus	1	P	6	0.0618557
Coleoptera-Gyrinidae-*Dineutus* (A)	5	P	5	0.257732
Coleoptera-Hydrophilidae-*Tropisternus* (L) *(Berosus)*	3	P	9	0.2783505
Coleoptera-Hydrophilidae-*Helobata* (A)	1	-	-	-
Coleoptera-Elmidae-*Stenelmis* (A)	7	CG/SCR	7	0.5051546
Coleoptera-Elmidae-*Stenelmis* (L)	1	CG/SCR	7	0.0721649
Coleoptera-Scirtidae-*Cyphon* (L)	5	CR/CG/SH	-	-
Coleoptera-Hydrochidae (Hydrophilidae)-*Hydrochus* (A)	1	CG	-	-
Diptera-Chironomidae	1	P/CG/FC	6	0.0618557
Gastropoda (Limnophila)-Physidae-*Physella*	1	SCR	9	0.0927835
Amphipoda-Hyallelidae-Hyallela (CG-8)	2	CG	8	0.1649485
Total	103	97		4.7835052
Intolerant/Tolerant	3.04			

Stream	Date	ID
Sandies	8/28/02	14935

Func.Gp	%
P	20.1031
SCR	33.8488
CG	42.0962
FC	1.03093
SHR	2.92096
	100

Taxa	N=	Func.Gp.	Tolerance	HBI
Odonata-Coenagrionidae-*Argia*	1	P	6	0.0618557
Ephemeroptera-Tricorythidae-Tricorythodes	3	CG	5	0.1546392
Ephemeroptera-Leptophlebiidae-*Thraulodes*	1	CG/SCR	2	0.0206186
Ephemeroptera-Heptageniidae-*Stenacron*	10	SCR/CG	4	0.4123711
Ephemeroptera-Baetidae-*Centroptilum*	26	SCR/CG	2	0.5360825
Ephemeroptera-Baetidae-*Procleon (Cleon)*	1	-	-	-
Hemiptera-Belostomatidae-*Belostoma*	8	P	10	0.8247423
Hemiptera-Hydrometridae-*Hydrometra*	1	-	-	-
Hemiptera-Gerridae-*Limnoporus*	1	-	-	-
Coleoptera-Hydrophilidae-*Berosus* (A)	8	P	9	0.742268
Coleoptera-Scirtidae-*Cyphon* (L)	7	CR/CG/SH	-	-
Coleoptera-Hydrochidae (Hydrophiladae)-*Hydrochus* (A)	4	CG	-	-
Coleoptera-Dytiscidae-*Laccodytes* (A)	2	-	-	-
Coleoptera-Dryopidae-Helichus (A)	14	SCR/CG	4	0.5773196
Coleoptera-Haliplidae-*Peltodytes*	1	SHR/P	8	0.0824742
Diptera-Chironomidae	3	P/CG/FC	6	0.185567
Hirudinea	1	P	8	0.0824742
Gastropoda (Limnophila)-Physidae-*Physella*	5	SCR	9	0.4639175
Amphipoda-Hyallelidae-Hyallela (CG-8)	2	CG	8	0.1649485
Decapoda-Palemonidae-Paleomonetes	3	CG	4	0.1237113
Total	97			4.4329897
Intolerant/Tolerant	1.97			

Stream	Date	ID
Elm	8/28/02	17893

Func.Gp	%
P	12.28956
SCR	28.45118
CG	55.38721
FC	1.683502
SHR	2.188552
	100

Taxa	N=	Func.Gp.	Tolerance	HBI
Odonata-Coenagrionidae-*Argia*	7	P	6	0.4468085
Ephemeroptera-Tricorythidae-Tricorythodes	16	CG	5	0.8510638
Ephemeroptera-Heptageniidae-*Stenacron*	43	SCR/CG	4	1.8297872
Ephemeroptera-Baetidae-*Centroptilum*	6	SCR/CG	2	0.1276596
Ephemeroptera-Baetidae-*Baetis*	1	SCR/CG	4	0.0425532
Ephemeroptera-Ephemeridae-*Hexagenia*	1	CG	6	0.0638298
Hemiptera-Belostomatidae-*Belostoma*	1	P	10	0.106383
Hemiptera-Nepidae-*Nepa (Ranatra)*	1	-	-	-
Coleoptera-Gyrinidae-*Dineutus* (L)	1	P	5	0.0531915
Coleoptera-Scirtidae-*Cyphon* (L)	5	CR/CG/SH	-	-
Coleoptera-Dryopidae-Helichus (A)	1	SCR/CG	4	0.0425532
Coleoptera-Haliplidae-*Peltodytes*	1	SHR/P	8	0.0851064
Diptera-Chironomidae	5	P/CG/FC	6	0.3191489
Hirudinea	1	P	8	0.0851064
Gastropoda (Limnophila)-Physidae-*Physella*	1	SCR	9	0.0957447
Gastropoda (Limnophila)-Planorbidae-*Biomphalaria*	2	-	-	-
Amphipoda-Hyallelidae-Hyallela (CG-8)	9	CG	8	0.7659574
Total	99	94		4.9148936
Intolerant/Tolerant	2.62			
	102			

Stream	Date	ID
Elm	8/29/02	17894

Func.Gp	%
P	31.13208
SCR	21.22642
CG	35.37736
FC	12.26415
SHR	0
	100

Taxa	N=	Func.Gp.	Tolerance	HBI
Odonata-Macromiidae-*Macromia*	1	P	3	0.0285714
Ephemeroptera-Tricorythidae-Tricorythodes	2	CG	5	0.0952381
Ephemeroptera-Heptageniidae-*Stenacron*	28	SCR/CG	4	1.0666667
Ephemeroptera-Baetidae-*Baetis*	16	SCR/CG	4	0.6095238
Hemiptera-Corixidae-*Trichocorixa*	1	P/CG	-	-
Trichoptera-Hydropsychidae-*Cheumatopsyche*	17	FC	6	0.0571429
Trichoptera-Hydrophilidae (Hydropsychidae)-*Hydropsyche*	1	FC	5	0.3333333
Trichoptera-Hydropsychidae-*Smicridea*	7	FC	4	0.1904762
Coleoptera-Gyrinidae-*Dineutus* (A)	5	P	5	0.0952381
Coleoptera-Gyrinidae-*Dineutus* (L)	2	P	5	0.047619
Coleoptera-Hydrophilidae-*Berosus* (A)	1	P	9	1.5428571
Coleoptera-Dryopidae-Helichus (A)	18	SCR/CG	4	0.0380952
Diptera-Chironomidae	1	P/CG/FC	6	0.1142857
Hirudinea	2	P	8	0.152381
Decapoda-Palemonidae-Paleomonetes	4	CG	4	0.152381
Total	106	105		4.5238095
Intolerant/Tolerant	4			

Stream	Date	ID
Sandies 2	9/26/02	17901

Func.Gp	%
P	26.3374
SCR	7.81893
CG	27.9835
FC	26.3374
SHR	11.5226
	100

Taxa	N=	Func.Gp.	Tolerance	HBI
Odonata-Coenagrionidae-*Argia*	1	P	6	0.075
Odonata-Macromiidae-*Macromia*	8	P	3	0.3
Odonata-Gomphidae-*Progomphus*	2	P	5	0.125
Odonata-Gomphidae-Erpetogomphus	1	P	1	0.0125
Odonata-Cordiuliidae-*Epitheca*	1	-	-	-
Odonata-Libellulidae-Perithemis	1	P	4	0.05
Ephemeroptera-Tricorythidae-*Tricorythodes*	2	CG	5	0.125
Ephemeroptera-Heptageniidae-*Stenacron*	2	SCR/CG	4	0.1
Ephemeroptera-Baetidae-*Baetis*	8	SCR/CG	4	0.4
Hemiptera-Hydrometridae-*Hydrometra*	1	-	-	-
Trichoptera-Hydropsychidae-*Cheumatopsyche*	7	FC	6	0.525
Coleoptera-Hydrophilidae-*Berosus*	4	P	9	0.45
Coleoptera-Scirtidae-*Cyphon* (L)	1	SCR/CG/SHR	-	-
Diptera-Chironomidae	13	P/CG/FC	6	0.975
Diptera-Simulidea-*Simulium*	2	FC	4	0.1
Oligochaeta	1	CG	8	0.1
Gastropoda-Physidae-*Physella*	1	SCR	9	0.1125
Bivalvia (Heterodonta)-Corbiculidae-*Corbiclua*	8	FC	6	0.6
Amphipoda-Hyallelidae-Hyallela	18	CG/SHR	8	1.8
Decapoda-Palaemonidae-Paleomonetes	1	CG	4	0.05
Total	81	80		5.9
Intolerant/Tolerant	0.50943			

Stream	Date	ID
Sandies 2	9/24/02	17895

Func.Gp	%
P	5.71429
SCR	20
CG	21.9048
FC	52.381
SHR	0
	100

Taxa	N=	Func.Gp.	Tolerance	HBI
Odonata-Calopterygidae-*Hetaerina*	1	P	6	0.05714286
Ephemeroptera-Leptophlebiidae-*Farrodes*	1	CG/SCR	2	0.01904762
Ephemeroptera-Heptageniidae-*Stenacron*	10	SCR/CG	4	0.38095238
Ephemeroptera-Baetidae-*Baetis*	9	SCR/CG	4	0.34285714
Ephemeroptera-Baetidae-*Fallceon*	14	SCR/CG	4	0.53333333
Megaloptera-Corydalidae-Corydalus	2	P	6	0.11428571
Trichoptera-Hydropsychidae-*Cheumatopsyche*	6	FC	6	0.34285714
Trichoptera-Hydropsychidae-*Hydropsyche*	1	FC	5	0.04761905
Trichoptera-Hydropsychidae-Smicridea	30	FC	4	1.14285714
Coleoptera-Gyrinidae-*Dineutus* (L)	1	P	5	0.04761905
Coleoptera-Elmidae-*Microcylloepus* (A)	1	CG/SCR	2	0.01904762
Coleoptera-Elmidae-*Microcylloepus* (L)	1	CG/SCR	2	0.01904762
Coleoptera-Elmidae-*Neoelmis*	6	CG/SCR	2	0.11428571
Diptera-Chironomidae	6	P/CG/FC	6	0.34285714
Diptera-Simulidae-*Simulium*	16	FC	4	0.60952381
Total	105			4.13333333
Intolerant/Tolerant	6			

Stream	Date	ID
Sandies 2	9/25/02	13657

Func.Gp	%
P	27.5362
SCR	36.9565
CG	34.058
FC	1.44928
SHR	0
	100

Taxa	N=	Func.Gp.	Tolerance	HBI
Odonata-Coenagrionidae-*Argia*	1	P	6	0.26086957
Odonata-Calopterygidae-*Hetaerina*	2	P	6	0.52173913
Odonata-Macromiidae-*Macromia*	1	P	3	0.13043478
Odonata-Gomphidae-*Progomphus*	1	P	5	0.2173913
Ephemeroptera-Tricorythidae-*Tricorythodes*	2	CG	5	0.43478261
Ephemeroptera-Heptageniidae-*Stenacron*	6	SCR/CG	4	1.04347826
Ephemeroptera-Baetidae-*Baetis*	4	SCR/CG	4	0.69565217
Trichoptera-Polycentropidae-*Cyrnellus*	1	-	-	-
Coleoptera-Elmidae-*Microcylloepus* (L)	1	CG/SCR	2	0.08695652
Diptera-Chironomidae	1	P/CG/FC	4	0.17391304
Hirudinea	1	P	8	0.34782609
Gastropoda-Physidae-*Physella*	3	SCR	9	1.17391304
Total	23			5.08695652
Intolerant/Tolerant	2.28571			

Stream	Date	ID
Sandies 2	9/25/02	14935

Func.Gp	%
P	29.3333
SCR	20
CG	43.3333
FC	7.33333
SHR	0
	100

Taxa	N=	Func.Gp.	Tolerance	HBI
Odonata-Coenagrionidae-*Argia*	8	P	6	0.96
Odonata-Macromiidae-*Macromia*	1	P	3	0.06
Odonata-Gomphidae-*Arigomphus*	4	-	-	-
Ephemeroptera-Tricorythidae-*Tricorythodes*	9	CG	5	0.9
Ephemeroptera-Heptageniidae-*Stenacron*	4	SCR/CG	4	0.32
Coleoptera-Gyrinidae-*Dineutus* (L)	1	P	5	0.1
Coleoptera-Hydrophilidae-*Berosus* (A)	1	P	9	0.18
Coleoptera-Hydrophilidae-*Berosus* (L)	1	P	9	0.18
Coeloptera-Elmidae-*Stenelmus* (A)	9	CG/SCR	7	1.26
Coleoptera-Elmidae-*Dubiraphia* (L)	1	CG/SCR	5	0.1
Diptera-Chironomidae	5	P/CG/FC	6	0.6
Hirudinea	1	P	8	0.16
Oligochaeta	4	CG	8	0.64
Gastropoda-Physidae-*Physella*	3	SCR	9	0.54
Bivalvia (Heterodonta)-Corbiculidae-*Corbiclua*	2	FC	6	0.24
Total	50			6.24
Intolerant/Tolerant	0.47059			

Stream	Date	ID
Elm 2	9/26/02	17893

Func.Gp	%
P	22.91667
SCR	13.54167
CG	16.45833
FC	46.66667
SHR	0.416667
	100

Taxa	N=	Func.Gp.	Tolerance	HBI
Odonata-Coenagrionidae-*Argia*	9	P	6	0.6835443
Odonata-Macromiidae-*Macromia*	1	P	3	0.03797468
Ephemeroptera-Tricorythidae-*Tricorythodes*	2	CG	5	0.12658228
Ephemeroptera-Heptageniidae-*Stenacron*	16	SCR/CG	4	0.81012658
Ephemeroptera-Baetidae-*Baetis*	1	SCR/CG	4	0.05063291
Megaloptera-Sialidae-*Sialis*	2	P	4	0.10126582
Trichoptera-Hydropsychidae-*Cheumatopsyche*	34	FC	6	2.58227848
Coleoptera-Scirtidae-*Cyphon*	1	SCR/CG/SHR	-	-
Coleoptera-Dytiscidae-*Uvarus*	2	-	-	-
Diptera-Chironomidae	7	P/CG/FC	6	0.53164557
Hirudinea	4	P	8	0.40506329
Gastropoda (Limnophila)-Physidae-*Physella*	2	SCR	9	0.2278481
Bivalvia (Heterodonta)-Corbiculidae-*Corbiclua*	1	FC	6	0.07594937
Total	80	79		5.63291139
Intolerant/Tolerant	0.38596			

Stream	Date	ID
Elm 2	9/25/02	17894

Func.Gp	%
P	21.62162
SCR	31.75676
CG	37.83784
FC	5.405405
SHR	3.378378
	100

Taxa	N=	Func.Gp.	Tolerance	HBI
Odonata-Coenagrionidae-*Argia*	7	P	6	0.56756757
Odonata-Macromiidae-*Macromia*	3	P	3	0.12162162
Ephemeroptera-Heptageniidae-*Stenacron*	36	SCR/CG	4	1.94594595
Hemiptera-Belostomatidae-*Belostoma*	1	P	10	0.13513514
Megaloptera-Corydalidae-Corydalus	1	P	6	0.08108108
Trichoptera-Hydropsychidae-*Cheumatopsyche*	1	FC	6	0.08108108
Trichoptera-Polycentropidae-*Cyrnellus*	2	-	-	-
Coleoptera-Hydrophilidae-*Berosus* (L)	1	P	9	0.12162162
Coleoptera-Elmidae-*Stenelmis* (L)	3	CG/SCR	7	0.28378378
Coleoptera-Dryopidae-Helichus	2	SCR/CG	4	0.10810811
Diptera-Chironomidae	6	P/CG/FC	6	0.48648649
Hirudinea	1	P	8	0.10810811
Oligochaeta	1	CG	8	0.10810811
Gastropoda (Limnophila)-Physidae-*Physella*	3	SCR	9	0.36486486
Bivalvia (Heterodonta)-Corbiculidae-*Corbiclua*	1	FC	6	0.08108108
Amphipoda-Hyallelidae-Hyallela	5	CG/SHR	8	0.54054054
Decapoda-Palaemonidae-Paleomonetes	2	CG	4	0.10810811
Total	74			5.24324324
Intolerant/Tolerant	1.3871			

Stream: Sandies
Date: 4/16/03
Location: 17901
10013

		Species	N=	Tolerance	FFG	HBI
		Argia sp.	4	6	P	0.179104478
		Archlestes	1			0
		Macromia	1	3	P	0.02238806
		Stenacron	3	4	CG/SCR	0.089552239
		Isonychia	2	3	FC	0.044776119
		Callibaetis	13	4	CG	0.388059701
		Baetis	1	4	SCR/CG	0.029850746
		Caenis	2	7	SCR/CG	0.104477612
		Perlesta	1	0	P	0
FFG	%	*Chimarra*	27	3	FC	0.604477612
P	18.421	*Hydrometra*	1	-		-
SCR	4.386	*Centrocorixa*	2	-	P/CG	-
CG	37.093	*Dineutus* (A)	4	5	P	0.149253731
FC	29.323	*Dineutus* (L)	3	5	P	0.111940299
SHR	10.777	*Tropisternus* (A)	1	9	P	0.067164179
	100	*Stenelmis* (A)	1	7	CG/SCR	0.052238806
		Cyphon (L)	1	-	SCR/CG/SHR	-
0.370902256		*Laccophilus* (L)	1	-	P	-
0.043857143		*Laccophilus* (A)	1	-	P	-
		Peltodytes (A)	1	8	SHR/P	0.059701493
		Chironomidae	21	6	P/CG/FC	0.940298507
		Physella	2	9	SCR	0.134328358
		Tricladida	1	7.5	P	0.055970149
		Corbicula	3	6	FC	0.134328358
		Hyalella	27	8	CG/SHR	1.611940299
		Paleomontes	11	4	CG	0.328358209
			134	1.04761905		5.108208955

Stream: Sandies
Date: 4/17/03
Location: 17895
10005

		Species	N=	Tolerance	FFG	HBI
		Erpetogomphus	1	1	P	0.013888889
		Stenacron	1	4	CG/SCR	0.055555556
		Fallceon	5	4	SCR/CG	0.277777778
FFG	%	*Brachycercus*	8	7	CG/SCR	0.777777778
P	26.389	*Perlesta*	1	0	P	0
SCR	11.806	*Cheumatopsyche*	1	6	FC	0.083333333
CG	35.417	*Dineutus* (L)	1	5	P	0.069444444
FC	23.611	*Helicus* (A)	1	4	SCR/CG	0.055555556
SHR	2.7778	Chironomidae	48	6	P/CG/FC	4
	100	*Physella*	1	9	SCR	0.125
		Hyalella	4	8	CG/SHR	0.444444444
			72	0.16129032		5.902777778

Stream: Sandies
Date: 4/15/03
Location: 13657

		Species	N=	Tolerance	FFG	HBI
		Argia	4	6	P	0.222222222
		Stenacron	44	4	CG/SCR	1.62962963
		Fallceon	13	4	SCR/CG	0.481481481
		Brachycercus	4	7	CG/SCR	0.259259259
FFG	%	*Perlesta*	18	0	P	0
P	37.963	*Cheumatopsyche*	2	6	FC	0.111111111
SCR	29.167	*Berosus* (L)	1	9	P	0.083333333
CG	29.167	*Stenelmis* (A)	1	7	CG/SCR	0.064814815
FC	3.7037	*Stenelmis* (L)	1	7	CG/SCR	0.064814815
SHR	0	*Stenus*	18	-	P	-
	100	*Corbicula*	2	6	FC	0.111111111
			108	5		3.027777778

Benthic Macroinvertebrates - Kick Sample (Qualitative)

Stream: Sandies
Date: 4/17/03
Location: 14935

		Species	N=	Tolerance	FFG	HBI
		Argia	2	6	P	0.117647059
		Stenacron	11	4	CG/SCR	0.431372549
		Callibaetis	3	4	CG	0.117647059
FFG	%	*Stenelmis* (A)	4	7	CG/SCR	0.274509804
P	27.941	*Peltodytes* (A)	1	8	SHR/P	0.078431373
SCR	9.3137	Chironomidae	78	6	P/CG/FC	4.588235294
CG	36.275	*Physella*	2	9	SCR	0.176470588
FC	25.49	*Hyalella*	1	8	CG/SHR	0.078431373
SHR	0.9804		102	0.15909091		5.862745098
	100					

Benthic Macroinvertebrates - Kick Sample (Qualitative)

Stream: Elm
Date: 4/16/03
Location: 17893

		Species	N=	Tolerance	FFG	HBI
		Argia sp.	14	6	P	0.8
		Nasiaeschna	1	2	P	0.019047619
		Stenacron	51	4	CG/SCR	1.942857143
FFG	%	*Brachycercus*	24	7	CG/SCR	1.6
P	20.952	*Perlesta*	1	0	P	0
SCR	37.937	*Curicta*	1	-		
CG	38.889	*Dineutus* (A)	3	5	P	0.142857143
FC	1.9048	*Dineutus* (L)	1	5	P	0.047619048
SHR	0.3175	*Cyphon* (L)	1	-	SCR/CG/SHR	-
	100	Chironomidae	6	6	P/CG/FC	0.342857143
		Physella	2	9	SCR	0.171428571
		Paleomontes	1	4	CG	0.038095238
			105	1.26086957		5.104761905

Stream: Elm
Date: 4/16/03
Location: 17894

		Species	N=	Tolerance	FFG	HBI
		Argia sp.	6	6	P	0.313043478
		Stenacron	30	4	CG/SCR	1.043478261
		Fallceon	3	4	SCR/CG	0.104347826
	%	*Brachycercus*	1	7	SCR/CG	0.060869565
P	29.275	*Perlesta*	18	0	P	0
SCR	21.739	*Corydalus*	1	6	P	0.052173913
CG	22.319	*Cheumatopsyche*	29	6	FC	1.513043478
FC	26.667	*Smicridea*	1	4	FC	0.034782609
SHR	0	*Dineutus* (A)	1	5	P	0.043478261
	100	*Dineutus* (L)	7	5	P	0.304347826
		Stenelmis (A)	13	7	CG/SCR	0.791304348
		Helicus (A)	1	4	SCR/CG	0.034782609
		Chironomidae	2	6	P/CG/FC	0.104347826
		Physella	1	9	SCR	0.07826087
		Paleomontes	1	4	CG	0.034782609
			115	1.16981132		4.513043478

Stream: Elm
Date: 7/29/03
Location: 17893

		Species	N=	Tolerance	FFG	HBI
		Argia	66	6	P	3.735849057
		Stenacron	15	4	SCR/CG	0.566037736
		Brachycercus	7	7	CG/SHR	0.462264151
FFG	%	*Hydrometra*	1	-	-	-
P	65.723	*Sialis*	1	4	P	0.037735849
SCR	12.893	*Cyrnellus*	1	-	-	-
CG	15.881	*Dineutus* (L)	1	5	P	0.047169811
FC	0.6289	*Cyphon*	8	-	SCR/CG/SHR	-
SHR	4.8742	*Uvarus (A)*	1	-	-	-
	100	Chironomidae	2	6	P/CG/FC	0.113207547
		Hirudinea	1	8	P	0.075471698
		Hyallela	5	8	CG/SHR	0.377358491
			106	0.20987654		5.41509434

Stream: Elm
Date: 7/29/03
Location: 17894

		Species	N=	Tolerance	FFG	HBI
		Argia	7	6	P	0.40776699
		Baetis	12	4	SCR/CG	0.466019417
		Stenacron	29	4	SCR/CG	1.126213592
	%	*Corydalus*	4	6	P	0.233009709
P	12.945	*Cheumatopsyche*	18	6	FC	1.048543689
SCR	34.466	*Dineutus* (L)	2	5	P	0.097087379
CG	34.79	*Stenelmis* (A)	26	7	CG/SCR	1.766990291
FC	17.799	*Neoelmis* (A)	4	2	CG/SCR	0.077669903
SHR	0	Chironomidae	1	6	P/CG/FC	0.058252427
	100		103	0.83928571		5.281553398

Stream: Sandies	**Date: 9/28/03**	**Location: 17901**	**County: Gonzales**
Metric		**Value**	**Score**
1. Taxa Richness		19	3
2. EPT Taxa Abundance		2	1
3. Biotic Index (HBI)		6.59	1
4. % Chironomidae		5.882352941	3
5. % Dominant Taxon		25.49019608	3
6. % Dominant FFG		39.33	3
7. % Predators		22	3
8. Ratio of Intolerant:Tolerant Taxa		0.48	1
9. % of Total Trichoptera as Hydropsychidae		NoTrichoptera	1
10. # of Non-insect Taxa		4	3
11. % Collector-Gatherers		39.33	2
12. % of Total Number as Elmidae		0.980392157	4
Aqautic Life Use: HIGH		Total Score:	28

Stream: Sandies	**Date: 9/28/03**	**Location: 17895**	**County: Gonzales**
Metric		**Value**	**Score**
1. Taxa Richness		12	2
2. EPT Taxa Abundance		6	2
3. Biotic Index (HBI)		4.41	3
4. % Chironomidae		0	1
5. % Dominant Taxon		61.44578313	1
6. % Dominant FFG		45.78313253	2
7. % Predators		7.228915663	4
8. Ratio of Intolerant:Tolerant Taxa		5.67	4
9. % of Total Trichoptera as Hydropsychidae		100	1
10. # of Non-insect Taxa		2	2
11. % Collector-Gatherers		45.78313253	1
12. % of Total Number as Elmidae		0	1
Aqautic Life Use: INTERMEDIATE		Total Score:	24

Stream: Sandies	**Date: 9/28/03**	**Location: 13657**	**County: Dewitt**
Metric		**Value**	**Score**
1. Taxa Richness		17	3
2. EPT Taxa Abundance		7	3
3. Biotic Index (HBI)		3.82	3
4. % Chironomidae		2.608695652	4
5. % Dominant Taxon		29.56521739	3
6. % Dominant FFG		40.72173913	3
7. % Predators		13.04347826	4
8. Ratio of Intolerant:Tolerant Taxa		4.7	3
9. % of Total Trichoptera as Hydropsychidae		100	1
10. # of Non-insect Taxa		0	1
11. % Collector-Gatherers		40.72173913	2
12. % of Total Number as Elmidae		30.43478261	1
Aqautic Life Use: HIGH		Total Score:	31

Stream: Sandies	**Date: 9/28/03**	**Location: 14935**	**County: Dewitt**
Metric		**Value**	**Score**
1. Taxa Richness		23	4
2. EPT Taxa Abundance		3	1
3. Biotic Index (HBI)		5.25	2
4. % Chironomidae		0.909090909	4
5. % Dominant Taxon		20.90909091	4
6. % Dominant FFG		52.15740741	2
7. % Predators		30.86111111	2
8. Ratio of Intolerant:Tolerant Taxa		2.03	2
9. % of Total Trichoptera as Hydropsychidae		NoTrichoptera	1
10. # of Non-insect Taxa		3	2
11. % Collector-Gatherers		52.15740741	1
12. % of Total Number as Elmidae		0.909090909	4
Aqautic Life Use: HIGH		Total Score:	29

BIOTIC ASSESSMENT – BENTHIC MACROINVERTEBRATES

Rapid Bioassessment Protocol

Stream: Sandies	**Date: 8/27/02**	**Location: 17901**	**County: Gonzales**
Metric		**Value**	**Score**
1. Taxa Richness		24	4
2. EPT Taxa Abundance		4	2
3. Biotic Index (HBI)		6.01	1
4. % Chironomidae		3.125	4
5. % Dominant Taxon		17.70833333	4
6. % Dominant FFG		50.34721875	2
7. % Predators		19.79166667	3
8. Ratio of Intolerant:Tolerant Taxa		0.666667	1
9. % of Total Trichoptera as Hydropsychidae		100	1
10. # of Non-insect Taxa		5	3
11. % Collector-Gatherers		50.34721875	1
12. % of Total Number as Elmidae		6.25	4
Aqautic Life Use: HIGH		Total Score:	30

Stream: Sandies	**Date: 8/27/02**	**Location: 17895**	**County: Gonzales**
Metric		**Value**	**Score**
1. Taxa Richness		20	3
2. EPT Taxa Abundance		7	3
3. Biotic Index (HBI)		4.42	3
4. % Chironomidae		0	1
5. % Dominant Taxon		26.85185185	3
6. % Dominant FFG		38.88888889	3
7. % Predators		14.81481481	4
8. Ratio of Intolerant:Tolerant Taxa		1.56	1
9. % of Total Trichoptera as Hydropsychidae		29.26829268	3
10. # of Non-insect Taxa		2	2
11. % Collector-Gatherers		23.30246852	3
12. % of Total Number as Elmidae		15.74074074	3
Aqautic Life Use: HIGH		Total Score:	32

Stream: Sandies	**Date: 8/26/02**	**Location: 13657**	**County: Dewitt**
Metric		**Value**	**Score**
1. Taxa Richness		15	3
2. EPT Taxa Abundance		3	1
3. Biotic Index (HBI)		4.78	2
4. % Chironomidae		0.970873786	4
5. % Dominant Taxon		64.0776699	1
6. % Dominant FFG		38.99676408	3
7. % Predators		16.82847573	3
8. Ratio of Intolerant:Tolerant Taxa		3.04	2
9. % of Total Trichoptera as Hydropsychidae		No Trichoptera	1
10. # of Non-insect Taxa		2	2
11. % Collector-Gatherers		42.23300971	1
12. % of Total Number as Elmidae		7.766990291	4
Aqautic Life Use: INTERMEDIATE		Total Score:	27

Stream: Sandies **Date: 8/28/02** **Location: 14935**	**County: Dewitt**	
Metric	**Value**	**Score**
1. Taxa Richness	20	3
2. EPT Taxa Abundance	4	2
3. Biotic Index (HBI)	4.43	3
4. % Chironomidae	3.092783505	4
5. % Dominant Taxon	26.80412371	3
6. % Dominant FFG	42.09621649	3
7. % Predators	20.10309278	3
8. Ratio of Intolerant:Tolerant Taxa	1.97	2
9. % of Total Trichoptera as Hydropsychidae	No Trichoptera	1
10. # of Non-insect Taxa	4	3
11. % Collector-Gatherers	42.09621649	1
12. % of Total Number as Elmidae	0	1
Aqautic Life Use: HIGH	Total Score:	29

Stream: Elm	**Date: 8/28/02**	**Location: 17893**	**County: Gonzales**
Metric		**Value**	**Score**
1. Taxa Richness		17	3
2. EPT Taxa Abundance		5	2
3. Biotic Index (HBI)		4.91	2
4. % Chironomidae		5.050505051	3
5. % Dominant Taxon		43.43434343	1
6. % Dominant FFG		55.38717172	1
7. % Predators		12.28955556	4
8. Ratio of Intolerant:Tolerant Taxa		2.62	2
9. % of Total Trichoptera as Hydropsychidae		No Trichoptera	1
10. # of Non-insect Taxa		4	3
11. % Collector-Gatherers		55.38717172	1
12. % of Total Number as Elmidae		0	1
Aqautic Life Use: INTERMEDIATE		Total Score:	24

Stream: Elm	**Date: 8/29/02**	**Location: 17894**	**County: Gonzales**
Metric		**Value**	**Score**
1. Taxa Richness		14	2
2. EPT Taxa Abundance		6	2
3. Biotic Index (HBI)		4.52	3
4. % Chironomidae		0.943396226	4
5. % Dominant Taxon		26.41509434	3
6. % Dominant FFG		35.37735849	4
7. % Predators		31.13207547	2
8. Ratio of Intolerant:Tolerant Taxa		4	3
9. % of Total Trichoptera as Hydropsychidae		100	1
10. # of Non-insect Taxa		2	2
11. % Collector-Gatherers		35.37735849	2
12. % of Total Number as Elmidae		0	1
Aqautic Life Use: HIGH		Total Score:	29

Stream: Sandies 2	**Date: 9/26/02**	**Location: 17901**	**County: Gonzales**
Metric		**Value**	**Score**
1. Taxa Richness		20	3
2. EPT Taxa Abundance		4	2
3. Biotic Index (HBI)		5.9	1
4. % Chironomidae		16.04938272	2
5. % Dominant Taxon		22.22222222	3
6. % Dominant FFG		27.98354321	4
7. % Predators		26.33740741	2
8. Ratio of Intolerant:Tolerant Taxa		0.51	1
9. % of Total Trichoptera as Hydropsychidae		100	1
10. # of Non-insect Taxa		5	3
11. % Collector-Gatherers		27.98354321	2
12. % of Total Number as Elmidae		0	1
Aqautic Life Use: INTERMEDIATE		Total Score:	25

Stream: Sandies 2	**Date: 9/24/02**	**Location: 17895**	**County: Gonzales**
Metric		**Value**	**Score**
1. Taxa Richness		14	2
2. EPT Taxa Abundance		7	3
3. Biotic Index (HBI)		4.13	3
4. % Chironomidae		5.714285714	3
5. % Dominant Taxon		28.57142857	3
6. % Dominant FFG		52.38095238	2
7. % Predators		5.714285714	4
8. Ratio of Intolerant:Tolerant Taxa		6	4
9. % of Total Trichoptera as Hydropsychidae		100	1
10. # of Non-insect Taxa		0	1
11. % Collector-Gatherers		21.9047619	3
12. % of Total Number as Elmidae		7.619	4
Aqautic Life Use: HIGH		Total Score:	33

Stream: Sandies 2	**Date: 9/25/02**	**Location: 13657**	**County: Dewitt**
Metric		**Value**	**Score**
1. Taxa Richness		12	2
2. EPT Taxa Abundance		4	2
3. Biotic Index (HBI)		5.09	2
4. % Chironomidae		4.347826087	3
5. % Dominant Taxon		26.08695652	3
6. % Dominant FFG		36.95652174	3
7. % Predators		27.53621739	2
8. Ratio of Intolerant:Tolerant Taxa		2.29	2
9. % of Total Trichoptera as Hydropsychidae		0	4
10. # of Non-insect Taxa		2	2
11. % Collector-Gatherers		34.05796957	2
12. % of Total Number as Elmidae		4.347826087	4
Aqautic Life Use: HIGH ***(Total Sample Size = 24)***		Total Score:	31

Stream: Sandies 2 **Date: 9/25/02** **Location: 14935**	**County: Dewitt**	
Metric	**Value**	**Score**
1. Taxa Richness	14	2
2. EPT Taxa Abundance	2	1
3. Biotic Index (HBI)	6.24	1
4. % Chironomidae	10	2
5. % Dominant Taxon	18	4
6. % Dominant FFG	43.33334	3
7. % Predators	29.333334	2
8. Ratio of Intolerant:Tolerant Taxa	0.47	1
9. % of Total Trichoptera as Hydropsychidae	No Trichoptera	1
10. # of Non-insect Taxa	4	3
11. % Collector-Gatherers	43.33334	1
12. % of Total Number as Elmidae	20	3
Aqautic Life Use: INTERMEDIATE ***(Total Sample Size = 54)***	Total Score:	24

Stream: Elm 2	**Date: 9/26/02**	**Location: 17893**	**County: Gonzales**
Metric		**Value**	**Score**
1. Taxa Richness		13	2
2. EPT Taxa Abundance		4	2
3. Biotic Index (HBI)		5.63	1
4. % Chironomidae		8.75	3
5. % Dominant Taxon		42.5	1
6. % Dominant FFG		46.666625	2
7. % Predators		22.916625	3
8. Ratio of Intolerant:Tolerant Taxa		0.386	1
9. % of Total Trichoptera as Hydropsychidae		100	1
10. # of Non-insect Taxa		3	2
11. % Collector-Gatherers		16.45875	3
12. % of Total Number as Elmidae		0	1
Aqautic Life Use: INTERMEDIATE		Total Score:	22

Stream: Elm 2	**Date: 9/25/02**	**Location: 17894**	**County: Gonzales**
Metric		**Value**	**Score**
1. Taxa Richness		17	3
2. EPT Taxa Abundance		3	1
3. Biotic Index (HBI)		5.24	2
4. % Chironomidae		8.108108108	3
5. % Dominant Taxon		48.64864865	1
6. % Dominant FFG		37.83783784	3
7. % Predators		21.62162162	3
8. Ratio of Intolerant:Tolerant Taxa		1.39	1
9. % of Total Trichoptera as Hydropsychidae		33.33333333	3
10. # of Non-insect Taxa		6	4
11. % Collector-Gatherers		37.83783784	2
12. % of Total Number as Elmidae		4.054054054	4
Aqautic Life Use: HIGH		Total Score:	30

Stream: Sandies Date: 4/16/03 Location: 17901	**County: Gonzales**	
Metric	**Value**	**Score**
1. Taxa Richness	24	4
2. EPT Taxa Abundance	5	2
3. Biotic Index (HBI)	5.1	2
4. % Chironomidae	15.67164179	2
5. % Dominant Taxon	20.14925373	4
6. % Dominant FFG	37.09022556	3
7. % Predators	18.42105263	3
8. Ratio of Intolerant:Tolerant Taxa	1.05	1
9. % of Total Trichoptera as Hydropsychidae	No Trichoptera	1
10. # of Non-insect Taxa	5	3
11. % Collector-Gatherers	37.09022556	2
12. % of Total Number as Elmidae	0.746268657	1
Aqautic Life Use: INTERMEDIATE	Total Score:	28

Stream: Sandies Date: 4/17/03 Location: 17895	**County: Gonzales**	
Metric	**Value**	**Score**
1. Taxa Richness	11	2
2. EPT Taxa Abundance	5	2
3. Biotic Index (HBI)	5.9	1
4. % Chironomidae	66.66666667	1
5. % Dominant Taxon	66.66666667	1
6. % Dominant FFG	35.41666667	4
7. % Predators	26.38888889	2
8. Ratio of Intolerant:Tolerant Taxa	0.16	1
9. % of Total Trichoptera as Hydropsychidae	100	1
10. # of Non-insect Taxa	2	2
11. % Collector-Gatherers	35.41666667	2
12. % of Total Number as Elmidae	0	1
Aqautic Life Use: LIMITED	Total Score:	20

Stream: Sandies Date: 4/15/03 Location: 13657	**County: Dewitt**	
Metric	**Value**	**Score**
1. Taxa Richness	10	2
2. EPT Taxa Abundance	5	2
3. Biotic Index (HBI)	3.03	4
4. % Chironomidae	No Chironomidae	1
5. % Dominant Taxon	40.74074074	1
6. % Dominant FFG	37.96296296	3
7. % Predators	37.96296296	1
8. Ratio of Intolerant:Tolerant Taxa	5	4
9. % of Total Trichoptera as Hydropsychidae	100%	1
10. # of Non-insect Taxa	1	1
11. % Collector-Gatherers	29.16666667	3
12. % of Total Number as Elmidae	1.851851852	4
Aqautic Life Use: INTERMEDIATE	Total Score:	27

Stream: Sandies **Date: 4/17/03 Location: 14935**	**County: Dewitt**	
Metric	**Value**	**Score**
1. Taxa Richness	8	2
2. EPT Taxa Abundance	2	1
3. Biotic Index (HBI)	5.86	1
4. % Chironomidae	76.47058824	1
5. % Dominant Taxon	76.47058824	1
6. % Dominant FFG	36.2745098	4
7. % Predators	27.94117647	2
8. Ratio of Intolerant:Tolerant Taxa	0.16	1
9. % of Total Trichoptera as Hydropsychidae	No Trichoptera	1
10. # of Non-insect Taxa	2	2
11. % Collector-Gatherers	36.2745098	2
12. % of Total Number as Elmidae	3.921568627	4
Aqautic Life Use: INTERMEDIATE	Total Score:	22

Stream: Elm	**Date: 4/16/03**	**Location: 17893**	**County: Gonzales**
Metric		**Value**	**Score**
1. Taxa Richness		11	2
2. EPT Taxa Abundance		3	1
3. Biotic Index (HBI)		5.1	2
4. % Chironomidae		5.714285714	3
5. % Dominant Taxon		48.57142857	1
6. % Dominant FFG		38.88571429	3
7. % Predators		20.95238095	3
8. Ratio of Intolerant:Tolerant Taxa		1.26	1
9. % of Total Trichoptera as Hydropsychidae		No Trichoptera	1
10. # of Non-insect Taxa		2	2
11. % Collector-Gatherers		38.88571429	2
12. % of Total Number as Elmidae		0	1
Aqautic Life Use: INTERMEDIATE		Total Score:	22

Stream: Elm	**Date: 4/16/03**	**Location: 17894**	**County: Gonzales**
Metric		**Value**	**Score**
1. Taxa Richness		14	2
2. EPT Taxa Abundance		6	2
3. Biotic Index (HBI)		4.51	3
4. % Chironomidae		1.739130435	4
5. % Dominant Taxon		26.08695652	3
6. % Dominant FFG		29.27826087	4
7. % Predators		29.27826087	2
8. Ratio of Intolerant:Tolerant Taxa		1.17	1
9. % of Total Trichoptera as Hydropsychidae		100	1
10. # of Non-insect Taxa		2	2
11. % Collector-Gatherers		22.32173913	3
12. % of Total Number as Elmidae		11.30434783	3
Aqautic Life Use: HIGH		Total Score:	30

Stream: Elm 2	**Date: 7/29/03**	**Location: 17893**	**County: Gonzales**
Metric		**Value**	**Score**
1. Taxa Richness		12	2
2. EPT Taxa Abundance		3	1
3. Biotic Index (HBI)		5.42	1
4. % Chironomidae		1.886792453	4
5. % Dominant Taxon		62.26415094	1
6. % Dominant FFG		65.72641509	1
7. % Predators		65.72641509	1
8. Ratio of Intolerant:Tolerant Taxa		0.21	1
9. % of Total Trichoptera as Hydropsychidae		0	4
10. # of Non-insect Taxa		2	2
11. % Collector-Gatherers		15.87735849	4
12. % of Total Number as Elmidae		0	1
Aqautic Life Use: INTERMEDIATE		Total Score:	23

Stream: Elm 2	**Date: 7/29/03**	**Location: 17894**	**County: Gonzales**
Metric		**Value**	**Score**
1. Taxa Richness		9	2
2. EPT Taxa Abundance		3	1
3. Biotic Index (HBI)		5.28	1
4. % Chironomidae		0.970873786	4
5. % Dominant Taxon		28.15533981	3
6. % Dominant FFG		34.78640777	4
7. % Predators		12.94174757	4
8. Ratio of Intolerant:Tolerant Taxa		0.84	1
9. % of Total Trichoptera as Hydropsychidae		100	1
10. # of Non-insect Taxa		1	1
11. % Collector-Gatherers		34.78640777	2
12. % of Total Number as Elmidae		29.12621359	2
Aqautic Life Use: INTERMEDIATE		Total Score:	26

Stream: Sandies	**Date: 9/28/03**	**Location: 17901**	**County: Gonzales**
Metric		**Value**	**Score**
1. Taxa Richness		19	3
2. EPT Taxa Abundance		2	1
3. Biotic Index (HBI)		6.59	1
4. % Chironomidae		5.882352941	3
5. % Dominant Taxon		25.49019608	3
6. % Dominant FFG		39.33	3
7. % Predators		22	3
8. Ratio of Intolerant:Tolerant Taxa		0.48	1
9. % of Total Trichoptera as Hydropsychidae		NoTrichoptera	1
10. # of Non-insect Taxa		4	3
11. % Collector-Gatherers		39.33	2
12. % of Total Number as Elmidae		0.980392157	4
Aqautic Life Use: HIGH		Total Score:	28

Stream: Sandies	**Date: 9/28/03**	**Location: 17895**	**County: Gonzales**
Metric		**Value**	**Score**
1. Taxa Richness		12	2
2. EPT Taxa Abundance		6	2
3. Biotic Index (HBI)		4.41	3
4. % Chironomidae		0	1
5. % Dominant Taxon		61.44578313	1
6. % Dominant FFG		45.78313253	2
7. % Predators		7.228915663	4
8. Ratio of Intolerant:Tolerant Taxa		5.67	4
9. % of Total Trichoptera as Hydropsychidae		100	1
10. # of Non-insect Taxa		2	2
11. % Collector-Gatherers		45.78313253	1
12. % of Total Number as Elmidae		0	1
Aqautic Life Use: INTERMEDIATE		Total Score:	24

Stream: Sandies	**Date: 9/28/03**	**Location: 13657**	**County: Dewitt**
Metric		**Value**	**Score**
1. Taxa Richness		17	3
2. EPT Taxa Abundance		7	3
3. Biotic Index (HBI)		3.82	3
4. % Chironomidae		2.608695652	4
5. % Dominant Taxon		29.56521739	3
6. % Dominant FFG		40.72173913	3
7. % Predators		13.04347826	4
8. Ratio of Intolerant:Tolerant Taxa		4.7	3
9. % of Total Trichoptera as Hydropsychidae		100	1
10. # of Non-insect Taxa		0	1
11. % Collector-Gatherers		40.72173913	2
12. % of Total Number as Elmidae		30.43478261	1
Aqautic Life Use: HIGH		Total Score:	31

Stream: Sandies	**Date: 9/28/03**	**Location: 14935**	**County: Dewitt**
Metric		**Value**	**Score**
1. Taxa Richness		23	4
2. EPT Taxa Abundance		3	1
3. Biotic Index (HBI)		5.25	2
4. % Chironomidae		0.909090909	4
5. % Dominant Taxon		20.90909091	4
6. % Dominant FFG		52.15740741	2
7. % Predators		30.86111111	2
8. Ratio of Intolerant:Tolerant Taxa		2.03	2
9. % of Total Trichoptera as Hydropsychidae		NoTrichoptera	1
10. # of Non-insect Taxa		3	2
11. % Collector-Gatherers		52.15740741	1
12. % of Total Number as Elmidae		0.909090909	4
Aqautic Life Use: HIGH		Total Score:	29

HABITAT ASSESSMENT

Part I – Stream Physical Characteristics Worksheet

See Appendix B

HABITAT ASSESSMENT

Part II – Summary of Physical Characteristics of Water Body

Part II - Summary of Physical Characteristics of Water Body

Stream name	Sandies 17901
Date of assessment	8/27/2002
Stream bed slope over evaluated reach	0.0061
Approximate drainage area above transect furthest downstream	151 km²
Stream order	4
Length of stream evaluated	150m
Number of lateral transects made	5
Average stream width	3.72m
Average stream depth	0.33m
Instantaneous flow	0.062 ft^3/sec
Indicate flow measurement method	Current Meter
Channel flow status	High
Maximum pool width	4m
Maximum pool depth	0.5- 1m
Total number of stream bends	2
Number of well defined bends	1
Number of moderately defined bends	0
Number of poorly defined bends	1
Total number of riffles	1
Dominant substrate type	Silt
Average percent of substrate gravel sized or larger	1%
Average percent instream cover	10.40%
Number of stream cover types	4
Average percent stream bank erosion potential	23%
Average stream bank slope	45°
Average width of vegetative buffer	8.6m
Average riparian vegetation percent composition by:	
Trees	2%
Shrubs	2%
Grasses/Forbes	60%
Cultivated Fields	-
Other	36%
Average percent tree canopy coverage	8%
Overall aesthetic appraisal of stream	Natural

Part II - Summary of Physical Characteristics of Water Body

Stream name	Sandies 17895
Date of assessment	8/29/2002
Stream bed slope over evaluated reach	0.0018
Approximate drainage area above transect furthest downstream	550 km²
Stream order	4
Length of stream evaluated	500m
Number of lateral transects made	6
Average stream width	8.9m
Average stream depth	0.95m
Instantaneous flow	1.82 ft^3/sec
Indicate flow measurement method	Current Meter
Channel flow status	High
Maximum pool width	9m
Maximum pool depth	>1m
Total number of stream bends	2
Number of well defined bends	1
Number of moderately defined bends	0
Number of poorly defined bends	1
Total number of riffles	1
Dominant substrate type	Silt
Average percent of substrate gravel sized or larger	0.00%
Average percent instream cover	27%
Number of stream cover types	3
Average percent stream bank erosion potential	69%
Average stream bank slope	65°
Average width of vegetative buffer	18m
Average riparian vegetation percent composition by:	
Trees	20%
Shrubs	15%
Grasses/Forbes	30%
Cultivated Fields	-
Other	35%
Average percent tree canopy coverage	73%
Overall aesthetic appraisal of stream	Natural

Part II - Summary of Physical Characteristics of Water Body

Stream name	Sandies 13657
Date of assessment	8/26/2002
Stream bed slope over evaluated reach	0.003
Approximate drainage area above transect furthest downstream	1,417 km²
Stream order	4
Length of stream evaluated	300m
Number of lateral transects made	5
Average stream width	7.8m
Average stream depth	0.52m
Instantaneous flow	3.01 ft^3/sec
Indicate flow measurement method	Current Meter
Channel flow status	High
Maximum pool width	5m
Maximum pool depth	>1m
Total number of stream bends	3
Number of well defined bends	1
Number of moderately defined bends	2
Number of poorly defined bends	0
Total number of riffles	0
Dominant substrate type	Silt
Average percent of substrate gravel sized or larger	0%
Average percent instream cover	9%
Number of stream cover types	3
Average percent stream bank erosion potential	58%
Average stream bank slope	39°
Average width of vegetative buffer	>20m
Average riparian vegetation percent composition by:	
Trees	7%
Shrubs	
Grasses/Forbes	3.50%
Cultivated Fields	-
Other	89.50%
Average percent tree canopy coverage	68%
Overall aesthetic appraisal of stream	Natural

Part II - Summary of Physical Characteristics of Water Body

Stream name	Sandies 14935
Date of assessment	8/28/2002
Stream bed slope over evaluated reach	0.0018
Approximate drainage area above transect furthest downstream	1,753 km²
Stream order	4
Length of stream evaluated	500m
Number of lateral transects made	6
Average stream width	17.0m
Average stream depth	0.81m
Instantaneous flow	2.67 ft^3/sec
Indicate flow measurement method	Current Meter
Channel flow status	High
Maximum pool width	14m
Maximum pool depth	>1m
Total number of stream bends	2
Number of well defined bends	0
Number of moderately defined bends	2
Number of poorly defined bends	0
Total number of riffles	0
Dominant substrate type	Silt
Average percent of substrate gravel sized or larger	12%
Average percent instream cover	26%
Number of stream cover types	5
Average percent stream bank erosion potential	66%
Average stream bank slope	53°
Average width of vegetative buffer	>20m
Average riparian vegetation percent composition by:	
Trees	20%
Shrubs	15%
Grasses/Forbes	10%
Cultivated Fields	-
Other	55%
Average percent tree canopy coverage	53%
Overall aesthetic appraisal of stream	Common

Part II - Summary of Physical Characteristics of Water Body

Stream name	Elm 17893
Date of assessment	8/28/2002
Stream bed slope over evaluated reach	0.0012
Approximate drainage area above transect furthest downstream	228km²
Stream order	4
Length of stream evaluated	150m
Number of lateral transects made	5
Average stream width	2.97m
Average stream depth	0.18m
Instantaneous flow	0.15 ft^3/sec
Indicate flow measurement method	Current Meter
Channel flow status	High
Maximum pool width	2.5m
Maximum pool depth	0.5 - 1m
Total number of stream bends	2
Number of well defined bends	1
Number of moderately defined bends	1
Number of poorly defined bends	0
Total number of riffles	0
Dominant substrate type	Silt
Average percent of substrate gravel sized or larger	1%
Average percent instream cover	30%
Number of stream cover types	4
Average percent stream bank erosion potential	66%
Average stream bank slope	38º
Average width of vegetative buffer	15m
Average riparian vegetation percent composition by:	
Trees	12.50%
Shrubs	12.50%
Grasses/Forbes	20%
Cultivated Fields	
Other	55%
Average percent tree canopy coverage	43%
Overall aesthetic appraisal of stream	Natural

Part II - Summary of Physical Characteristics of Water Body

Stream name	Elm 17894
Date of assessment	8/29/2002
Stream bed slope over evaluated reach	0.002
Approximate drainage area above transect furthest downstream	350km²
Stream order	4
Length of stream evaluated	150m
Number of lateral transects made	5
Average stream width	4.99m
Average stream depth	0.28m
Instantaneous flow	0.1728 ft^3/sec
Indicate flow measurement method	Current Meter
Channel flow status	High
Maximum pool width	5m
Maximum pool depth	0.5 - 1m
Total number of stream bends	2
Number of well defined bends	0
Number of moderately defined bends	2
Number of poorly defined bends	0
Total number of riffles	1
Dominant substrate type	Silt
Average percent of substrate gravel sized or larger	21%
Average percent instream cover	31%
Number of stream cover types	4
Average percent stream bank erosion potential	66%
Average stream bank slope	41º
Average width of vegetative buffer	>20m
Average riparian vegetation percent composition by:	
Trees	12.50%
Shrubs	5%
Grasses/Forbes	10%
Cultivated Fields	
Other	72.50%
Average percent tree canopy coverage	46%
Overall aesthetic appraisal of stream	Natural

Part II - Summary of Physical Characteristics of Water Body

Stream name	Sandies2 17901
Date of assessment	9/26/2002
Stream bed slope over evaluated reach	0.0061
Approximate drainage area above transect furthest downstream	151 km²
Stream order	4
Length of stream evaluated	150m
Number of lateral transects made	5
Average stream width	3.09m
Average stream depth	0.26m
Instantaneous flow	0.062 ft^3/sec
Indicate flow measurement method	Current Meter
Channel flow status	High
Maximum pool width	4m
Maximum pool depth	0.5 - 1m
Total number of stream bends	2
Number of well defined bends	1
Number of moderately defined bends	1
Number of poorly defined bends	0
Total number of riffles	1
Dominant substrate type	Sand
Average percent of substrate gravel sized or larger	0%
Average percent instream cover	18%
Number of stream cover types	4
Average percent stream bank erosion potential	61%
Average stream bank slope	65°
Average width of vegetative buffer	9m
Average riparian vegetation percent composition by:	
Trees	5%
Shrubs	5%
Grasses/Forbes	85%
Cultivated Fields	
Other	5%
Average percent tree canopy coverage	25%
Overall aesthetic appraisal of stream	Natural

Part II - Summary of Physical Characteristics of Water Body

Stream name	Sandies2 17895
Date of assessment	9/24/2002
Stream bed slope over evaluated reach	0.0018
Approximate drainage area above transect furthest downstream	550 km²
Stream order	4
Length of stream evaluated	500m
Number of lateral transects made	6
Average stream width	9.0m
Average stream depth	1.08m
Instantaneous flow	3.645 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	2
Number of well defined bends	0
Number of moderately defined bends	2
Number of poorly defined bends	0
Total number of riffles	1
Dominant substrate type	Silt
Average percent of substrate gravel sized or larger	0%
Average percent instream cover	32%
Number of stream cover types	6
Average percent stream bank erosion potential	70%
Average stream bank slope	83°
Average width of vegetative buffer	20m
Average riparian vegetation percent composition by:	
Trees	20%
Shrubs	15%
Grasses/Forbes	30%
Cultivated Fields	
Other	35%
Average percent tree canopy coverage	82%
Overall aesthetic appraisal of stream	Natural

Part II - Summary of Physical Characteristics of Water Body

Stream name	Sandies2 13657
Date of assessment	9/25/2002
Stream bed slope over evaluated reach	0.003
Approximate drainage area above transect furthest downstream	1,417 km²
Stream order	4
Length of stream evaluated	500m
Number of lateral transects made	6
Average stream width	9.7m
Average stream depth	0.58m
Instantaneous flow	17.826 ft^3/sec
Indicate flow measurement method	Current Meter
Channel flow status	High
Maximum pool width	10m
Maximum pool depth	>1m
Total number of stream bends	3
Number of well defined bends	1
Number of moderately defined bends	2
Number of poorly defined bends	0
Total number of riffles	0
Dominant substrate type	Silt
Average percent of substrate gravel sized or larger	0%
Average percent instream cover	28%
Number of stream cover types	4
Average percent stream bank erosion potential	70%
Average stream bank slope	54°
Average width of vegetative buffer	17m
Average riparian vegetation percent composition by:	
Trees	30%
Shrubs	10%
Grasses/Forbes	7.50%
Cultivated Fields	
Other	52.50%
Average percent tree canopy coverage	50%
Overall aesthetic appraisal of stream	Natural

Part II - Summary of Physical Characteristics of Water Body

Stream name	Sandies2 14935
Date of assessment	9/24/2002
Stream bed slope over evaluated reach	0.0018
Approximate drainage area above transect furthest downstream	1,753 km²
Stream order	4
Length of stream evaluated	500m
Number of lateral transects made	6
Average stream width	17.3m
Average stream depth	0.81m
Instantaneous flow	20.0 ft^3/sec
Indicate flow measurement method	Current Meter
Channel flow status	High
Maximum pool width	16m
Maximum pool depth	>1m
Total number of stream bends	2
Number of well defined bends	0
Number of moderately defined bends	2
Number of poorly defined bends	0
Total number of riffles	0
Dominant substrate type	Silt
Average percent of substrate gravel sized or larger	10%
Average percent instream cover	20%
Number of stream cover types	4
Average percent stream bank erosion potential	58%
Average stream bank slope	76°
Average width of vegetative buffer	>20m
Average riparian vegetation percent composition by:	
Trees	20%
Shrubs	15%
Grasses/Forbes	10%
Cultivated Fields	
Other	55%
Average percent tree canopy coverage	53%
Overall aesthetic appraisal of stream	Common

Part II - Summary of Physical Characteristics of Water Body

Stream name	Elm2 17893
Date of assessment	9/26/2002
Stream bed slope over evaluated reach	0.0061
Approximate drainage area above transect furthest downstream	228km²
Stream order	3 to 4
Length of stream evaluated	150m
Number of lateral transects made	5
Average stream width	3.48m
Average stream depth	0.18m
Instantaneous flow	0.315 ft^3/sec
Indicate flow measurement method	Current Meter
Channel flow status	High
Maximum pool width	4m
Maximum pool depth	<0.5m
Total number of stream bends	2
Number of well defined bends	1
Number of moderately defined bends	1
Number of poorly defined bends	0
Total number of riffles	0
Dominant substrate type	Silt
Average percent of substrate gravel sized or larger	1%
Average percent instream cover	29%
Number of stream cover types	6
Average percent stream bank erosion potential	75%
Average stream bank slope	39°
Average width of vegetative buffer	16m
Average riparian vegetation percent composition by:	
Trees	20%
Shrubs	15%
Grasses/Forbes	5%
Cultivated Fields	
Other	60%
Average percent tree canopy coverage	72%
Overall aesthetic appraisal of stream	Natural

Part II - Summary of Physical Characteristics of Water Body

Stream name	Elm2 17894
Date of assessment	9/25/2002
Stream bed slope over evaluated reach	0.002
Approximate drainage area above transect furthest downstream	350km²
Stream order	3 to 4
Length of stream evaluated	150m
Number of lateral transects made	5
Average stream width	5.1m
Average stream depth	0.37m
Instantaneous flow	1.955 ft^3/sec
Indicate flow measurement method	Current Meter
Channel flow status	High
Maximum pool width	6m
Maximum pool depth	>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	Silt
Average percent of substrate gravel sized or larger	3%
Average percent instream cover	20%
Number of stream cover types	6
Average percent stream bank erosion potential	59%
Average stream bank slope	38°
Average width of vegetative buffer	>20m
Average riparian vegetation percent composition by:	
Trees	20%
Shrubs	20%
Grasses/Forbes	10%
Cultivated Fields	
Other	50%
Average percent tree canopy coverage	60%
Overall aesthetic appraisal of stream	Natrual

Part II - Summary of Physical Characteristics of Water Body

Stream name	Sandies 17901
Date of assessment	4/16/2003
Stream bed slope over evaluated reach	0.0061
Approximate drainage area above transect furthest downstream	151 km²
Stream order	4
Length of stream evaluated	150m
Number of lateral transects made	5
Average stream width	3.51m
Average stream depth	0.31m
Instantaneous flow	
Indicate flow measurement method	Current Meter
Channel flow status	High
Maximum pool width	4.6m
Maximum pool depth	0.5- 1m
Total number of stream bends	2
Number of well defined bends	1
Number of moderately defined bends	0
Number of poorly defined bends	1
Total number of riffles	0
Dominant substrate type	Silt
Average percent of substrate gravel sized or larger	1%
Average percent instream cover	33.00%
Number of stream cover types	6
Average percent stream bank erosion potential	83%
Average stream bank slope	58°
Average width of vegetative buffer	>20m
Average riparian vegetation percent composition by:	
Trees	2%
Shrubs	3%
Grasses/Forbes	89%
Cultivated Fields	-
Other	6%
Average percent tree canopy coverage	28%
Overall aesthetic appraisal of stream	Natural

Part II - Summary of Physical Characteristics of Water Body

Stream name	Sandies 17895
Date of assessment	4/17/2003
Stream bed slope over evaluated reach	0.0018
Approximate drainage area above transect furthest downstream	550 km²
Stream order	4
Length of stream evaluated	500m
Number of lateral transects made	6
Average stream width	10.2m
Average stream depth	1.13m
Instantaneous flow	
Indicate flow measurement method	Current Meter
Channel flow status	High
Maximum pool width	14m
Maximum pool depth	>1m
Total number of stream bends	1
Number of well defined bends	1
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	1.00%
Average percent instream cover	14%
Number of stream cover types	7
Average percent stream bank erosion potential	87%
Average stream bank slope	64°
Average width of vegetative buffer	>20m
Average riparian vegetation percent composition by:	
Trees	21%
Shrubs	0%
Grasses/Forbes	51%
Cultivated Fields	-
Other	28%
Average percent tree canopy coverage	86%
Overall aesthetic appraisal of stream	Natural

Part II - Summary of Physical Characteristics of Water Body

Stream name	Sandies 13657
Date of assessment	4/15/2003
Stream bed slope over evaluated reach	0.003
Approximate drainage area above transect furthest downstream	1,417 km²
Stream order	4
Length of stream evaluated	500m
Number of lateral transects made	6
Average stream width	8.3m
Average stream depth	0.49m
Instantaneous flow	
Indicate flow measurement method	Current Meter
Channel flow status	High
Maximum pool width	10m
Maximum pool depth	>1m
Total number of stream bends	2
Number of well defined bends	0
Number of moderately defined bends	2
Number of poorly defined bends	0
Total number of riffles	1
Dominant substrate type	Silt
Average percent of substrate gravel sized or larger	2%
Average percent instream cover	23%
Number of stream cover types	5
Average percent stream bank erosion potential	83%
Average stream bank slope	35°
Average width of vegetative buffer	>20m
Average riparian vegetation percent composition by:	
Trees	25%
Shrubs	3%
Grasses/Forbes	47.00%
Cultivated Fields	-
Other	25.00%
Average percent tree canopy coverage	74%
Overall aesthetic appraisal of stream	Natural

Part II - Summary of Physical Characteristics of Water Body

Stream name	Sandies 14935
Date of assessment	4/17/2003
Stream bed slope over evaluated reach	0.0018
Approximate drainage area above transect furthest downstream	1,753 km²
Stream order	4
Length of stream evaluated	500m
Number of lateral transects made	6
Average stream width	14m
Average stream depth	0.60m
Instantaneous flow	
Indicate flow measurement method	Current Meter
Channel flow status	High
Maximum pool width	15m
Maximum pool depth	>1m
Total number of stream bends	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	8%
Average percent instream cover	6%
Number of stream cover types	6
Average percent stream bank erosion potential	82%
Average stream bank slope	66°
Average width of vegetative buffer	>20m
Average riparian vegetation percent composition by:	
Trees	15%
Shrubs	7%
Grasses/Forbes	24%
Cultivated Fields	-
Other	54%
Average percent tree canopy coverage	45%
Overall aesthetic appraisal of stream	Natural

Part II - Summary of Physical Characteristics of Water Body

Stream name	Elm 17893
Date of assessment	4/16/2003
Stream bed slope over evaluated reach	0.0012
Approximate drainage area above transect furthest downstream	228km²
Stream order	4
Length of stream evaluated	150m
Number of lateral transects made	5
Average stream width	4.72m
Average stream depth	0.37m
Instantaneous flow	
Indicate flow measurement method	Current Meter
Channel flow status	High
Maximum pool width	5m
Maximum pool depth	0.5 - 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	0
Dominant substrate type	Silt
Average percent of substrate gravel sized or larger	0%
Average percent instream cover	22%
Number of stream cover types	2
Average percent stream bank erosion potential	90%
Average stream bank slope	51º
Average width of vegetative buffer	>20m
Average riparian vegetation percent composition by:	
Trees	22.00%
Shrubs	7.00%
Grasses/Forbes	46%
Cultivated Fields	
Other	25%
Average percent tree canopy coverage	97%
Overall aesthetic appraisal of stream	Natural

Part II - Summary of Physical Characteristics of Water Body

Stream name	Elm 17894
Date of assessment	4/16/2003
Stream bed slope over evaluated reach	0.002
Approximate drainage area above transect furthest downstream	350km²
Stream order	4
Length of stream evaluated	150m
Number of lateral transects made	5
Average stream width	4.48m
Average stream depth	.30m
Instantaneous flow	
Indicate flow measurement method	Current Meter
Channel flow status	Moderate
Maximum pool width	6m
Maximum pool depth	0.5 - 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	11%
Average percent instream cover	25%
Number of stream cover types	6
Average percent stream bank erosion potential	77%
Average stream bank slope	37º
Average width of vegetative buffer	>20m
Average riparian vegetation percent composition by:	
Trees	19.00%
Shrubs	2%
Grasses/Forbes	68%
Cultivated Fields	
Other	11.00%
Average percent tree canopy coverage	90%
Overall aesthetic appraisal of stream	Natural

Part II - Summary of Physical Characteristics of Water Body

Stream name	Elm2 17893
Date of assessment	7/29/2003
Stream bed slope over evaluated reach	0.0061
Approximate drainage area above transect furthest downstream	228km²
Stream order	3 to 4
Length of stream evaluated	150m
Number of lateral transects made	5
Average stream width	4.4m
Average stream depth	0.25m
Instantaneous flow	
Indicate flow measurement method	Current Meter
Channel flow status	Moderate
Maximum pool width	6m
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	0
Dominant substrate type	Silt
Average percent of substrate gravel sized or larger	0%
Average percent instream cover	36%
Number of stream cover types	5
Average percent stream bank erosion potential	93%
Average stream bank slope	59°
Average width of vegetative buffer	>20m
Average riparian vegetation percent composition by:	
Trees	30%
Shrubs	3%
Grasses/Forbes	37%
Cultivated Fields	
Other	30%
Average percent tree canopy coverage	87%
Overall aesthetic appraisal of stream	Natural

Part II - Summary of Physical Characteristics of Water Body

Stream name	Elm2 17894
Date of assessment	7/29/2003
Stream bed slope over evaluated reach	0.002
Approximate drainage area above transect furthest downstream	350km²
Stream order	3 to 4
Length of stream evaluated	150m
Number of lateral transects made	5
Average stream width	5.2m
Average stream depth	0.31m
Instantaneous flow	
Indicate flow measurement method	Current Meter
Channel flow status	Moderate
Maximum pool width	7m
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	0
Dominant substrate type	Silt
Average percent of substrate gravel sized or larger	19%
Average percent instream cover	40%
Number of stream cover types	8
Average percent stream bank erosion potential	69%
Average stream bank slope	53°
Average width of vegetative buffer	>20m
Average riparian vegetation percent composition by:	
Trees	20%
Shrubs	4%
Grasses/Forbes	34%
Cultivated Fields	
Other	42%
Average percent tree canopy coverage	68%
Overall aesthetic appraisal of stream	Natrual

Part II - Summary of Physical Characteristics of Water Body

Stream name	Sandies 17901
Date of assessment	9/28/2003
Stream bed slope over evaluated reach	0.0061
Approximate drainage area above transect furthest downstream	151 km²
Stream order	4
Length of stream evaluated	150m
Number of lateral transects made	5
Average stream width	3.03m
Average stream depth	0.25m
Instantaneous flow	
Indicate flow measurement method	Current Meter
Channel flow status	Moderate
Maximum pool width	5m
Maximum pool depth	0.69m
Total number of stream bends	2
Number of well defined bends	1
Number of moderately defined bends	0
Number of poorly defined bends	1
Total number of riffles	0
Dominant substrate type	Silt
Average percent of substrate gravel sized or larger	0%
Average percent instream cover	21.00%
Number of stream cover types	5
Average percent stream bank erosion potential	80%
Average stream bank slope	45.8
Average width of vegetative buffer	>20m
Average riparian vegetation percent composition by:	
Trees	3%
Shrubs	0%
Grasses/Forbes	85%
Cultivated Fields	12%
Other	
Average percent tree canopy coverage	11%
Overall aesthetic appraisal of stream	Natural

Part II - Summary of Physical Characteristics of Water Body

Stream name	Sandies 17895
Date of assessment	9/28/2003
Stream bed slope over evaluated reach	0.0018
Approximate drainage area above transect furthest downstream	550 km²
Stream order	4
Length of stream evaluated	500m
Number of lateral transects made	6
Average stream width	7.07m
Average stream depth	0.71m
Instantaneous flow	
Indicate flow measurement method	Current Meter
Channel flow status	Moderate
Maximum pool width	10m
Maximum pool depth	1.9m
Total number of stream bends	1
Number of well defined bends	1
Number of moderately defined bends	0
Number of poorly defined bends	0
Total number of riffles	1
Dominant substrate type	Silt
Average percent of substrate gravel sized or larger	0.30%
Average percent instream cover	23%
Number of stream cover types	7
Average percent stream bank erosion potential	83%
Average stream bank slope	75
Average width of vegetative buffer	>20m
Average riparian vegetation percent composition by:	
Trees	26%
Shrubs	2%
Grasses/Forbes	55%
Cultivated Fields	
Other	17%
Average percent tree canopy coverage	89%
Overall aesthetic appraisal of stream	Natural

Part II - Summary of Physical Characteristics of Water Body

Stream name	Sandies 13657
Date of assessment	9/28/2003
Stream bed slope over evaluated reach	0.003
Approximate drainage area above transect furthest downstream	1,417 km²
Stream order	4
Length of stream evaluated	500m
Number of lateral transects made	6
Average stream width	8.19m
Average stream depth	0.46m
Instantaneous flow	
Indicate flow measurement method	Current Meter
Channel flow status	Moderate
Maximum pool width	10m
Maximum pool depth	1.15m
Total number of stream bends	1
Number of well defined bends	1
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	0%
Average percent instream cover	9%
Number of stream cover types	6
Average percent stream bank erosion potential	92%
Average stream bank slope	49
Average width of vegetative buffer	>20m
Average riparian vegetation percent composition by:	
Trees	16%
Shrubs	3%
Grasses/Forbes	66.00%
Cultivated Fields	
Other	15.00%
Average percent tree canopy coverage	73%
Overall aesthetic appraisal of stream	Natural

Part II - Summary of Physical Characteristics of Water Body

Stream name	Sandies 14935
Date of assessment	9/28/2003
Stream bed slope over evaluated reach	0.0018
Approximate drainage area above transect furthest downstream	1,753 km²
Stream order	4
Length of stream evaluated	500m
Number of lateral transects made	6
Average stream width	12.7m
Average stream depth	0.8m
Instantaneous flow	
Indicate flow measurement method	Current Meter
Channel flow status	High
Maximum pool width	16.5m
Maximum pool depth	1.7m
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	0
Dominant substrate type	Sand
Average percent of substrate gravel sized or larger	6%
Average percent instream cover	13%
Number of stream cover types	7
Average percent stream bank erosion potential	90%
Average stream bank slope	82
Average width of vegetative buffer	>20m
Average riparian vegetation percent composition by:	
Trees	22%
Shrubs	8%
Grasses/Forbes	52%
Cultivated Fields	
Other	18%
Average percent tree canopy coverage	53%
Overall aesthetic appraisal of stream	Natural

HABITAT ASSESSMENT

Part III – Habitat Quality Indices

Part III - Habitat Quality Index

Habitat Parameter	Scoring Category		Location: 17901	Date: 8/27/02
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: 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 auxillary pockets
Score: 2	**3**	**2**	**1**	**0**
Channel Flow Status	**High** Water reaches the base of both the lower banks; <5% of channel substrate is exposed	**Moderate** Water fills <75% of the channel; or <25% of channel substrate is exposed	**Low** Water fills 25-75% of the available channel and/or riffle substrates are mostly exposed	**No Flow** Very little water in the channel and mostly present in standing pools; or stream is dry
Score: 3	**3**	**2**	**1**	**0**
Bank Stability	**Stable** Little evidence (<10%) of erosion bank failure; bank angles average <30°	**Moderately Stable** Some evidence (10-29.9%) of erosion or bank failure; small areas of erosion mostly healed over; bank angles average 30-39.9°	**Moderately Unstable** Evidence of erosion bank failure is common (30-50%); high potential of erosion during flooding; bank angles average 40-60°	**Unstable** Large and frequent evidence (>50%) of erosion or bank failure; raw areas frequent along steep banks; bank angles average <60°
Score: 1	**3**	**2**	**1**	**0**
Channel Sinuosity	**High** ≥2 well-defined bends with deep outside areas (cut banks) and shallow inside areas (point bars) are present	**Moderate** 1 well-defined bend OR ≥3 moderately-defined bends present	**Low** <3 moderately-defined bends OR only poorly-defined bends present	**None** Straight channel; may be channelized
Score: 2	**3**	**2**	**1**	**0**
Riparian Buffer Vegetation	**Extensive** Width of natural buffer is <20 meters	**Wide** Width of natural buffer is 10.1-20 meters	**Moderate** Width of natural buffer is 5-10 meters	**Narrow** Width of natural buffer is <5 meters
Score: 1	**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: 16	INTERMEDIATE			

Part III - Habitat Quality Index

Habitat Parameter	Scoring Category		Location: 17895	Date: 829/02
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: 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 auxillary pockets
Score: 3	**3**	**2**	**1**	**0**
Channel Flow Status	**High** Water reaches the base of both the lower banks; <5% of channel substrate is exposed	**Moderate** Water fills <75% of the channel; or <25% of channel substrate is exposed	**Low** Water fills 25-75% of the available channel and/or riffle substrates are mostly exposed	**No Flow** Very little water in the channel and mostly present in standing pools; or stream is dry
Score: 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: 2	**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: 13657	Date: 8/26/02
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: 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 auxillary pockets
Score: 3	**3**	**2**	**1**	**0**
Channel Flow Status	**High** Water reaches the base of both the lower banks; <5% of channel substrate is exposed	**Moderate** Water fills <75% of the channel; or <25% of channel substrate is exposed	**Low** Water fills 25-75% of the available channel and/or riffle substrates are mostly exposed	**No Flow** Very little water in the channel and mostly present in standing pools; or stream is dry
Score: 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: 16	INTERMEDIATE			

Part III - Habitat Quality Index

Habitat Parameter	Scoring Category		Location: 14935	Date: 8/28/02
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: 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 auxillary pockets
Score: 3	**3**	**2**	**1**	**0**
Channel Flow Status	**High** Water reaches the base of both the lower banks; <5% of channel substrate is exposed	**Moderate** Water fills <75% of the channel; or <25% of channel substrate is exposed	**Low** Water fills 25-75% of the available channel and/or riffle substrates are mostly exposed	**No Flow** Very little water in the channel and mostly present in standing pools; or stream is dry
Score: 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: 1	**3**	**2**	**1**	**0**
Total Score: 15	INTERMEDIATE			

Part III - Habitat Quality Index

Habitat Parameter	Scoring Category		Location: 17893	Date: 8/28/02
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: 3	**4**	**3**	**2**	**1**
Bottom Substrate Stability	**Stable** >50% gravel or larger substrate, i.e., gravel, cobble, boulders; dominant substrate type is gravel or larger	**Moderately Stable** 30-50% gravel or larger substrate; dominant substrate type is mix of gravel with some finer sediments	**Moderately Unstable** 10-29.9% gravel or larger substrate; dominant substrate type is finer than gravel, but may still be in mix of sizes	**Unstable** <10% gravel or larger substrate; substrate is uniform sand, silt, clay, or bedrock
Score: 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 auxillary pockets
Score: 2	**3**	**2**	**1**	**0**
Channel Flow Status	**High** Water reaches the base of both the lower banks; <5% of channel substrate is exposed	**Moderate** Water fills <75% of the channel; or <25% of channel substrate is exposed	**Low** Water fills 25-75% of the available channel and/or riffle substrates are mostly exposed	**No Flow** Very little water in the channel and mostly present in standing pools; or stream is dry
Score: 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: 2	**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: 16	INTERMEDIATE			

Part III - Habitat Quality Index

Habitat Parameter	Scoring Category		Location: 17894	Date: 8/29/02
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: 3	**4**	**3**	**2**	**1**
Bottom Substrate Stability	**Stable** >50% gravel or larger substrate, i.e., gravel, cobble, boulders; dominant substrate type is gravel or larger	**Moderately Stable** 30-50% gravel or larger substrate; dominant substrate type is mix of gravel with some finer sediments	**Moderately Unstable** 10-29.9% gravel or larger substrate; dominant substrate type is finer than gravel, but may still be in mix of sizes	**Unstable** <10% gravel or larger substrate; substrate is uniform sand, silt, clay, or bedrock
Score: 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: 2	**4**	**3**	**2**	**1**
Dimensions of Largest Pool	**Large** Pool covers more than 50% of the channel width; maximum depth is > 1m	**Moderate** Pool covers approximately 50% or slightly less than the channel width; maximum depth is 0.5-1 meter	**Small** Pool covers approximately 25% of the channel width; maximum depth is <0.5 meter	**Absent** No existing pools; only shallow auxillary pockets
Score: 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: 18	INTERMEDIATE			

Part III - Habitat Quality Index

Habitat Parameter	Scoring Category		Location: 17901	Date: 9/26/02
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: 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 auxillary pockets
Score: 2	**3**	**2**	**1**	**0**
Channel Flow Status	**High** Water reaches the base of both the lower banks; <5% of channel substrate is exposed	**Moderate** Water fills <75% of the channel; or <25% of channel substrate is exposed	**Low** Water fills 25-75% of the available channel and/or riffle substrates are mostly exposed	**No Flow** Very little water in the channel and mostly present in standing pools; or stream is dry
Score: 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: 1	**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 III - Habitat Quality Index

Habitat Parameter	Scoring Category		Location: 17895	Date: 9/24/02
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: 3	**4**	**3**	**2**	**1**
Bottom Substrate Stability	**Stable** >50% gravel or larger substrate, i.e., gravel, cobble, boulders; dominant substrate type is gravel or larger	**Moderately Stable** 30-50% gravel or larger substrate; dominant substrate type is mix of gravel with some finer sediments	**Moderately Unstable** 10-29.9% gravel or larger substrate; dominant substrate type is finer than gravel, but may still be in mix of sizes	**Unstable** <10% gravel or larger substrate; substrate is uniform sand, silt, clay, or bedrock
Score: 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 auxillary pockets
Score: 3	**3**	**2**	**1**	**0**
Channel Flow Status	**High** Water reaches the base of both the lower banks; <5% of channel substrate is exposed	**Moderate** Water fills <75% of the channel; or <25% of channel substrate is exposed	**Low** Water fills 25-75% of the available channel and/or riffle substrates are mostly exposed	**No Flow** Very little water in the channel and mostly present in standing pools; or stream is dry
Score: 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: 2	**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: 13657	Date: 9/25/02
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: 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 auxillary pockets
Score: 3	3	2	1	0
Channel Flow Status	**High** Water reaches the base of both the lower banks; <5% of channel substrate is exposed	**Moderate** Water fills <75% of the channel; or <25% of channel substrate is exposed	**Low** Water fills 25-75% of the available channel and/or riffle substrates are mostly exposed	**No Flow** Very little water in the channel and mostly present in standing pools; or stream is dry
Score: 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: 2	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: 16	INTERMEDIATE			

Part III - Habitat Quality Index

Habitat Parameter	Scoring Category		Location: 14935	Date: 9/24/02
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: 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 auxillary pockets
Score: 3	**3**	**2**	**1**	**0**
Channel Flow Status	**High** Water reaches the base of both the lower banks; <5% of channel substrate is exposed	**Moderate** Water fills <75% of the channel; or <25% of channel substrate is exposed	**Low** Water fills 25-75% of the available channel and/or riffle substrates are mostly exposed	**No Flow** Very little water in the channel and mostly present in standing pools; or stream is dry
Score: 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: 1	**3**	**2**	**1**	**0**
Total Score: 16	INTERMEDIATE			

Part III - Habitat Quality Index

Habitat Parameter	Scoring Category		Location: 17893	Date: 9/26/02
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: 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 auxillary pockets
Score: 1	**3**	**2**	**1**	**0**
Channel Flow Status	**High** Water reaches the base of both the lower banks; <5% of channel substrate is exposed	**Moderate** Water fills <75% of the channel; or <25% of channel substrate is exposed	**Low** Water fills 25-75% of the available channel and/or riffle substrates are mostly exposed	**No Flow** Very little water in the channel and mostly present in standing pools; or stream is dry
Score: 3	**3**	**2**	**1**	**0**
Bank Stability	**Stable** Little evidence (<10%) of erosion bank failure; bank angles average <30°	**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: 2	**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: 17894	Date: 9/25/02
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: 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 auxillary pockets
Score: 3	**3**	**2**	**1**	**0**
Channel Flow Status	**High** Water reaches the base of both the lower banks; <5% of channel substrate is exposed	**Moderate** Water fills <75% of the channel; or <25% of channel substrate is exposed	**Low** Water fills 25-75% of the available channel and/or riffle substrates are mostly exposed	**No Flow** Very little water in the channel and mostly present in standing pools; or stream is dry
Score: 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: 16	INTERMEDIATE			

Part III - Habitat Quality Index

Habitat Parameter	Scoring Category		Location: 17901	Date: 4/16/03
Available Instream Cover	**Abundant** >50% of substrate favorable for colonization and fish cover; good mix of several stable (not new fall or transient) cover types such as snags, cobble, undercut banks, macrophytes	**Common** 30-50% of substrate supports a stable habitat; adequate habitat for maintenance of populations; may be limited in the number of different habitat types	**Rare** 10-29.9% of substrate supports stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed	**Absent** <10% of substrate supports stable habitat; lack of habitat is obvious; substrate unstable or lacking
Score: 3	**4**	3	**2**	**1**
Bottom Substrate Stability	**Stable** >50% gravel or larger substrate, i.e., gravel, cobble, boulders; dominant substrate type is gravel or larger	**Moderately Stable** 30-50% gravel or larger substrate; dominant substrate type is mix of gravel with some finer sediments	**Moderately Unstable** 10-29.9% gravel or larger substrate; dominant substrate type is finer than gravel, but may still be in mix of sizes	**Unstable** <10% gravel or larger substrate; substrate is uniform sand, silt, clay, or bedrock
Score: 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 auxillary pockets
Score: 2	**3**	2	**1**	**0**
Channel Flow Status	**High** Water reaches the base of both the lower banks; <5% of channel substrate is exposed	**Moderate** Water fills <75% of the channel; or <25% of channel substrate is exposed	**Low** Water fills 25-75% of the available channel and/or riffle substrates are mostly exposed	**No Flow** Very little water in the channel and mostly present in standing pools; or stream is dry
Score: 3	3	**2**	**1**	**0**
Bank Stability	**Stable** Little evidence (<10%) of erosion bank failure; bank angles average <30°	**Moderately Stable** Some evidence (10-29.9%) of erosion or bank failure; small areas of erosion mostly healed over; bank angles average 30-39.9°	**Moderately Unstable** Evidence of erosion bank failure is common (30-50%); high potential of erosion during flooding; bank angles average 40-60°	**Unstable** Large and frequent evidence (>50%) of erosion or bank failure; raw areas frequent along steep banks; bank angles average <60°
Score: 1	**3**	**2**	1	**0**
Channel Sinuosity	**High** ≥2 well-defined bends with deep outside areas (cut banks) and shallow inside areas (point bars) are present	**Moderate** 1 well-defined bend OR ≥3 moderately-defined bends present	**Low** <3 moderately-defined bends OR only poorly-defined bends present	**None** Straight channel; may be channelized
Score: 2	**3**	2	**1**	**0**
Riparian Buffer Vegetation	**Extensive** Width of natural buffer is <20 meters	**Wide** Width of natural buffer is 10.1-20 meters	**Moderate** Width of natural buffer is 5-10 meters	**Narrow** Width of natural buffer is <5 meters
Score: 3	3	**2**	**1**	**0**
Aesthetics of Reach	**Wilderness** Outstanding natural beauty; usually wooded or unpastured area; water clarity is usually exceptional	**Natural Area** Tree and/or native vegetation common; some development evident (from fields, pastures, dwellings); water clarity may be slightly turbid	**Common Setting** Not offensive; area is developed, but uncluttered such as in an urban park; water clarity may be turbid or discolored	**Offensive** Stream does not enhance the aesthetics of the area; cluttered; highly developed; may be a dumping area; water clarity is usually turbid or discolored
Score: 2	**3**	2	**1**	**0**
Total Score: 18	INTERMEDIATE			

Part III - Habitat Quality Index

Habitat Parameter	Scoring Category		Location: 17895	Date: 4/17/03
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: 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 auxillary pockets
Score: 3	**3**	**2**	**1**	**0**
Channel Flow Status	**High** Water reaches the base of both the lower banks; <5% of channel substrate is exposed	**Moderate** Water fills <75% of the channel; or <25% of channel substrate is exposed	**Low** Water fills 25-75% of the available channel and/or riffle substrates are mostly exposed	**No Flow** Very little water in the channel and mostly present in standing pools; or stream is dry
Score: 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: 17	INTERMEDIATE			

Part III - Habitat Quality Index

Habitat Parameter	Scoring Category		Location: 13657	Date: 4/15/03
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: 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 auxillary pockets
Score: 3	**3**	**2**	**1**	**0**
Channel Flow Status	**High** Water reaches the base of both the lower banks; <5% of channel substrate is exposed	**Moderate** Water fills <75% of the channel; or <25% of channel substrate is exposed	**Low** Water fills 25-75% of the available channel and/or riffle substrates are mostly exposed	**No Flow** Very little water in the channel and mostly present in standing pools; or stream is dry
Score: 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: 18	INTERMEDIATE			

Part III - Habitat Quality Index

Habitat Parameter	Scoring Category		Location: 14935	Date: 4/17/03
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 auxillary pockets
Score: 3	**3**	**2**	**1**	**0**
Channel Flow Status	**High** Water reaches the base of both the lower banks; <5% of channel substrate is exposed	**Moderate** Water fills <75% of the channel; or <25% of channel substrate is exposed	**Low** Water fills 25-75% of the available channel and/or riffle substrates are mostly exposed	**No Flow** Very little water in the channel and mostly present in standing pools; or stream is dry
Score: 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: 15	INTERMEDIATE			

Part III - Habitat Quality Index

Habitat Parameter	Scoring Category		Location: 17893	Date: 4/16/03
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: 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 auxillary pockets
Score: 2	**3**	**2**	**1**	**0**
Channel Flow Status	**High** Water reaches the base of both the lower banks; <5% of channel substrate is exposed	**Moderate** Water fills <75% of the channel; or <25% of channel substrate is exposed	**Low** Water fills 25-75% of the available channel and/or riffle substrates are mostly exposed	**No Flow** Very little water in the channel and mostly present in standing pools; or stream is dry
Score: 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: 15	INTERMEDIATE			

Part III - Habitat Quality Index

Habitat Parameter	Scoring Category		Location: 17894	Date: 4/16/03
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: 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: 2	**4**	**3**	**2**	**1**
Dimensions of Largest Pool	**Large** Pool covers more than 50% of the channel width; maximum depth is > 1m	**Moderate** Pool covers approximately 50% or slightly less than the channel width; maximum depth is 0.5-1 meter	**Small** Pool covers approximately 25% of the channel width; maximum depth is <0.5 meter	**Absent** No existing pools; only shallow auxillary pockets
Score: 2	**3**	**2**	**1**	**0**
Channel Flow Status	**High** Water reaches the base of both the lower banks; <5% of channel substrate is exposed	**Moderate** Water fills <75% of the channel; or <25% of channel substrate is exposed	**Low** Water fills 25-75% of the available channel and/or riffle substrates are mostly exposed	**No Flow** Very little water in the channel and mostly present in standing pools; or stream is dry
Score: 2	**3**	**2**	**1**	**0**
Bank Stability	**Stable** Little evidence (<10%) of erosion bank failure; bank angles average <30°	**Moderately Stable** Some evidence (10-29.9%) of erosion or bank failure; small areas of erosion mostly healed over; bank angles average 30-39.9°	**Moderately Unstable** Evidence of erosion bank failure is common (30-50%); high potential of erosion during flooding; bank angles average 40-60°	**Unstable** Large and frequent evidence (>50%) of erosion or bank failure; raw areas frequent along steep banks; bank angles average >60°
Score: 1	**3**	**2**	**1**	**0**
Channel Sinuosity	**High** ≥2 well-defined bends with deep outside areas (cut banks) and shallow inside areas (point bars) are present	**Moderate** 1 well-defined bend OR ≥3 moderately-defined bends present	**Low** <3 moderately-defined bends OR only poorly-defined bends present	**None** Straight channel; may be channelized
Score: 1	**3**	**2**	**1**	**0**
Riparian Buffer Vegetation	**Extensive** Width of natural buffer is >20 meters	**Wide** Width of natural buffer is 10.1-20 meters	**Moderate** Width of natural buffer is 5-10 meters	**Narrow** Width of natural buffer is <5 meters
Score: 3	**3**	**2**	**1**	**0**
Aesthetics of Reach	**Wilderness** Outstanding natural beauty; usually wooded or unpastured area; water clarity is usually exceptional	**Natural Area** Tree and/or native vegetation common; some development evident (from fields, pastures, dwellings); water clarity may be slightly turbid	**Common Setting** Not offensive; area is developed, but uncluttered such as in an urban park; water clarity may be turbid or discolored	**Offensive** Stream does not enhance the aesthetics of the area; cluttered; highly developed; may be a dumping area; water clarity is usually turbid or discolored
Score: 2	**3**	**2**	**1**	**0**
Total Score: 17	INTERMEDIATE			

Part III - Habitat Quality Index

Habitat Parameter	Scoring Category		Location: 17893	Date: 7/29/03
Available Instream Cover	**Abundant** >50% of substrate favorable for colonization and fish cover; good mix of several stable (not new fall or transient) cover types such as snags, cobble, undercut banks, macrophytes	**Common** 30-50% of substrate supports a stable habitat; adequate habitat for maintenance of populations; may be limited in the number of different habitat types	**Rare** 10-29.9% of substrate supports stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed	**Absent** <10% of substrate supports stable habitat; lack of habitat is obvious; substrate unstable or lacking
Score: 3	**4**	**3**	**2**	**1**
Bottom Substrate Stability	**Stable** >50% gravel or larger substrate, i.e., gravel, cobble, boulders; dominant substrate type is gravel or larger	**Moderately Stable** 30-50% gravel or larger substrate; dominant substrate type is mix of gravel with some finer sediments	**Moderately Unstable** 10-29.9% gravel or larger substrate; dominant substrate type is finer than gravel, but may still be in mix of sizes	**Unstable** <10% gravel or larger substrate; substrate is uniform sand, silt, clay, or bedrock
Score: 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 auxillary pockets
Score: 2	**3**	**2**	**1**	**0**
Channel Flow Status	**High** Water reaches the base of both the lower banks; <5% of channel substrate is exposed	**Moderate** Water fills <75% of the channel; or <25% of channel substrate is exposed	**Low** Water fills 25-75% of the available channel and/or riffle substrates are mostly exposed	**No Flow** Very little water in the channel and mostly present in standing pools; or stream is dry
Score: 2	**3**	**2**	**1**	**0**
Bank Stability	**Stable** Little evidence (<10%) of erosion bank failure; bank angles average <30°	**Moderately Stable** Some evidence (10-29.9%) of erosion or bank failure; small areas of erosion mostly healed over; bank angles average 30-39.9°	**Moderately Unstable** Evidence of erosion bank failure is common (30-50%); high potential of erosion during flooding; bank angles average 40-60°	**Unstable** Large and frequent evidence (>50%) of erosion or bank failure; raw areas frequent along steep banks; bank angles average >60°
Score: 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: 15	INTERMEDIATE			

Part III - Habitat Quality Index

Habitat Parameter	Scoring Category		Location: 17894	Date: 7/29/03
Available Instream Cover	**Abundant** >50% of substrate favorable for colonization and fish cover; good mix of several stable (not new fall or transient) cover types such as snags, cobble, undercut banks, macrophytes	**Common** 30-50% of substrate supports a stable habitat; adequate habitat for maintenance of populations; may be limited in the number of different habitat types	**Rare** 10-29.9% of substrate supports stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed	**Absent** <10% of substrate supports stable habitat; lack of habitat is obvious; substrate unstable or lacking
Score: 3	**4**	**3**	**2**	**1**
Bottom Substrate Stability	**Stable** >50% gravel or larger substrate, i.e., gravel, cobble, boulders; dominant substrate type is gravel or larger	**Moderately Stable** 30-50% gravel or larger substrate; dominant substrate type is mix of gravel with some finer sediments	**Moderately Unstable** 10-29.9% gravel or larger substrate; dominant substrate type is finer than gravel, but may still be in mix of sizes	**Unstable** <10% gravel or larger substrate; substrate is uniform sand, silt, clay, or bedrock
Score: 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: 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 auxillary pockets
Score: 2	**3**	**2**	**1**	**0**
Channel Flow Status	**High** Water reaches the base of both the lower banks; <5% of channel substrate is exposed	**Moderate** Water fills <75% of the channel; or <25% of channel substrate is exposed	**Low** Water fills 25-75% of the available channel and/or riffle substrates are mostly exposed	**No Flow** Very little water in the channel and mostly present in standing pools; or stream is dry
Score: 2	**3**	**2**	**1**	**0**
Bank Stability	**Stable** Little evidence (<10%) of erosion bank failure; bank angles average <30°	**Moderately Stable** Some evidence (10-29.9%) of erosion or bank failure; small areas of erosion mostly healed over; bank angles average 30-39.9°	**Moderately Unstable** Evidence of erosion bank failure is common (30-50%); high potential of erosion during flooding; bank angles average 40-60°	**Unstable** Large and frequent evidence (>50%) of erosion or bank failure; raw areas frequent along steep banks; bank angles average >60°
Score: 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: 16	INTERMEDIATE			

Part III - Habitat Quality Index

Habitat Parameter	Scoring Category		Location: 17901	Date: 9/28/03
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: 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 auxillary pockets
Score: 2	3	2	1	0
Channel Flow Status	**High** Water reaches the base of both the lower banks; <5% of channel substrate is exposed	**Moderate** Water fills <75% of the channel; or <25% of channel substrate is exposed	**Low** Water fills 25-75% of the available channel and/or riffle substrates are mostly exposed	**No Flow** Very little water in the channel and mostly present in standing pools; or stream is dry
Score: 2	3	2	1	0
Bank Stability	**Stable** Little evidence (<10%) of erosion bank failure; bank angles average <30°	**Moderately Stable** Some evidence (10-29.9%) of erosion or bank failure; small areas of erosion mostly healed over; bank angles average 30-39.9°	**Moderately Unstable** Evidence of erosion bank failure is common (30-50%); high potential of erosion during flooding; bank angles average 40-60°	**Unstable** Large and frequent evidence (>50%) of erosion or bank failure; raw areas frequent along steep banks; bank angles average <60°
Score: 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: 15	INTERMEDIATE			

Part III - Habitat Quality Index

Habitat Parameter	Scoring Category		Location: 17895	Date: 9/28/03
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: 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 auxillary pockets
Score: 3	**3**	**2**	**1**	**0**
Channel Flow Status	**High** Water reaches the base of both the lower banks; <5% of channel substrate is exposed	**Moderate** Water fills <75% of the channel; or <25% of channel substrate is exposed	**Low** Water fills 25-75% of the available channel and/or riffle substrates are mostly exposed	**No Flow** Very little water in the channel and mostly present in standing pools; or stream is dry
Score: 2	**3**	**2**	**1**	**0**
Bank Stability	**Stable** Little evidence (<10%) of erosion bank failure; bank angles average <30°	**Moderately Stable** Some evidence (10-29.9%) of erosion or bank failure; small areas of erosion mostly healed over; bank angles average 30-39.9°	**Moderately Unstable** Evidence of erosion bank failure is common (30-50%); high potential of erosion during flooding; bank angles average 40-60°	**Unstable** Large and frequent evidence (>50%) of erosion or bank failure; raw areas frequent along steep banks; bank angles average <60°
Score: 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: 17	INTERMEDIATE			

Part III - Habitat Quality Index

Habitat Parameter	Scoring Category		Location: 13657	Date: 9/28/03
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 auxillary pockets
Score: 3	**3**	**2**	**1**	**0**
Channel Flow Status	**High** Water reaches the base of both the lower banks; <5% of channel substrate is exposed	**Moderate** Water fills <75% of the channel; or <25% of channel substrate is exposed	**Low** Water fills 25-75% of the available channel and/or riffle substrates are mostly exposed	**No Flow** Very little water in the channel and mostly present in standing pools; or stream is dry
Score: 2	**3**	**2**	**1**	**0**
Bank Stability	**Stable** Little evidence (<10%) of erosion bank failure; bank angles average <30°	**Moderately Stable** Some evidence (10-29.9%) of erosion or bank failure; small areas of erosion mostly healed over; bank angles average 30-39.9°	**Moderately Unstable** Evidence of erosion bank failure is common (30-50%); high potential of erosion during flooding; bank angles average 40-60°	**Unstable** Large and frequent evidence (>50%) of erosion or bank failure; raw areas frequent along steep banks; bank angles average <60°
Score: 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: 15	INTERMEDIATE			

Part III - Habitat Quality Index

Habitat Parameter	Scoring Category		Location: 14935	Date: 9/28/03
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: 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 auxillary pockets
Score: 3	**3**	**2**	**1**	**0**
Channel Flow Status	**High** Water reaches the base of both the lower banks; <5% of channel substrate is exposed	**Moderate** Water fills <75% of the channel; or <25% of channel substrate is exposed	**Low** Water fills 25-75% of the available channel and/or riffle substrates are mostly exposed	**No Flow** Very little water in the channel and mostly present in standing pools; or stream is dry
Score: 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: 16	INTERMEDIATE			