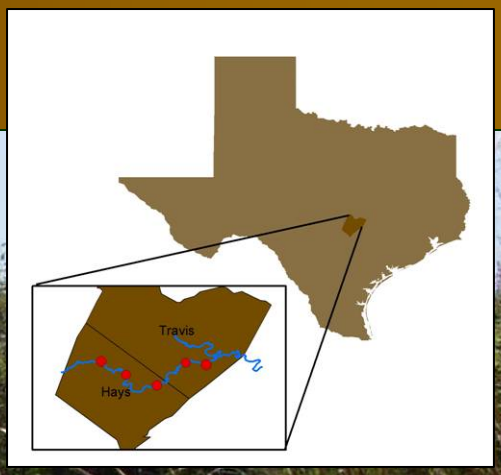
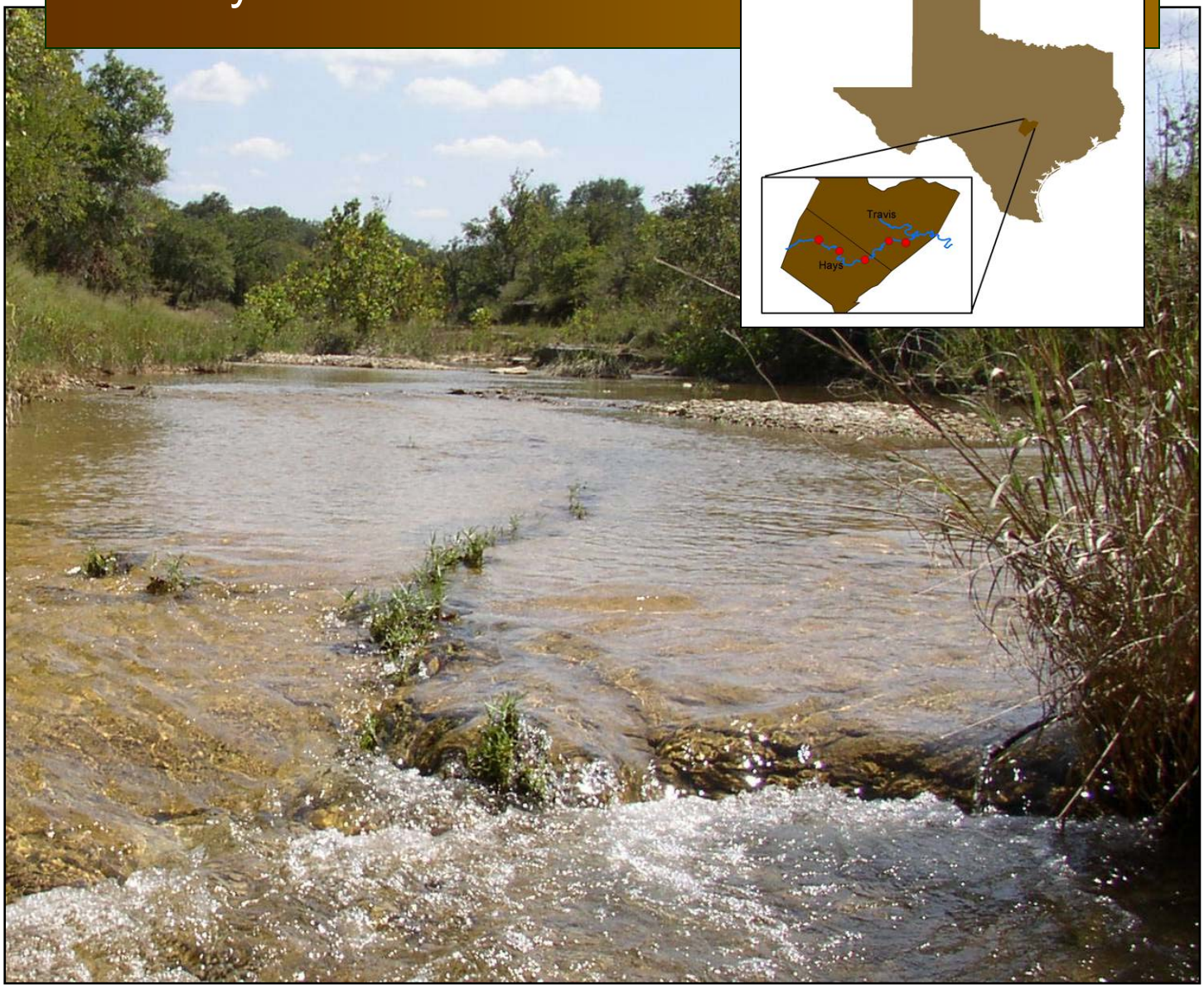
Impairment Verification Monitoring-Volume 2: Biological and Habitat Components Segment 1427, Onion Creek January 2005





Ecological Communications Corporation
Austin, TX

Impairment Verification Monitoring-Volume 2: Biological and Habitat Components
Segment 1427, Onion Creek

By:
Jeremy Walther and Victor Palma

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

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

ABSTRACT

Ecological Communications Corporation (EComm) conducted biological data collection and analysis as part of an impairment verification monitoring project on Onion Creek (Segment 1427). Segment 1427 appears on the State of Texas' 303(d) list as impaired for high aquatic life based on low dissolved oxygen concentrations previously reported by or to the Texas Commission on Environmental Quality (TCEQ) or its predecessor agencies. Due to an insufficient amount of data to support a re-assessment, this water body remained on the draft 2002 303(d) list. The objective of EComm's data assessment was to assemble enough information on the water body to support a use attainability analysis if it was determined that the designated aquatic life use was incorrect.

A separate but related assessment was simultaneously conducted by the Texas Engineering Experiment Station (TEES) and the Conrad Blucher Institute for Surveying and Science (CBI) to facilitate the objective. The TEES/CBI effort included physical and chemical data collection and analysis in an attempt to provide a comprehensive assessment of the water quality within the stream segment. As part of the overriding TMDL project (TCEQ Contract 582-4-58897), the combined biological, physical, and chemical data collection and analytical activities will result in one of four outcomes:

1. Removal of the water body from the 303(d) list,
2. An evaluation of applicable water quality standards (aquatic life use impairments only),
3. Development of a TMDL, or
4. Additional monitoring to better characterize the impairment.

Based on data collected by EComm and TEES from 2002 to 2004, this water body was found to be meeting the dissolved oxygen criteria for high aquatic life use, and will be recommended for delisting.

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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 are included on the 1999 State of Texas Clean Water Act 303(d) list as impaired due to concentrations of dissolved oxygen or bacteria or both which exceed established criteria. One of these waterbodies was Onion Creek (Segment 1427), and is included on the State's 303(d) list as impaired for its high aquatic life use designation. The impairment to this portion of Onion Creek was caused by an exceedance of the established dissolved oxygen criteria. As an initial phase for TMDL development, Segment 1427 was assessed to verify the aquatic life impairment using the latest sampling techniques. This initial assessment was performed so that resources within the program can be efficiently utilized for truly impaired waterbodies, preventing TMDL development for a waterbody that may be delisted or subject to a water quality standards revision at a later date. Chemical, physical, and biological data were collected at five sites within the segment in an effort to determine what course of action, if any, needed to be taken to address impairments. Data collection activities would result in one of four outcomes:

Figure 1. Station 12452

1) Removal of the water body from the 303(d) list,
2) An evaluation of applicable water quality standards (aquatic life use impairments only),
3) Development of a TMDL, or
4) Additional monitoring to better characterize the impairment.

Segment 1427 originates in extreme eastern Blanco County, Texas. It flows 78 miles eastward through Hays County into the Colorado River in eastern Travis County, southeast of Austin. The watershed includes the cities of Dripping Springs, Buda, and extreme southeastern Austin. The stream is fed by natural springs and the watershed represents a significant recharge feature for the Edwards Aquifer. A location map of the segment is provided in Figure 2. Site 12454 is located in Hays County just above Dripping Springs at County Road 190 near the Mount Gainer Road intersection. Site 12452 (Figure 1) is located below Dripping Springs, at Camp Ben McCullough off of FM 1826 in Hays County. Site 12449, also located in Hays County, is located 0.7 mile north of Buda near the MoPac railway. The three above sites all fall within Ecoregion 30 – Central Texas Plateau (TPWD 2002). Site 12444 is located in Travis County at Nuckols Crossing. The most downstream site, 12436, also located in Travis County, is located at the U.S. Highway 183 crossing, southeast of Austin. The two lower sites are within Ecoregion 32 – Subhumid Agricultural Plains (TPWD 2002).

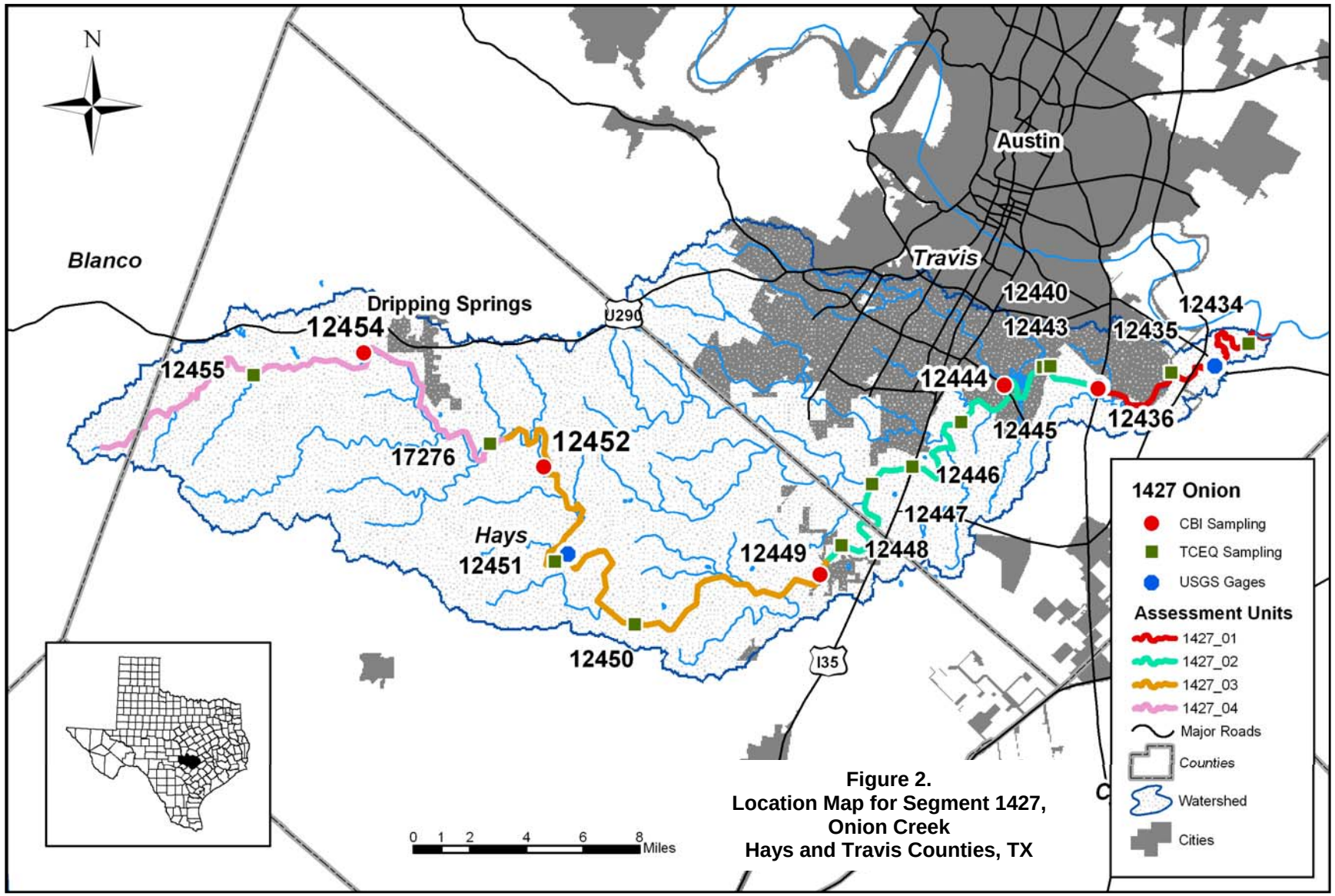

Figure 2.
Location Map for Segment 1427,
Onion Creek
Hays and Travis Counties, TX

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 (IBI). Additionally, EComm generated IBI for all stations using regional criteria developed by the 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 12449

Also, in addition to data collection via RWA guidelines and TCEQ Surface Water Quality Monitoring (SWQM) Procedures Manual (TNRCC 1999a), EComm captured data for 14 previously uncoded biological and habitat parameters. These parameters include: the various metrics used in determining regional IBI scores; the final scores for aquatic life use values for both statewide and regional IBI criteria; the final scores for Rapid Bioassessment Protocol (RBP) for benthic macroinvertebrates; and the final scores for Habitat Quality Indices (HQIs). All 14 parameters were assigned unique STORET codes in an effort to create maximum efficiency for data management. The new STORET codes and descriptions, along with other STORET codes captured for this segment, are provided in Table 1.

Segment 1427 had not previously been designated as a segment requiring either a Use Attainability Analysis (UAA) or an Aquatic Life Assessment (ALA). Although the main purpose of the physical\chemical component of the study was to verify the impairment, a biological sampling regime satisfying the minimum UAA data requirements was attempted for this segment to be used if it was determined that a UAA was the correct course of action. UAA requirements include at least three complete sampling events over two consecutive index periods. One event is required in the early portion (before April 30) of the Index Period (March 15 – October 15) in either Year 1 or Year 2, and the other two efforts must be conducted during the Critical Period (July 1 – September 30), including one sampling event during Year 1 and the other during Year 2. Biological sampling for Segment 1427 was conducted in August 2002, April 2003, and September 2003; thus, if it is determined that the aquatic life uses and criteria should be evaluated within a UAA, a sufficient amount of data was collected within the required temporal regime for this segment of Onion Creek.

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

STORET Code*	Description	STORET Code	Description
89832	Number of lateral transects	90008	EPT index
89847	Average bank slope	98009	Total number of sucker species
89846	Average bank erosion potential	98010	Total number of intolerant species
89845	Percent of substrate that is gravel or larger	98016	Percent individuals as tolerants (fish)
800	*Channel flow status*	98017	Percent individuals as omnivores
89844	Dominant substrate	98021	Percent individuals as insectivores
89843	Total number of riffles	98022	Percent individuals as piscivores
89842	Number of poorly defined stream bends	98023	Total number of individuals in fish sample
89841	Number of moderately defined stream bends	98024	Percent individuals as hybrid
89840	Number of well defined stream bends	98030	Percent with disease
812	*Statewide IBI*	98003	Number of fish species
833	*Habitat Quality Index*	89905	Number of minutes debris was sampled
84161	Stream order	89851	Percent grass
84159	Percent instream cover	89854	Percentage tree canopy
813	*Number of cyprinidae species*	89859	Drainage area
814	*Number of benthic invertebrates*	89860	Length of reach
72052	Streambed slope	89861	Average stream width
816	*Percent that are tolerant species, excluding G.affinis*	89862	Average stream depth
817	*Number of individuals per seine haul*	89864	Maximum pool width
818	*Number of individuals per minute electroshocking*	89865	Maximum pool depth
819	*Percentage of individuals as non-native*	89866	Average width of riparian vegetation
820	*Regional IBI*	90010	Dominant functional feeding group percentage
832	*Total RBP score*	89899	Biological rpt unit
89853	Percent other as riparian vegetation	90009	Number of functional feeding groups
89839	Total number of stream bends	89906	Number of individuals in RBA sample
98008	Total number of sunfish species	89941	Seine length
90025	Percentage benthic gatherers	89943	Electrofishing method
90030	Percentage benthic filterers	89944	Electrofishing duration
90035	Percentage benthic shredders	89946	Average mesh size
90036	Percentage benthic predators	89948	Number of seine hauls
834	*Percentage benthic scrapers*	89950	Benthic sampling code
90042	Percentage benthic inverts individuals in dominant taxon	89961	Texas ecoregion
90050	Ratio of intolerant to tolerant taxa	89976	Area seined
90052	Number of non-insects	90007	Hilsenhoff biotic index
90054	Percentage of Elmidae	89849	Percent trees
92266	Percentage of Trichoptera that are Hydropsychidae	89867	Aesthetics
92491	Percent Chironomidae	*835*	*Benthic invertebrate taxa richness*
89850	Percent as shrubs	*836*	*Number instream cover types*
98004	Total number of darter species	89904	Minutes spent kicknetting

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

Benthic Macroinvertebrate Collections

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. Intervals were repeated until the minimum sample size of 100 specimens was approached, met, or exceeded. All individuals collected within the net 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 4. Macroinvertebrate Collection

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 electrofishing gear powered by either 7 amp-hour or 12 amp-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 plastic bucket partially filled with water for later identification. Sampling teams moved in an upstream direction, focusing pulses on snags, along vegetated banks, within large boulders or gravel-based riffles, and any other location most likely to contain fish. Active sampling (instances when current was applied to the water) was conducted for a minimum of 900 seconds. Field teams used best judgment to gauge if enough active sampling had been conducted to collect an accurate representation of present species; therefore, the minimum sampling time was exceeded at some sites. Maximum active sampling time for any site was approximately 1,000 seconds. Upon completion of electrofishing, fish were immediately identified, recorded, and returned to the water in order to minimize mortality. Any fish that could not be identified in the field was preserved in either formalin solution or ethanol. If more than one fish exhibiting the same characteristics could not be field identified, then only one representative

Figure 5. Electrofishing at Site 12452

specimen was preserved for later lab identification. Additionally, one individual from each field-identified species was retained as a voucher specimen.

Electrofishing collections were 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.

Figure 6. Habitat Data Collection

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

Several subjective habitat parameters were evaluated as required by the RWA 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 ensure that all crew members were given identical background and similar interpretation of the subjective measurements.

3.0 RESULTS

Aquatic life use determinations were based upon scores for each of the three ecosystem components (fish, benthic macroinvertebrates, and habitat) analyzed for Segment 1427. The fish

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

Table 2. Ranges and Subcategories for each component

Subcategory	Statewide IBI	Regional IBI (Region 30)	Regional IBI (Region 32)	RBP	HQI
Limited	<34	<30	<35	<22	<14
Intermediate	40-44	30-41	35-40	22-28	14-19
High	48-52	42-51	41-48	29-36	20-25
Exceptional	58-60	>51	>48	>36	26-31

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

Table 3. Results of Biological and Habitat Sampling for Segment 1427, Onion Creek

Event 1				
Station (region)	**Statewide IBI**	**Regional IBI**	**RBP**	**HQI**
12454 (30)	38 - Limited-Intermediate	36 - Intermediate	33 - High	17 - Intermediate
12452 (30)	38 - Limited-Intermediate	41 – Intermediate	29 - High	22 - High
12449 (30)	40 - Intermediate	38 - Intermediate	38 - Exceptional	18 - Intermediate
12444 (32)	38 - Limited-Intermediate	37 - Intermediate	33 - High	20 - High
12436 (32)	44 - Intermediate	40 - Intermediate	32 - High	23 - High
Event 2				
Station (region)	**Statewide IBI**	**Regional IBI**	**RBP**	**HQI**
12454 (30)	46 - Intermediate-High	42 - High	35 - High	17 - Intermediate
12452 (30)	44 - Intermediate	41 – Intermediate	31 - High	23 - High
12449 (30)	46 - Intermediate-High	44 - High	31 - High	18 - Intermediate
12444 (32)	48 - High	46 – High	35 - High	19 - Intermediate
12436 (32)	50 - High	48 - High	33 - High	23 - High
Event 3				
Station (region)	**Statewide IBI**	**Regional IBI**	**RBP**	**HQI**
12454 (30)	44 - Intermediate	48 - High	26 - Intermediate	21 - High
12452 (30)	42 - Intermediate	40 – Intermediate	24 - Intermediate	20 - High
12449 (30)	42 - Intermediate	48 - High	23 - Intermediate	18 - Intermediate
12444 (32)	44 - Intermediate	36 - Intermediate	26 - Intermediate	18 - Intermediate
12436 (32)	46 - Intermediate-High	45 - High	30 - High	25 - High

For each component, an average score was calculated using scores from every sampling event. Scores for sampling events for each component that scored within the subcategory "High" agreed with the designated aquatic life use value for the segment. A subcategory of "Limited", "Limited-Intermediate", "Intermediate", or "Intermediate-High" was considered substandard, as it reflects a poorer level of water quality than that for which the segment is designated. A subcategory of "Exceptional" would be considered exceeding standards for Segment 1427. Statewide IBI scores averaged approximately 43 (Intermediate) across all sites over all sampling events. This result was in poor agreement with the designated aquatic life use, which was determined as "High" (13.3% overall). Regional IBI scores averaged 42 for three sites within ecoregion 30 (High), 42 for sites within ecoregion 32 (High) and represented a higher agreement with the standard (46.7%; 53.3% below standard). RBP scores averaged approximately 31 (High), a 66.7% agreement (26.7% below standard), while HQI averaged 20 (High) in 53.3% agreement with the aquatic life use (46.7% below standard).

4.0 DISCUSSION

Other than Statewide IBI, average scores of all components generally reflected agreement with the high aquatic life use designation for Segment 1427. The general trend in Statewide IBI scores is to underestimate the aquatic life use when compared to other assessment methods (TPWD 2002). Therefore, the lower Statewide IBI scores generated from data collected for this study are most likely not indicative of lower aquatic life use. Regional IBI, RBP, and HQI scores were fairly inconsistent and fell within a wide range of scores across sites and across time. However, broad averages for scores within this segment were mostly within the "high" subcategory. Further, dissolved oxygen concentrations throughout the study were generally above criteria. The combined data supports the recommendation to delist Segment 1427.

It should be noted that because this segment traverses the Edwards Aquifer recharge zone, some portions of the creek are intermittent as water enters openings in the surface into underground waterways. Site 12449, located near Buda, exhibited this phenomenon during low flow conditions over the center portion of the reach studied. Sampling was concentrated on either ends of the reach, where pools had formed before and after the surface water retreated below ground level. Scores for this site were not unusual for the rest of the segment, and it is likely that the necessary sampling modifications did not result in a skew in final scores for any component.

As discussed above, Segment 1427 did show some spatial and temporal variation in aquatic life use scores among and within sites. EComm is currently investigating the causes for this, but it is hypothesized that several factors may contribute, including flows, time of day, time of year, temperature, and dissolved oxygen levels.

5.0 CONCLUSION

Based on the Regional IBI, RBP, and HQI scores, the biological and habitat data appear to indicate a lower aquatic life use than the high use designated in the Texas Water Quality Standards. This data will be used in 2006 to assess the aquatic life use for the Water Quality Inventory [305(b)].

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APPENDIX A
COMPLETE RAW DATA SET
SEGMENT 1427-ONION CREEK
AUGUST 2002
APRIL 2003
SEPTEMBER 2003

Ecological Communications Corporation
Austin, TX

BIOTIC ASSESSMENT – BENTHIC MACROINVERTEBRATES

Species Lists and Preliminary Data Manipulation

Stream	Date	ID
Onion	8/19/02	12454

Func.Gp	%
P	27.102804
SCR	12.616822
CG	21.028037
FC	39.252336
SHR	0
	100

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

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

Taxa	N=	Func.Gp.	Tolerance	HBI
Odonata-Coenagrionidae-*Argia*	4	P	6	0.2553191
Odonata-Calopterygidae-*Hetaerina*	3	P	6	0.1914894
Odonata-Libellulidae-Perithemis	6	P	4	0.2553191
Ephemeroptera-Leptophlebiidae-*Thraulodes*	5	CG/SCR	2	0.106383
Ephemeroptera-Leptophlebiidae-*Neochoroterpes (Choroterpes)*	4	CG/SCR	2	0.0851064
Ephemeroptera-Isonychidae-*Isonychia*	2	FC	3	0.0638298
Ephemeroptera-Heptageniidae-*Stenonema*	2	SCR/CG	4	0.0851064
Hemiptera-Naucoridae-*Ambrysus*	1	P	-	-
Hemiptera-Naucoridae-*Cryphocricos*	2	P	-	-
Hemiptera-Veliidae-*Rhagovelia*	1	P	-	-
Megaloptera-Corydalidae-Corydalus	2	P	6	0.1276596
Trichoptera-Hydropsychidae-*Cheumatopsyche*	7	FC	6	0.4468085
Trichoptera-Philopotamidae-*Chimarra*	26	FC	3	0.8297872
Coleoptera-Elmidae-*Macrelmis (Elsianus)*	1	CG/SCR	2	0.0212766
Coleoptera-Elmidae-*Hexacylloepus* (A)	4	CG/SCR	2	0.0851064
Coleoptera-Elmidae-*Microcylleopus* (A)	8	CG/SCR	2	0.1702128
Coleoptera-Elmidae-*Microcylleopus* (L)	2	CG/SCR	2	0.0425532
Coleoptera-Elmidae-*Stenelmis* (A)	1	CG/SCR	7	0.0744681
Coleoptera-Lutrochidae-*Lutrochus* (A)	7	CG	-	-
Coleoptera-Staphylinidae-*Psephenidonus*	1	P	-	-
Coleoptera-Staphylinidae-*Stenus*	1	P	-	-
Diptera-Tabanidae-*Tabanus*	7	P	7	0.5212766
Diptera-Simulidae-*Simulium*	7	FC	4	0.2978723
Tricladia (Dugesia)	1	P	7.5	0.0797872
Oligochaeta	2	CG	8	0.1702128
Total	107	94		3.9095745
Intolerant/Tolerant	2.48			

Stream	Date	ID
Onion	8/20/02	12452

Func.Gp	%
P	49.679487
SCR	3.8461538
CG	6.4102885
FC	40.064103
SHR	0
	100.00003

Taxa	N=	Func.Gp.	Tolerance	HBI
Odonata-Coenagrionidae-*Argia*	9	P	6	0.5744681
Odonata-Calopterygidae-*Hetaerina*	1	P	6	0.0638298
Odonata-Libellulidae-Perithemis	24	P	4	1.0212766
Odonata-Libellulidae-*Brechmorhoga*	7	P	6	0.4468085
Ephemeroptera-Leptophlebiidae-*Travarella*	1	FC	2	0.0212766
Ephemeroptera-Leptophlebiidae-*Neochoroterpes (Choroterpes)*	6	CG/SCR	2	0.1276596
Ephemeroptera-Isonychidae-*Isonychia*	1	FC	3	0.0319149
Ephemeroptera-Heptageniidae-*Stenonema*	1	SCR/CG	4	0.0425532
Hemiptera-Naucoridae-*Cryphocricos*	1	P	-	-
Hemiptera-Veliidae-*Rhagovelia*	7	P	-	-
Megaloptera-Corydalidae-Corydalus	1	P	6	0.0638298
Trichoptera-Hydropsychidae-*Cheumatopsyche*	3	FC	6	0.1914894
Trichoptera-Philopotamidae-*Chimarra*	36	FC	3	1.1489362
Coleoptera-Elmidae-*Stenelmis* (L)	1	CG/SCR	7	0.0744681
Coleoptera-Lutrochidae-*Lutrochus* (A)	2	CG	-	-
Diptera-Chironomidae	2	P/CG/FC	6	0.1276596
Diptera-Tabanidae-*Tabanus*	1	P	7	0.0744681
Total	104	93		4.0106383
Intolerant/Tolerant	2.88			

Stream	Date	ID
Onion	8/21/02	12449

Func.Gp	%
P	18.867925
SCR	22.641509
CG	24.528302
FC	33.962264
SHR	0
	100

Taxa	N=	Func.Gp.	Tolerance	HBI
Odonata-Coenagrionidae-*Argia*	14	P	6	0.8076923
Odonata-Calopterygidae-*Hetaerina*	2	P	6	0.1153846
Ephemeroptera-Leptophlebiidae-*Thraulodes*	34	CG/SCR	2	0.6538462
Ephemeroptera-Leptophlebiidae-*Travarella*	1	FC	2	0.0192308
Ephemeroptera-Leptophlebiidae-*Neochoroterpes (Choroterpes)*	1	CG/SCR	2	0.0192308
Ephemeroptera-Isonychidae-*Isonychia*	1	FC	3	0.0288462
Ephemeroptera-Heptageniidae-*Stenonema*	8	SCR/CG	4	0.3076923
Ephemeroptera-Heptageniidae-*Stenacron*	3	SCR/CG	4	0.1153846
Ephemeroptera-Baetidae-*Centroptilum*	1	SCR/CG	2	0.0192308
Hemiptera-Naucoridae-*Ambrysus*	1	P	-	-
Hemiptera-Naucoridae-*Cryphocricos*	1	P	-	-
Trichoptera-Hydropsychidae-*Cheumatopsyche*	2	FC	6	0.1153846
Trichoptera-Philopotamidae-*Chimarra*	31	FC	3	0.8942308
Coleoptera-Hydrophilidae-*Tropisternus (L) (Berosus)*	1	P	9	0.0865385
Coleoptera-Elmidae-*Stenelmis* (A)	1	CG/SCR	7	0.0673077
Diptera-Chironomidae	3	P/CG/FC	6	0.1730769
Decapoda-Cambaridae	1	CG	5	0.0480769
Total	106	103		3.4711538
Intolerant/Tolerant	3.68			

Stream	Date	ID
Onion	8/22/02	12444

Func.Gp	%
P	59.938838
SCR	9.1743119
CG	12.232416
FC	18.654434
SHR	0
	100

Taxa	N=	Func.Gp.	Tolerance	HBI
Odonata-Coenagrionidae-*Argia*	10	P	6	0.8219178
Odonata-Calopterygidae-*Hetaerina*	2	P	6	0.1558442
Odonata-Libellulidae-Perithemis	1	P	4	0.0519481
Odonata-Libellulidae-*Brechmorhoga*	11	P	6	0.8571429
Ephemeroptera-Tricorythidae-*Tricorythodes*	3	CG	5	0.1948052
Ephemeroptera-Leptophlebiidae-*Thraulodes*	6	CG/SCR	2	0.1558442
Ephemeroptera-Leptophlebiidae-*Neochoroterpes (Choroterpes)*	2	CG/SCR	2	0.0519481
Ephemeroptera-Isonychidae-*Isonychia*	7	FC	3	0.2727273
Ephemeroptera-Baetidae-*Baetis*	1	CG/SCR	4	0.0519481
Hemiptera-Naucoridae-*Ambrysus*	11	P	-	-
Hemiptera-Naucoridae-*Cryphocricos*	15	P	-	-
Hemiptera-Veliidae-*Rhagovelia*	5	P	-	-
Megaloptera-Corydalidae-Corydalus	2	P	6	0.1558442
Trichoptera-Philopotamidae-*Chimarra*	12	FC	3	0.4675325
Coleoptera-Psephenidae-*Psephenus*	1	SCR	4	0.0519481
Coleoptera-Hydrophilidae-*Berosus* (A)	6	P	9	0.7012987
Coleoptera-Elmidae-*Microcylloepus* (A)	1	CG/SCR	2	0.025974
Coleoptera-Elmidae-*Stenelmis* (A)	4	CG/SCR	7	0.3636364
Coleoptera-Staphylinidae-*Thinobius (Staphylinidae)*	1	P	-	-
Diptera-Chironomidae	4	P/CG/FC	6	0.3116883
Gastropoda (Limnophila)-Physidae-*Physella*	2	SCR	9	0.2337662
Amphipoda-Hyallelidae-*Hyallela (CG-8)*	1	CG	8	0.1038961
Decapoda-Palaemonidae-Paleomonetes	1	CG	4	0.0519481
Total	109	73		5.0816581
Intolerant/Tolerant	0.92			

Stream	Date	ID
Onion	8/23/02	12436

Func.Gp	%
P	25.714286
SCR	16.190476
CG	15.238095
FC	42.857143
SHR	0
	100

Taxa	N=	Func.Gp.	Tolerance	HBI
Odonata-Coenagrionidae-*Argia*	11	P	6	0.6734694
Odonata-Calopterygidae-*Hetaerina*	1	P	6	0.0612245
Odonata-Libellulidae-Perithemis	2	P	4	0.0816327
Odonata-Libellulidae-*Brechmorhoga*	4	P	6	0.244898
Ephemeroptera-Tricorythidae-*Leptohypes*	1	CG	2	0.0204082
Ephemeroptera-Leptophlebiidae-*Thraulodes*	5	CG/SCR	2	0.1020408
Ephemeroptera-Leptophlebiidae-*Travarella*	2	FC	2	0.0408163
Ephemeroptera-Isonychidae-*Isonychia*	16	FC	3	0.4897959
Ephemeroptera-Baitidae-*Camelobaetidius (Dactylobaetis)*	1	SCR/CG	4	0.0408163
Hemiptera-Naucoridae-*Cryphocricos*	7	P	-	-
Trichoptera-Hydropsychidae-*Cheumatopsyche*	10	FC	6	0.6122449
Trichoptera-Hydropsychidae-*Hydropsyche*	1	FC	5	0.0510204
Trichoptera-Philopotamidae-*Chimarra*	16	FC	3	0.4897959
Coleoptera-Psephenidae-*Psephenus*	3	SCR	4	0.122449
Coleoptera-Elmidae-*Macrelmis (Elsianus)*	1	CG/SCR	2	0.0204082
Coleoptera-Elmidae-*Microcylleopus* (A)	3	CG/SCR	2	0.0612245
Coleoptera-Elmidae-*Stenelmis* (A)	17	CG/SCR	7	1.2142857
Coleoptera-Elmidae-*Neoelmis*	1	CG/SCR	2	0.0204082
Diptera-Chironomidae (Tabanidea)-*Tabanus*	2	P	7	0.1428571
Decapoda-Cambaridae	1	CG	5	0.0510204
Total	105	81		4.5408163
Intolerant/Tolerant	1.89			

Stream: Onion
Date: 4/23/03
Location: 12454

FFG	%
P	21.3836
SCR	2.83019
CG	17.6101
FC	58.1761
SHR	0
	100

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

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

Species	N=	Tolerance	FFG	HBI
Argia sp.	4	6	P	0.22641509
Erpetogomphus	5	1	P	0.04716981
Brechmorhoga	1	6	P	0.05660377
Thraulodes	4	2	CG/SCR	0.0754717
Isonychia	2	3	FC	0.05660377
Fallceon	1	4	SCR/CG	0.03773585
Corydalus	1	6	P	0.05660377
Cheumatopsyche	1	6	FC	0.05660377
Hydropsyche	2	5	FC	0.09433962
Chimarra	27	3	FC	0.76415094
Stenelmis (A)	1	7	CG/SCR	0.06603774
Lutrochus (A)	13	~	CG	-
Chironomidae	5	6	P/CG/FC	0.28301887
Simulium	28	4	FC	1.05660377
Cryptolabis	1			0
Oligochaeta	1	8	CG	0.0754717
Tricladida	9	7.5	P	0.63679245
Hydracarina	1	6	P	0.05660377
	106	2.875		3.64622642

Stream: Onion
Date: 4/24/03
Location: 12452

FFG	%
P	22.2222
SCR	31.4286
CG	31.746
FC	14.6032
SHR	0
	100

Species	N=	Tolerance	FFG	HBI
Argia sp.	8	6	P	0.45714286
Brechmorhoga	6	6	P	0.34285714
Thraulodes	41	2	CG/SCR	0.78095238
Choroterpes	25	2	CG/SCR	0.47619048
Isonychia	2	3	FC	0.05714286
Cheumatopsyche	5	6	FC	0.28571429
Chimarra	5	3	FC	0.14285714
Perlesta	3	0	P	0
Chironomidae	1	6	P/CG/FC	0.05714286
Atherix	2	4	P	0.07619048
Tricladida	4	7.5	P	0.28571429
Cobicula	3	6	FC	0.17142857
	105	2.88888889		3.13333333

Stream: Onion
Date: 4/24/03
Location: 12449

FFG	%
P	34.5566
SCR	21.5596
CG	27.2171
FC	10.7034
SHR	5.9633
	100

Species	N=	Tolerance	FFG	HBI
Argia sp.	10	6	P	0.55045872
Isonychia	1	3	FC	0.02752294
Stenonema	30	4	SCR/CG	1.10091743
Stenacron	1	4	SCR/CG	0.03669725
Fallceon	3	4	SCR/CG	0.11009174
Camelobaetidius	1	4	SCR/CG	0.03669725
Microvelia	3	~	P	-
Cheumatopsyche	8	6	FC	0.44036697
Perlesta	3	0	P	0
Tropisternus (L)	4	9	P	0.33027523
Lutrochus (A)	3	~	CG	-
Celina (A)	1	~	P	-
Chironomidae	8	6	P/CG/FC	0.44036697
Tricladida	14	7.5	P	0.96330275
Physella	5	9	SCR	0.41284404
Planobula	1	7	SCR	0.06422018
Hyallela	13	8	CG/SHR	0.95412844
	109	0.61904762		5.46788991

Stream: Onion
Date: 4/25/03
Location: 12444

FFG	%
P	37.2372
SCR	15.3153
CG	15.6156
FC	31.8318
SHR	0
	100

Species	N=	Tolerance	FFG	HBI
Argia sp.	5	6	P	0.27027027
Brechmorhoga	2	6	P	0.10810811
Tricorythodes	1	5	CG	0.04504505
Isonychia	7	3	FC	0.18918919
Fallceon	13	4	SCR/CG	0.46846847
Camelobaetidius	14	4	SCR/CG	0.5045045
Ambrysus	18	~	P	-
Cheumatopsyche	19	6	FC	1.02702703
Chimarra	8	3	FC	0.21621622
Perlesta	11	0	P	0
Stenelmis (A)	3	7	CG/SCR	0.18918919
Chironomidae	4	6	P/CG/FC	0.21621622
Tabanus	1	7	P	0.06306306
Tricladida	3	7.5	P	0.2027027
Physella	2	9	SCR	0.16216216
	111	1.5		3.66216216

Stream: Onion
Date: 4/25/03
Location: 12436

FFG	%
P	26.0606
SCR	15.4545
CG	15.1515
FC	43.3333
SHR	0
	100

Species	N=	Tolerance	FFG	HBI
Argia sp.	7	6	P	0.38181818
Erpetogomphus	1	1	P	0.00909091
Isonychia	1	3	FC	0.02727273
Fallceon	3	4	SCR/CG	0.10909091
Plauditus	2	4	SCR/CG	0.07272727
Camelobaetidius	3	4	SCR/CG	0.10909091
Ambrysus	11	~	P	-
Rhagovelia	2	~	P	-
Cheumatopsyche	14	6	FC	0.76363636
Hydropsyche	11	5	FC	0.5
Chimarra	16	3	FC	0.43636364
Perlesta	5	0	P	0
Psephenus	2	4	SCR	0.07272727
Microcylloepus (L)	1	2	CG/SCR	0.01818182
Stenelmis (A)	17	7	CG/SCR	1.08181818
Lutrochus (A)	1	~	CG	-
Chironomidae	8	6	P/CG/FC	0.43636364
Physella	1	9	SCR	0.08181818
Planobula	1	7	SCR	0.06363636
Cobicula	3	6	FC	0.16363636
	110	0.88235294		4.32727273

Stream: Onion
Date: 9/18/03
Location: 12454

FFG	%
P	60.78431
SCR	10.78431
CG	13.72549
FC	13.72549
SHR	0.980392
	100

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

HBI-Hisenhoff Biotic Index= sum(nt/N)
n=number of individuals of a particular taxa
t=tolerance value of that taxa
N=total number of organisms in a sample

Species	N=	Tolerance	FFG	HBI
Argia	35	6	P	2.95774648
Hetaerina	1	6	P	0.08450704
Erpetogomphus	1	1	P	0.01408451
Basiaeshna	1	2	P	0.02816901
Choroterpes	1	2	CG/SCR	0.02816901
Stenonema	1	4	SCR/CG	0.05633803
Baetis	7	4	SCR/CG	0.3943662
Ambrysus	12	-	P	-
Cryphocricos	1	-	P	-
Pelocoris	1	-	P	-
Corydalus	1	6	P	0.08450704
Chimarra	13	3	FC	0.54929577
Berosus (A)	3	9	P	0.38028169
Tropisternus (L)	1	9	P	0.12676056
Lutrochus (A)	2	-	CG	-
Halipus (A)	2	-	SHR/P	-
Chironomidae	3	6	P/CG/FC	0.25352113
Tabanus	2	7	P	0.1971831
Tricladida	1	7.5	P	0.1056338
Physella	13	9	SCR/CG	1.64788732
	102	0.4		6.9084507

Stream: Onion
Date: 9/18/03
Location: 12452

FFG	%
P	24.29907
SCR	2.803738
CG	63.5514
FC	9.345794
SHR	0
	100

Species	N=	Tolerance	FFG	HBI
Argia	9	6	P	0.57446809
Tricorythodes	66	5	CG	3.5106383
Leptohypes	1	2	CG/SCR	0.0212766
Isonychia	4	3	FC	0.12765957
Stenonema	1	4	CG/SCR	0.04255319
Fallceon	2	4	CG/SCR	0.08510638
Rhagovelia	13	-	P	-
Corydalus	1	6	P	0.06382979
Cheumatopsyche	1	6	FC	0.06382979
Chimarra	2	3	FC	0.06382979
Polycentropus	6	6	P/FC	0.38297872
Psephenus	1	4	SCR	0.04255319
	107	4.8125		4.9787234

Stream: Onion
Date: 9/18/03
Location: 12449

FFG	%
P	51.66667
SCR	17.5
CG	19.16667
FC	6.666667
SHR	5
	100

Species	N=	Tolerance	FFG	HBI
Argia	3	6	P	1.125
Brechmorhoga	2	6	P	0.75
Fallceon	2	4	CG/SCR	0.5
Caenis	3	7	SCR/CG	1.3125
Trepobates	1	-	P	-
Tropisternus (A)	2	9	P	1.125
Uvarus (A)	1	-	P	-
Peltdytes (A)	2	8	SHR/P	1
Chironomidae	1	6	P/CG/FC	0.375
Physella	2	9	SCR/CG	1.125
Corbicula	1	6	FC	0.375
	20	0.125		7.6875

Stream: Onion
Date: 9/19/03
Location: 12444

FFG	%
P	35.71429
SCR	13.54167
CG	21.13095
FC	17.85714
SHR	11.75595
	100

Species	N=	Tolerance	FFG	HBI
Trepobates	4	-	P	-
Belostoma	3	10	P	0.30927835
Psephenus	3	4	SCR	0.12371134
Berosus (A)	30	9	P	2.78350515
Peltdytes (A)	4	8	SHR/P	0.32989691
Cyphon (L)	11	-	SCR/CG/SHR	-
Chironomidae	3	6	SCR/CG	0.18556701
Anopheles	8	8	FC/CG	0.65979381
Physella	14	9	SCR/CG	1.29896907
Cobicula	16	6	FC	0.98969072
Hyallela	15	8	CG/SHR	1.2371134
Hydracarina	1	6	P	0.06185567
	112	0.03191489		7.97938144

Stream: Onion
Date: 9/19/03
Location: 12436

FFG	%
P	9.090909
SCR	41.81818
CG	35.45455
FC	13.63636
SHR	0
	100

Species	N=	Tolerance	FFG	HBI
Fallceon	17	4	SCR/CG	0.61818182
Camelobaetidius	11	4	SCR/CG	0.4
Caenis	1	7	SCR/CG	0.06363636
Cheumatopsyche	1	6	FC	0.05454545
Chimarra	7	3	FC	0.19090909
Berosus (A)	9	9	P	0.73636364
Hexacylloepus (A)	5	2	SCR/CG	0.09090909
Microcylloepus (A)	7	2	SCR/CG	0.12727273
Stenelmis (A)	9	7	SCR/CG	0.57272727
Helichus (A)	3	4	SCR/CG	0.10909091
Chironomidae	25	6	SCR/CG	1.36363636
Simulium	2	4	FC	0.07272727
Physella	7	9	SCR	0.57272727
Cobicula	5	6	FC	0.27272727
Hydracarina	1	6	P	0.05454545
	110	0.89655172		5.3

BIOTIC ASSESSMENT – BENTHIC MACROINVERTEBRATES

Rapid Bioassessment Protocol

Stream: Onion	**Date: 8/19/02**	**Location: 12454**	**County: Hays**
Metric		**Value**	**Score**
1. Taxa Richness		24	4
2. EPT Taxa Abundance		6	2
3. Biotic Index (HBI)		3.91	3
4. % Chironomidae		0	1
5. % Dominant Taxon		24.2990654	3
6. % Dominant FFG		39.2523364	3
7. % Predators		26.1682243	3
8. Ratio of Intolerant:Tolerant Taxa		2.48	2
9. % of Total Trichoptera as Hydropsychidae		21.2121212	4
10. # of Non-insect Taxa		2	2
11. % Collector-Gatherers		20.5607477	3
12. % of Total Number as Elmidae		14.953271	3
Aqautic Life Use: HIGH		Total Score:	33

Stream: Onion	**Date: 8/20/02**	**Location: 12452**	**County: Hays**
Metric		**Value**	**Score**
1. Taxa Richness		17	3
2. EPT Taxa Abundance		6	2
3. Biotic Index (HBI)		4.01	3
4. % Chironomidae		1.92307692	4
5. % Dominant Taxon		34.6153846	2
6. % Dominant FFG		49.6798077	2
7. % Predators		49.6798077	1
8. Ratio of Intolerant:Tolerant Taxa		2.76	2
9. % of Total Trichoptera as Hydropsychidae		7.69230769	4
10. # of Non-insect Taxa		0	1
11. % Collector-Gatherers		6.41057692	1
12. % of Total Number as Elmidae		0.96153846	4
Aqautic Life Use: HIGH		Total Score:	29

Stream: Onion	**Date: 8/21/02**	**Location: 12449**	**County: Travis**
Metric		**Value**	**Score**
1. Taxa Richness		17	3
2. EPT Taxa Abundance		9	3
3. Biotic Index (HBI)		3.47	4
4. % Chironomidae		2.83018868	4
5. % Dominant Taxon		32.0754717	2
6. % Dominant FFG		33.9622642	4
7. % Predators		18.8679245	3
8. Ratio of Intolerant:Tolerant Taxa		3.52	3
9. % of Total Trichoptera as Hydropsychidae		6.06060606	4
10. # of Non-insect Taxa		1	1
11. % Collector-Gatherers		24.5283019	3
12. % of Total Number as Elmidae		0.94339623	4
Aqautic Life Use: EXCEPTIONAL		Total Score:	38

Stream: Onion	**Date: 8/22/02**	**Location: 12444**	**County: Travis**
Metric		**Value**	**Score**
1. Taxa Richness		23	4
2. EPT Taxa Abundance		6	2
3. Biotic Index (HBI)		5.08	2
4. % Chironomidae		3.66972477	4
5. % Dominant Taxon		13.7614679	4
6. % Dominant FFG		59.9385321	1
7. % Predators		59.9385321	1
8. Ratio of Intolerant:Tolerant Taxa		0.83	1
9. % of Total Trichoptera as Hydropsychidae		0	4
10. # of Non-insect Taxa		3	2
11. % Collector-Gatherers		12.2321101	4
12. % of Total Number as Elmidae		4.58715596	4
Aqautic Life Use: HIGH		Total Score:	33

Stream: Onion	**Date: 8/23/02**	**Location: 12436**	**County: Travis**
Metric		**Value**	**Score**
1. Taxa Richness		20	3
2. EPT Taxa Abundance		8	3
3. Biotic Index (HBI)		4.54	2
4. % Chironomidae		1.9047619	4
5. % Dominant Taxon		16.1904762	4
6. % Dominant FFG		42.8571429	3
7. % Predators		25.7142857	2
8. Ratio of Intolerant:Tolerant Taxa		1.18	1
9. % of Total Trichoptera as Hydropsychidae		40.7407407	3
10. # of Non-insect Taxa		1	1
11. % Collector-Gatherers		15.2380952	4
12. % of Total Number as Elmidae		20.952381	2
Aqautic Life Use: HIGH		Total Score:	32

Stream: Onion	**Date: 4/23/03**	**Location: 12454**	**County: Hays**
Metric		**Value**	**Score**
1. Taxa Richness		18	3
2. EPT Taxa Abundance		6	2
3. Biotic Index (HBI)		3.65	4
4. % Chironomidae		4.67	3
5. % Dominant Taxon		26.17	3
6. % Dominant FFG		58.18	1
7. % Predators		21.38%	3
8. Ratio of Intolerant:Tolerant Taxa		2.88	2
9. % of Total Trichoptera as Hydropsychidae		6.7	4
10. # of Non-insect Taxa		3	2
11. % Collector-Gatherers		17.6	4
12. % of Total Number as Elmidae		0.9	4
Aqautic Life Use: HIGH		Total Score:	35

Stream: Onion	**Date: 4/24/03**	**Location: 12452**	**County: Hays**
Metric		**Value**	**Score**
1. Taxa Richness		12	2
2. EPT Taxa Abundance		6	2
3. Biotic Index (HBI)		3.13	4
4. % Chironomidae		0.95238095	4
5. % Dominant Taxon		39.047619	2
6. % Dominant FFG		31.7142857	4
7. % Predators		22.1904762	3
8. Ratio of Intolerant:Tolerant Taxa		2.89	2
9. % of Total Trichoptera as Hydropsychidae		50	3
10. # of Non-insect Taxa		2	2
11. % Collector-Gatherers		31.7142857	2
12. % of Total Number as Elmidae		0	1
Aqautic Life Use: HIGH		Total Score:	31

Stream: Onion	**Date: 4/24/03**	**Location: 12449**	**County: Travis**
Metric		**Value**	**Score**
1. Taxa Richness		17	3
2. EPT Taxa Abundance		7	3
3. Biotic Index (HBI)		5.47	1
4. % Chironomidae		7.33944954	3
5. % Dominant Taxon		27.5229358	3
6. % Dominant FFG		34.5568807	4
7. % Predators		34.5568807	2
8. Ratio of Intolerant:Tolerant Taxa		0.619	1
9. % of Total Trichoptera as Hydropsychidae		100	1
10. # of Non-insect Taxa		4	3
11. % Collector-Gatherers		27.2174312	3
12. % of Total Number as Elmidae		3.66972477	4
Aqautic Life Use: HIGH		Total Score:	31

Stream: Onion	**Date: 4/25/03**	**Location: 12444**	**County: Travis**
Metric		**Value**	**Score**
1. Taxa Richness		15	3
2. EPT Taxa Abundance		7	3
3. Biotic Index (HBI)		3.66	4
4. % Chironomidae		3.6036036	4
5. % Dominant Taxon		17.1171171	4
6. % Dominant FFG		37.2369369	3
7. % Predators		37.2369369	1
8. Ratio of Intolerant:Tolerant Taxa		1.5	1
9. % of Total Trichoptera as Hydropsychidae		70.3703704	2
10. # of Non-insect Taxa		2	2
11. % Collector-Gatherers		15.6126126	4
12. % of Total Number as Elmidae		2.7027027	4
Aqautic Life Use: HIGH		Total Score:	35

Stream: Onion	**Date: 4/25/03**	**Location: 12436**	**County: Travis**
Metric		**Value**	**Score**
1. Taxa Richness		20	3
2. EPT Taxa Abundance		8	3
3. Biotic Index (HBI)		4.33	3
4. % Chironomidae		7.27272727	3
5. % Dominant Taxon		15.4545455	4
6. % Dominant FFG		43.3336364	3
7. % Predators		26.0609091	2
8. Ratio of Intolerant:Tolerant Taxa		0.88	1
9. % of Total Trichoptera as Hydropsychidae		60.9756098	2
10. # of Non-insect Taxa		3	2
11. % Collector-Gatherers		15.1518182	4
12. % of Total Number as Elmidae		16.3636364	3
Aqautic Life Use: HIGH		Total Score:	33

Stream: Onion	**Date: 9/18/03**	**Location: 12454**	**County: Hays**
Metric		**Value**	**Score**
1. Taxa Richness		20	3
2. EPT Taxa Abundance		4	2
3. Biotic Index (HBI)		5.84	1
4. % Chironomidae		2.94117647	4
5. % Dominant Taxon		34.3137255	2
6. % Dominant FFG		60.7843137	1
7. % Predators		60.7843137	1
8. Ratio of Intolerant:Tolerant Taxa		0.4	1
9. % of Total Trichoptera as Hydropsychidae		0	4
10. # of Non-insect Taxa		2	2
11. % Collector-Gatherers		13.7254902	4
12. % of Total Number as Elmidae		0	1
Aqautic Life Use: INTERMEDIATE		Total Score:	26

Stream: Onion	**Date:9/18/03**	**Location: 12452**	**County: Hays**
Metric		**Value**	**Score**
1. Taxa Richness		12	2
2. EPT Taxa Abundance		8	3
3. Biotic Index (HBI)		4.98	2
4. % Chironomidae		0	1
5. % Dominant Taxon		61.682243	1
6. % Dominant FFG		63.5514019	1
7. % Predators		24.2990654	3
8. Ratio of Intolerant:Tolerant Taxa		4.81	4
9. % of Total Trichoptera as Hydropsychidae		11.1111111	4
10. # of Non-insect Taxa		0	1
11. % Collector-Gatherers		63.5514019	1
12. % of Total Number as Elmidae		0	1
Aqautic Life Use: INTERMEDIATE		Total Score:	24

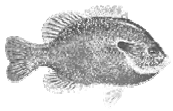
Stream: Onion	**Date: 9/18/03**	**Location: 12449**	**County: Travis**
Metric		**Value**	**Score**
1. Taxa Richness		11	2
2. EPT Taxa Abundance		2	1
3. Biotic Index (HBI)		7.6875	1
4. % Chironomidae		5	3
5. % Dominant Taxon		15	4
6. % Dominant FFG		51.65	2
7. % Predators		51.65	1
8. Ratio of Intolerant:Tolerant Taxa		0.125	1
9. % of Total Trichoptera as Hydropsychidae		NoTrichoptera	1
10. # of Non-insect Taxa		2	2
11. % Collector-Gatherers		19.165	4
12. % of Total Number as Elmidae		0	1
Aqautic Life Use: INTERMEDIATE		Total Score:	23

Stream: Onion	**Date: 9/19/03**	**Location: 12444**	**County: Travis**
Metric		**Value**	**Score**
1. Taxa Richness		12	2
2. EPT Taxa Abundance		0	1
3. Biotic Index (HBI)		7.98	1
4. % Chironomidae		2.67857143	4
5. % Dominant Taxon		26.7857143	3
6. % Dominant FFG		35.7142857	4
7. % Predators		35.7142857	2
8. Ratio of Intolerant:Tolerant Taxa		0.03	1
9. % of Total Trichoptera as Hydropsychidae		NoTrichoptera	1
10. # of Non-insect Taxa		4	3
11. % Collector-Gatherers		21.13125	3
12. % of Total Number as Elmidae		0	1
Aqautic Life Use: INTERMEDIATE		Total Score:	26

Stream: Onion	**Date: 9/19/03**	**Location: 12436**	**County: Travis**
Metric		**Value**	**Score**
1. Taxa Richness		16	3
2. EPT Taxa Abundance		5	2
3. Biotic Index (HBI)		5.3	2
4. % Chironomidae		22.7272727	1
5. % Dominant Taxon		22.7272727	3
6. % Dominant FFG		41.8181818	3
7. % Predators		9.09090909	4
8. Ratio of Intolerant:Tolerant Taxa		0.9	1
9. % of Total Trichoptera as Hydropsychidae		12.5	4
10. # of Non-insect Taxa		3	2
11. % Collector-Gatherers		35.4545455	2
12. % of Total Number as Elmidae		19.0909091	3
Aqautic Life Use: HIGH		Total Score:	30

BIOTIC ASSESSMENT – FISH

Species Lists and Preliminary Data Manipulation



FISH COLLECTED

Stream	Date	ID	Species	N=	Type	Method	Tolerance	Trophic Gp
Onion	8/19/02 (S)	12454	Blacktail Shiner	40		S	-	IF
	8/24/02 (E)		Blacktail Shiner	1		E	-	IF
			Bluegill	9	SF	S	T	IF
			Bluegill	5	SF	E	T	IF
			Channel Catfish	3		E	T	O
			Green Sunfish	19	SF	E	T	P
			Largemouth Bass	2		S	-	P
			Longear Sunfish	2	SF	E	-	IF
			Redbreast Sunfish	5	SF	E	-	IF
			Spotted Bass	1		E	-	P
			Total	87				

***Abnormalities:
1 Green SF with parasites

Stream	Date	ID	Species	N=	Type	Method	Tolerance	Trophic Gp
Onion	8/20/02	12452	Bluegill	2	SF	E	T	IF
			Blacktail Shiner	20		S	-	IF
			Blacktail Shiner	2		E	-	IF
			Bullhead Minnow	1		E	-	IF
			Common Carp	1		E	T	O
			Gambusia affinis	1		E	T	IF
			Gambusia affinis	4		S	T	IF
			Gizzard Shad	1		E	T	O
			Green Sunfish	11	SF	E	T	P
			Longear Sunfish	6	SF	S	-	IF
			Longear Sunfish	15	SF	E	-	IF
			Longear/Spotted Sunfish	5	SF	E	-	IF
			Redear Sunfish	1	SF	E	-	IF
			Red Shiner	1		E	T	IF
			Rio Grande Cichlid	1		E	-	IF
			Sailfin Molly	1		E	T	O
			Stoneroller	1		E	-	H
			Warmouth	1	SF	E	T	P
			Yellow Bullhead	1		S	-	O
			Yellow Bullhead	4		E	-	O
			Total	80				

*** Abnormalities:
3 Green SF with fungus
1 Longear SF with fungus
1 Yellow Bullhead with parasites

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
Onion	8/21/02	12449	Blacktail Shiner	10		S	-	IF
			Bluegill	3	SF	E	T	IF
			Channel Catfish	2		E	T	O
			Gambusia affinis	1		E	T	IF
			Gambusia affinis	4		S	T	IF
			Green Sunfish	20	SF	E	T	P
			Largemouth Bass	2		S	-	P
			Largemouth Bass	9		E	-	P
			Lepomis sp. ?	1	SF	S		
			Lepomis sp. ?	1	SF	S		
			Longear Sunfish	1	SF	S	-	IF
			Longear Sunfish	11	SF	E	-	IF
			Redbreast/Longear Sunfish	7	SF	E	-	IF
			Redbreast Sunfish	20	SF	E	-	IF
			Redbreast Sunfish	3	SF	S	-	IF
			Rio Grande Cichlid	2		E	-	IF
			Stoneroller	2		E	-	H
			Total	99				

Stream	Date	ID	Species	N=	Type	Method	Tolerance	Trophic Gp
Onion	8/22/02	12444	Blacktail Shiner	5		S	-	IF
			Bluegill	5	SF	S	T	IF
			Bluegill	6	SF	E	T	IF
			Gambusia affinis	2		S	T	IF
			Gambusia affinis	3		E	T	IF
			Green Sunfish	4	SF	E	T	P
			Largemouth Bass	2		S	-	P
			Largemouth/Guadalupe hybrid	1		S	-	P
			Longear Sunfish	7	SF	S	-	IF
			Longear Sunfish	5	SF	E	-	IF
			Longear/Spotted SF hybrid	3	SF	E	-	IF
			Redbreast Sunfish	1	SF	E	-	IF
			Redbreast Sunfish	7	SF	S	-	IF
			Redbreast/Longear Sunfish	2	SF	E	-	IF
			Rio Grande Cichlid	1		S	-	IF
			Spotted Sunfish	11	SF	E	-	IF
			Warmouth	1	SF	E	T	P
			Yellow Bullhead	2		E	-	O
			Total	68				

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
Onion	8/23/02	12436	Blacktail Shiner	1		E	-	IF
			Bluegill	5	SF	E	T	IF
			Bluegill	1	SF	S	T	IF
			Channel Catfish	4		E	T	O
			Channel Catfish	1		S	T	O
			Gambusia affinis	3		E	T	IF
			Gambusia affinis	21		S	T	IF
			Green Sunfish	1	SF	E	T	P
			Guadalupe Bass	1		E	I	P
			Guadalupe Bass	1		S	I	P
			Longear Sunfish	5	SF	S	-	IF
			Orangethroat Darter	2	D	E	-	IF
			Redear Sunfish	1	SF	S	-	IF
			Redbreast Sunfish	3	SF	S	-	IF
			Redbreast/Longear Sunfish	1	SF	E	-	IF
			Rio Grande Cichlid	2		E	-	IF
			Spotted Bass	1		E	-	P
			Spotted Bass	5		S	-	P
			Spotted Sunfish	3	SF	E	-	IF
			Stoneroller	1		S	-	H
			Stoneroller	18		E	-	H
			Texas Logperch	6	D	E	I	IF
			Yellow Bullhead	2		E	-	O
			Total	89				

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: Onion Date: 4/23/03 Location: 12454	Species		Type	Method	Tolerance	Trophic Gp.
	Bluegill	2	SF	E	T	IF
	Channel catfish	3		E	T	O
	Gambusia affinis	2		E	T	IF
	Gambusia affinis	1		S	T	IF
	Green sunfish	20	SF	E	T	P
	Green sunfish	1	SF	S	T	P
	Guadalupe bass	1		V	I	P
	Longear sunfish	18	SF	E	~	IF
	Longear sunfish	2	SF	S	~	IF
	Spottail	24	CY	E	~	IF
	Spottail	182	CY	S	~	IF
	Texas shiner	74	CY	S	~	IF
		330				

Stream: Onion Date: 4/24/03 Location: 12452	Species	N=	Type	Method	Tolerance	Trophic Gp.
	Central stoneroller	7	CY	E	~	H
	Channel catfish	18		E	T	O
	Gambusia affinis	5		E	T	IF
	Guadalupe bass	1		E	I	P
	Longear sunfish	12	SF	E	~	IF
	Longear sunfish	1	SF	S	~	IF
	Notropis sp.	1	CY	E	~	IF
	Notropis sp.	10	CY	S	~	IF
	Spottail	9	CY	E	~	IF
	Spottail	139	CY	S	~	IF
	Lepomis sp.	5	SF	E	~	IF
	Texas shiner	3	CY	E	~	IF
	Texas shiner	45	CY	S	~	IF
	Yellow bullhead	2		E	~	O
		258				

Stream: Onion Date: 4/24/03 Location: 12449	Species	N=	Type	Method	Tolerance	Trophic Gp.
	Amazon molly	7		S	~	O
	Bluegill	1	SF	E	T	IF
	Channel catfish	1		E	T	O
	Gambusia affinis	10		E	T	IF
	Gambusia affinis	24		S	T	IF
	Green sunfish	18	SF	E	T	P
	Green/Longear sunfish hybrid	2	SF	E	~	IF
	Guadalupe bass	4		S	I	P
	Longear sunfish	17	SF	E	~	IF
	Longear sunfish	1	SF	S	~	IF
	Notropis sp.	25	CY	E	~	IF
	Notropis sp.	7	CY	S	~	IF
	Redbreast sunfish	8	SF	E	~	IF
	Redbreast sunfish	1	SF	S	~	IF
	Rio Grande cichlid	1		E	~	IF
	Spottail	20	CY	E	~	IF
	Spottail	120	CY	S	~	IF
	Lepomis sp.	2	SF	E	~	IF
	Lepomis sp.	1	SF	S	~	IF
	Texas shiner	2	CY	E	~	IF
	Texas shiner	6	CY	S	~	IF
		278				

Stream: Onion
Date: 4/25/03
Location: 12444

Species	N=	Type	Method	Tolerance	Trophic Gp.
Bluegill	5	SF	E	T	IF
Bullhead minnow	1	CY	E	~	IF
Bullhead minnow	3	CY	S	~	IF
Central stoneroller	14	CY	S	~	H
Gambusia affinis	7		S	T	IF
Green sunfish	10	SF	E	T	P
Grey redhorse	1	SK	S	~	IF
Longear sunfish	28	SF	E	~	IF
Longear sunfish	5	SF	S	~	IF
Notropis sp.	6	CY	E	~	IF
Notropis sp.	201	CY	S	~	IF
Redbreast sunfish	2	SF	E	~	IF
Spottail	5	CY	E	~	IF
Spottail	414	CY	S	~	IF
Lepomis sp.	11	SF	E	~	IF
Warmouth	1	SF	E	T	P
	714				

Stream: Onion
Date: 4/25/03
Location: 12436

Species	N=	Type	Method	Tolerance	Trophic Gp.
Bluegill	6	SF	E	T	IF
Central stoneroller	15	CY	E	~	H
Central stoneroller	31	CY	S	~	H
Channel catfish	2		E	T	O
Dusky darter	1	D	E	I	IF
Dusky darter	3	D	S	I	IF
Green sunfish	5	SF	E	T	P
Guadalupe bass	2		E	I	P
Longear sunfish	9	SF	E	~	IF
Notropis sp.	5	CY	E	~	IF
Notropis sp.	2	CY	S	~	IF
Orangethroat darter	6	D	S	~	IF
Red shiner	1	CY	E	T	IF
Red shiner	8	CY	S	T	IF
Spottail	1	CY	E	~	IF
Spottail	35	CY	S	~	IF
Lepomis sp.	1	SF	E	~	IF
Texas log perch	1	D	E	I	IF
Texas shiner	2	CY	E	~	IF
Texas shiner	7	CY	S	~	IF
Warmouth	1	SF	E	T	P
	144				

Stream: Onion
Date: 9/18/03
Location: 12454

Species	N	Type	Method	Tolerance	Trophic Gp.
Bluegill	5	SF	E	T	IF
Bluegill	1	SF	S	T	IF
Channel Catfish	1		E	T	O
Green Sunfish	34	SF	E	T	P
Green Sunfish	1	SF	S	T	P
Guadalupe Bass	2		E	I	P
Guadalupe Bass	1		S	I	P
Largemouth Bass	1		E	-	P
Largemouth Bass	1		S	-	P
Lepomis sp.	8	SF	E	-	-
Lepomis sp.	2	SF	S	-	-
Lepomis sp. hybrid	1	SF	E	-	-
Longear Sunfish	29	SF	E	-	IF
Longear Sunfish	1	SF	S	-	IF
Redbreast Sunfish	5	SF	E	-	IF
Redear Sunfish	4	SF	E	-	IF
Blacktail Shiner	33	CY	E	-	IF
Blacktail Shiner	31	CY	S	-	IF
Spotted Sunfish	2	SF	E	-	IF
Texas Shiner	14	CY	S	-	IF
Warmouth	1	SF	E	T	P
Western Mosquitofish	24		E	T	IF
Western Mosquitofish	57		S	T	IF
	259		109	43	206
			150		41

Stream: Onion
Date: 9/18/03
Location: 12452

Species	N=	Type	Method	Tolerance	Trophic Gp.
Blacktail Shiner	1	CY	E		IF
Blacktail Shiner	197	CY	S		IF
Central Stoneroller	25	CY	E		H
Central Stoneroller	85	CY	S		H
Green Sunfish	7	SF	E	T	P
Guadalupe Bass	2		E	I	P
Guadalupe Bass	7		S	I	P
Lepomis sp.	14	SF	E		
Lepomis sp.	1	SF	S		
Longear Sunfish	37	SF	E		IF
Longear Sunfish	38	SF	S		IF
Redbreast Sunfish	8	SF	E		IF
Redbreast Sunfish	16	SF	S		IF
Western Mosquitofish	3		E	T	IF
Western Mosquitofish	27		S	T	IF
Yellow Bullhead	6		E		O
	474		371	37	327
			103		

*1 Gambusia w/ black spots

Stream: Onion
Date: 9/18/03
Location: 12449

Species	N=	Type	Method	Tolerance	Trophic Gp.
Blacktail Shiner	57	CY	E	-	IF
Blacktail Shiner	1	CY	S	-	IF
Bluegill	17	SF	E	T	IF
Bluegill	7	SF	S	T	IF
Central Stoneroller	4	CY	S	-	H
Channel Catfish	1		S	T	O
Green Sunfish	22	SF	S	T	P
Guadalupe Bass	5		E	I	P
Guadalupe Bass	2		S	I	P
Lepomis sp.	41	SF	E	-	-
Lepomis sp. hybrid	1	SF	S	-	-
Longear Sunfish	50	SF	E	-	IF
Longear Sunfish	24	SF	S	-	IF
Redbreast Sunfish	1	SF	S	-	IF
Rio Grande Cichlid	4		S	-	IF
Spotted Sunfish	1	SF	E	-	IF
Western Mosquitofish	58		E	T	IF
Western Mosquitofish	1		S	T	IF
	297		68	47	221
			229		

* 1 Green sunfish with black spots

Stream: Onion
Date: 9/19/03
Location: 12444

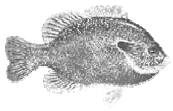
Species	N=	Type	Method	Tolerance	Trophic Gp.
Blacktail Shiner	36	CY	S	-	IF
Bluegill	1	SF	E	T	IF
Central Stoneroller	1	CY	E	-	H
Central Stoneroller	1	CY	S	-	H
Green Sunfish	2	SF	E	T	P
Guadalupe Bass	1		E	I	P
Largemouth Bass	2		S	-	P
Lepomis sp.	10	SF	E	-	-
Lepomis sp.	1	SF	S	-	-
Longear Sunfish	36	SF	E	-	IF
Longear Sunfish	3	SF	S	-	IF
Redbreast Sunfish	10	SF	E	-	IF
Redbreast Sunfish	4	SF	S	-	IF
Spotted Sunfish	4	SF	E	-	IF
Western Mosquitofish	3		E	T	IF
Western Mosquitofish	90		S	T	IF
Yellow Bullhead	1		E	-	O
	206		137	96	187
			69		

Stream: Onion
Date: 9/19/03
Location: 12436

Species	N=	Type	Method	Tolerance	Trophic Gp.
Blacktail Shiner	4	CY	E	-	IF
Blacktail Shiner	25	CY	S	-	IF
Bluegill	2	SF	E	T	IF
Bluegill	1	SF	S	T	IF
Central Stoneroller	2	CY	E	-	H
Central Stoneroller	34	CY	S	-	H
Channel Catfish	1		E	T	O
Dusky Darter	1	D	E	I	IF
Green Sunfish	1	SF	E	T	P
Guadalupe Bass	1		E	I	P
Lepomis sp.	3	SF	E	-	-
Lepomis sp.	1	SF	S	-	-
Longear Sunfish	17	SF	E	-	IF
Longear Sunfish	2	SF	S	-	IF
Orange-throat Darter	1	D	E	-	IF
Texas Logperch	4	D	E	I	IF
Texas Shiner	2	CY	S	-	IF
Warmouth	1	SF	E	T	P
Western Mosquitofish	2		E	T	IF
Western Mosquitofish	52		S	T	IF
	157		117	60	113
			40		

BIOTIC ASSESSMENT – FISH

Indices of Biotic Integrity – Statewide Criteria



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

Stream: Onion	Date: 8/23/02	Location: 12436	County: Travis	
Category	**Metric**		**Value**	**Score**
Species Richness and Composition	1. Total number of fish species		16	5
	2. Number of darter species		2	3
	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		39	1
Trophic Composition	7. Percentage of individuals as omnivores		8	5
	8. Percentage of individuals as insectivores		61	3
	9. Percentage of individuals as piscivores		10	5
Fish Abundance and Condition	10. Number of individuals in sample		89	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: Onion	Date: 8/22/02	Location: 12444	County: Travis	
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)		7	5
	4. Number of sucker speices		0	1
	5. Number of intolerant species		0	1
	6. Percentage of individuals as tolerants		31	1
Trophic Composition	7. Percentage of individuals as omnivores		3	5
	8. Percentage of individuals as insectivores		85	5
	9. Percentage of individuals as piscivores		12	5
Fish Abundance and Condition	10. Number of individuals in sample		68	3
	11. Percentage of individuals as hybrids		6	1
	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: Onion	Date: 8/21/02	Location: 12449	County: Hays	
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)		5	5
	4. Number of sucker speices		0	1
	5. Number of intolerant species		0	1
	6. Percentage of individuals as tolerants		30	1
Trophic Composition	7. Percentage of individuals as omnivores		2	5
	8. Percentage of individuals as insectivores		64	3
	9. Percentage of individuals as piscivores		32	5
Fish Abundance and Condition	10. Number of individuals in sample		99	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: Onion	Date: 8/20/02	Location: 12452	County: Hays	
Category	**Metric**		**Value**	**Score**
Species Richness and Composition	1. Total number of fish species		16	5
	2. Number of darter species		0	1
	3. Number of sunfish species (exc. bass)		5	5
	4. Number of sucker speices		0	1
	5. Number of intolerant species		0	1
	6. Percentage of individuals as tolerants		26	1
Trophic Composition	7. Percentage of individuals as omnivores		10	5
	8. Percentage of individuals as insectivores		74	3
	9. Percentage of individuals as piscivores		15	5
Fish Abundance and Condition	10. Number of individuals in sample		80	3
	11. Percentage of individuals as hybrids		0	5
	12. Percentage of individuals with disease/anomalies		5	3
	Aquatic Life Use: LIMITED-INTERMEDIATE		Total Points:	**38**

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

Stream: Onion	Date: 8/19,24/02 Location: 12454	County: Hays	
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)	4	5
	4. Number of sucker speices	0	1
	5. Number of intolerant species	0	1
	6. Percentage of individuals as tolerants	41	1
Trophic Composition	7. Percentage of individuals as omnivores	3	5
	8. Percentage of individuals as insectivores	71	3
	9. Percentage of individuals as piscivores	25	5
Fish Abundance and Condition	10. Number of individuals in sample	87	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**

Stream: Onion	Date: 4/23/03	Location: 12454	County: Hays	
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)		3	5
	4. Number of sucker species		0	1
	5. Number of intolerant species		1	3
	6. Percentage of individuals as tolerants		8	3
Trophic Composition	7. Percentage of individuals as omnivores		1	5
	8. Percentage of individuals as insectivores		92	5
	9. Percentage of individuals as piscivores		7	5
Fish Abundance and Condition	10. Number of individuals in sample		330	5
	11. Percentage of individuals as hybrids		0	5
	12. Percentage of individuals with disease/anomolies		0	5
	Aquatic Life Use: INTERMEDIATE-HIGH		Total Points:	46

Stream: Onion	Date: 4/24/03	Location: 12452	County: Hays	
Category	**Metric**		**Value**	**Score**
Species Richness and Composition	1. Total # of fish species		10	5
	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		9	3
Trophic Composition	7. Percentage of individuals as omnivores		8	5
	8. Percentage of individuals as insectivores		89	5
	9. Percentage of individuals as piscivores		0.3	1
Fish Abundance and Condition	10. Number of individuals in sample		258	5
	11. Percentage of individuals as hybrids		0	5
	12. Percentage of individuals with disease/anomolies		0	5
	Aquatic Life Use: INTERMEDIATE		Total Points:	44

Stream: Onion	Date: 4/24/03	Location: 12449	County: Hays	
Category	**Metric**		**Value**	**Score**
Species Richness and Composition	1. Total # of fish species		13	5
	2. Number of darter species		0	1
	3. Number of sunfish species (exc. bass)		5	5
	4. Number of sucker species		0	1
	5. Number of intolerant species		1	3
	6. Percentage of individuals as tolerants		19	3
Trophic Composition	7. Percentage of individuals as omnivores		2.9	5
	8. Percentage of individuals as insectivores		89	5
	9. Percentage of individuals as piscivores		8	5
Fish Abundance and Condition	10. Number of individuals in sample		278	5
	11. Percentage of individuals as hybrids		0.7	3
	12. Percentage of individuals with disease/anomolies		0	5
	Aquatic Life Use: INTERMEDIATE-HIGH		Total Points:	46

Stream: Onion	**Date: 4/25/03**	**Location: 12444**	**County: Travis**
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	1	3
	5. Number of intolerant species	0	1
	6. Percentage of individuals as tolerants	3	5
Trophic Composition	7. Percentage of individuals as omnivores	0	5
	8. Percentage of individuals as insectivores	96	5
	9. Percentage of individuals as piscivores	2	3
Fish Abundance and Condition	10. Number of individuals in sample	714	5
	11. Percentage of individuals as hybrids	0	5
	12. Percentage of individuals with disease/anomolies	0	5
	Aquatic Life Use: HIGH	Total Points:	48

Stream: Onion	**Date: 4/25/03**	**Location: 12436**	**County: Travis**
Category	**Metric**	**Value**	**Score**
Species Richness and Composition	1. Total # of fish species	15	5
	2. Number of darter species	3	5
	3. Number of sunfish species (exc. bass)	5	5
	4. Number of sucker species	0	1
	5. Number of intolerant species	3	5
	6. Percentage of individuals as tolerants	16	3
Trophic Composition	7. Percentage of individuals as omnivores	1	5
	8. Percentage of individuals as insectivores	61	3
	9. Percentage of individuals as piscivores	6	5
Fish Abundance and Condition	10. Number of individuals in sample	144	3
	11. Percentage of individuals as hybrids	0	5
	12. Percentage of individuals with disease/anomolies	0	5
	Aquatic Life Use: HIGH	Total Points:	50

Stream: Onion	Date: 9/18/03	Location: 12454	County: Hays	
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)		9	5
	4. Number of sucker species		0	1
	5. Number of intolerant species		1	3
	6. Percentage of individuals as tolerants		50	1
Trophic Composition	7. Percentage of individuals as omnivores		0.403225806	5
	8. Percentage of individuals as insectivores		83.06451613	5
	9. Percentage of individuals as piscivores		16.53225806	5
Fish Abundance and Condition	10. Number of individuals in sample		259	5
	11. Percentage of individuals as hybrids		0.386100386	3
	12. Percentage of individuals with disease/anomolies		0	5
	Aquatic Life Use: INTERMEDIATE		Total Points:	44

Stream: Onion	Date: 9/18/03	Location: 12452	County: Hays	
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)		4	5
	4. Number of sucker species		0	1
	5. Number of intolerant species		1	3
	6. Percentage of individuals as tolerants		8.061002179	3
Trophic Composition	7. Percentage of individuals as omnivores		1.307189542	5
	8. Percentage of individuals as insectivores		71.24183007	3
	9. Percentage of individuals as piscivores		3.48583878	3
Fish Abundance and Condition	10. Number of individuals in sample		474	5
	11. Percentage of individuals as hybrids		0	5
	12. Percentage of individuals with disease/anomolies		0	5
	Aquatic Life Use: INTERMEDIATE		Total Points:	42

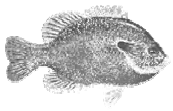
Stream: Onion	Date: 9/18/03	Location: 12449	County: Hays	
Category	**Metric**		**Value**	**Score**
Species Richness and Composition	1. Total # of fish species		13	5
	2. Number of darter species		0	1
	3. Number of sunfish species (exc. bass)		7	5
	4. Number of sucker species		0	1
	5. Number of intolerant species		1	3
	6. Percentage of individuals as tolerants		41.56862745	1
Trophic Composition	7. Percentage of individuals as omnivores		0.392156863	5
	8. Percentage of individuals as insectivores		86.66666667	5
	9. Percentage of individuals as piscivores		2.745098039	3
Fish Abundance and Condition	10. Number of individuals in sample		297	5
	11. Percentage of individuals as hybrids		0.336700337	3
	12. Percentage of individuals with disease/anomolies		0	5
	Aquatic Life Use: INTERMEDIATE		Total Points:	42

Stream: Onion	Date: 9/19/03	Location: 12444	County: Travis
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	1	3
	6. Percentage of individuals as tolerants	49.23076923	1
Trophic Composition	7. Percentage of individuals as omnivores	0.512820513	5
	8. Percentage of individuals as insectivores	95.8974359	5
	9. Percentage of individuals as piscivores	2.564102564	3
Fish Abundance and Condition	10. Number of individuals in sample	206	5
	11. Percentage of individuals as hybrids	0	5
	12. Percentage of individuals with disease/anomolies	0	5
	Aquatic Life Use: INTERMEDIATE	Total Points:	44

Stream: Onion	Date: 9/19/03	Location: 12436	County: Travis
Category	**Metric**	**Value**	**Score**
Species Richness and Composition	1. Total # of fish species	14	5
	2. Number of darter species	3	5
	3. Number of sunfish species (exc. bass)	5	5
	4. Number of sucker species	0	1
	5. Number of intolerant species	3	5
	6. Percentage of individuals as tolerants	39.21568627	1
Trophic Composition	7. Percentage of individuals as omnivores	0.653594771	5
	8. Percentage of individuals as insectivores	73.85620915	3
	9. Percentage of individuals as piscivores	1.960784314	3
Fish Abundance and Condition	10. Number of individuals in sample	157	3
	11. Percentage of individuals as hybrids	0	5
	12. Percentage of individuals with disease/anomolies	0	5
	Aquatic Life Use: INTERMEDIATE-HIGH	Total Points:	46

BIOTIC ASSESSMENT – FISH

Indices of Biotic Integrity – Regional Criteria



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

Stream:Onion	Date:08/24/02	Location: 12454 (Region30)	County: Hays	
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			4	5
5. Number of intolerant species			0	1
6. Percentage of individuals as tolerants (exc. G. affinis)			41.4	3
7. Percentage of individuals as omnivores			3	5
8. Percentage of individuals as insectivores			71	5
9. Percentage of individuals as piscivores			25	5
10. Number of individuals in sample			87	-
a. number of ind/seine haul			8.5	1
b. number of ind/min electrofishing			2.4	1
11. Percentage of ind. as non-native species			5.75	1
12. Percentage of individuals with disease/anomalies			0	5
Aquatic Life Use:	INTERMEDIATE		Total Points:	**36**

1*

*Average of 10a and 10b

Drainage area upstream of Station 12454 = 85 sq. km.

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

Stream:Onion	Date:08/20/02	Location: 12452 (Region30)	County: Hays	
Metric			**Value**	**Score**
1. Total number of fish species			16	5
2. Number of native cyprinid species			4	3
3. Number of benthic invertivore species			0	1
4. Number of sunfish species			5	5
5. Number of intolerant species			0	1
6. Percentage of individuals as tolerants (exc. G. affinis)			22.5	5
7. Percentage of individuals as omnivores			10	3
8. Percentage of individuals as insectivores			74	5
9. Percentage of individuals as piscivores			15	5
10. Number of individuals in sample			80	
a. number of ind/seine haul			5.17	1
b. number of ind/min electrofishing			3.27	3
11. Percentage of ind. as non-native species			1.25	5
12. Percentage of individuals with disease/anomalies			5	1
Aquatic Life Use:	INTERMEDIATE		Total Points:	**41**

2*

*Average of 10a and 10b

Drainage area upstream of Station 12452 = 271 sq. km.

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

Stream:Onion	Date:08/21/02	Location: 12449 (Region30)	County: Hays	
Metric			**Value**	**Score**
1. Total number of fish species			12	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. Number of intolerant species			0	1
6. Percentage of individuals as tolerants (exc. G. affinis)			25.3	5
7. Percentage of individuals as omnivores			2	5
8. Percentage of individuals as insectivores			64	3
9. Percentage of individuals as piscivores			32	5
10. Number of individuals in sample			99	-
a. number of ind/seine haul			3.67	1
b. number of ind/min electrofishing			5.13	5
11. Percentage of ind. as non-native species			23	1
12. Percentage of individuals with disease/anomalies			0	5
Aquatic Life Use:	INTERMEDIATE		Total Points:	**38**

3*

*Average of 10a and 10b

Drainage area upstream of Station 12449 = 430 sq. km.

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

Stream:Onion	Date:08/22/02	Location: 12444 (Region32)	County: Hays	
Metric			**Value**	**Score**
1. Total number of fish species			13	3
2. Number of native cyprinid species			1	1
3. Number of benthic invertivore species			0	1
4. Number of sunfish species			7	5
5. Percentage of individuals as tolerants (exc. G. affinis)			24	5
6. Percentage of individuals as omnivores			3	5
7. Percentage of individuals as insectivores			85	5
8. Percentage of individuals as piscivores			12	5
9. Number of individuals in sample			68	-
a. number of ind/seine haul			5	1
b. number of ind/min electrofishing			2.5	1
10. Percentage of ind. as non-native species			11.8	1
11. Percentage of individuals with disease/anomalies			0	5
Aquatic Life Use:	INTERMEDIATE		Total Points:	**37**

1*

*Average of 9a and 9b

Drainage area upstream of Station 12444 = 742 sq. km.

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

Stream:Onion	Date:08/23/02	Location: 12436 (Region 32)	County: Travis	
Metric			**Value**	**Score**
1. Total number of fish species			16	5
2. Number of native cyprinid species			2	1
3. Number of benthic invertivore species			1	3
4. Number of sunfish species			6	5
5. Percentage of individuals as tolerants (exc. G. affinis)			13	5
6. Percentage of individuals as omnivores			8	5
7. Percentage of individuals as insectivores			61	3
8. Percentage of individuals as piscivores			10	5
9. Number of individuals in sample			89	-
a. number of ind/seine haul			6.5	1
b. number of ind/min electrofishing			3.3	3
10. Percentage of ind. as non-native species			3.4	1
11. Percentage of individuals with disease/anomalies			0	5
Aquatic Life Use:	INTERMEDIATE		Total Points:	**40**

2*

*Average of 9a and 9b

Drainage area upstream of station 12436 = 838 sq. km.

Stream: Onion (Region30)	**Date: 4/23/03**	**Location: 12454**	**County: Hays**	
Metric			**Value**	**Score**
1. Total # of fish species			8	3
2.Total Number of cyprinid species			2	1
3. Number of benthic invertivore species			0	1
4. Number of sunfish species (exc. bass)			3	3
5. Number of intolerant species			1	3
6. Percentage of individuals as tolerants (exc. *G.affinis*)			7.9	5
7. Percentage of individuals as omnivores			0.9	5
8. Percentage of individuals as insectivores			92	5
9. Percentage of individuals as piscivores			6.7	3
10. Number of individuals in sample			~	~
a. Number of individuals/seine hual			43	3
b. Number of individuals/min. electroshocking			4.6	3
11. Percentage of individuals as non-native species			0	5
12. Percentage of individuals with disease/anomolies			0	5
Aquatic Life Use: HIGH			Total Points:	42

3*

*Average of 10a and 10b

Drainage area upstream of Station 12454 = 85 sq. km.

Stream: Onion (Region30)	**Date: 4/24/03**	**Location: 12452**	**County: Hays**	
Metric			**Value**	**Score**
1. Total # of fish species			10	3
2.Total Number of cyprinid species			4	3
3. Number of benthic invertivore species			0	1
4. Number of sunfish species (exc. bass)			2	3
5. Number of intolerant species			1	3
6. Percentage of individuals as tolerants (exc. *G.affinis*)			7	5
7. Percentage of individuals as omnivores			7.8	5
8. Percentage of individuals as insectivores			87	5
9. Percentage of individuals as piscivores			0.4	1
10. Number of individuals in sample			~	~
a. Number of individuals/seine hual			32.5	1
b. Number of individuals/min. electroshocking			4.2	3
11. Percentage of individuals as non-native species			0	5
12. Percentage of individuals with disease/anomolies			0	5
Aquatic Life Use: INTERMEDIATE			Total Points:	41

2*

*Average of 10a and 10b

Drainage area upstream of Station 12452 = 271 sq. km.

Stream: Onion (Region30)	**Date: 4/24/03**	**Location: 12449**	**County: Hays**	
Metric			**Value**	**Score**
1. Total # of fish species			13	5
2.Total Number of cyprinid species			3	3
3. Number of benthic invertivore species			0	1
4. Number of sunfish species (exc. bass)			5	5
5. Number of intolerant species			1	3
6. Percentage of individuals as tolerants (exc. *G.affinis*)			7.2	5
7. Percentage of individuals as omnivores			2.9	5
8. Percentage of individuals as insectivores			89.2	5
9. Percentage of individuals as piscivores			7.9	3
10. Number of individuals in sample			~	~
a. Number of individuals/seine hual			28.5	1
b. Number of individuals/min. electroshocking			7.13	5
11. Percentage of individuals as non-native species			3.2	1
12. Percentage of individuals with disease/anomolies			0	5
Aquatic Life Use: HIGH			Total Points:	44

3*

*Average of 10a and 10b

Drainage area upstream of Station 12449 = 429 sq. km.

Stream: Onion (Region32)	**Date: 4/25/03**	**Location: 12444**	**County: Travis**	
Metric			**Value**	**Score**
1. Total # of fish species			12	3
2.Total Number of cyprinid species			4	5
3. Number of benthic invertivore species			1	3
4. Number of sunfish species (exc. bass)			6	5
5. Percentage of individuals as tolerants (exc. *G.affinis*)			2.2	5
6. Percentage of individuals as omnivores			0	5
7. Percentage of individuals as insectivores			96.5	5
8. Percentage of individuals as piscivores			1.5	1
9.. Number of individuals in sample			~	~
a. Number of individuals/seine hual			107.5	5
b. Number of individuals/min. electroshocking			4.6	3
10. Percentage of individuals as non-native species			0.3	5
11. Percentage of individuals with disease/anomolies			0	5
Aquatic Life Use: HIGH			Total Points:	46

4*

*Average of 9a and 9b

Drainage area upstream of Station 12444 = 742 sq. km.

Stream: Onion (Region32)	**Date: 4/25/03**	**Location: 12436**	**County: Travis**	
Metric			**Value**	**Score**
1. Total # of fish species			15	5
2.Total Number of cyprinid species			5	5
3. Number of benthic invertivore species			2	5
4. Number of sunfish species (exc. bass)			5	5
5. Percentage of individuals as tolerants (exc. *G.affinis*)			16	5
6. Percentage of individuals as omnivores			1.4	5
7. Percentage of individuals as insectivores			61	3
8. Percentage of individuals as piscivores			5.6	3
9.. Number of individuals in sample			~	~
a. Number of individuals/seine hual			15.3	1
b. Number of individuals/min. electroshocking			3.5	3
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:	48

2*

*Average of 9a and 9b

Drainage area upstream of Station 12436 = 838 sq. km.

Stream: Onion (Region30)	Date: 9/18/03	Location: 12454	County: Hays	
Metric		**Value**	**Score**	
1. Total # of fish species		15	5	
2.Total Number of cyprinid species		2	1	
3. Number of benthic invertivore species		0	1	
4. Number of sunfish species (exc. bass)		9	5	
5. Number of intolerant species		1	3	
6. Percentage of individuals as tolerants (exc. *G.affinis*)		17.33870968	5	
7. Percentage of individuals as omnivores		0.403225806	5	
8. Percentage of individuals as insectivores		83.06451613	5	
9. Percentage of individuals as piscivores		16.53225806	5	
10. Number of individuals in sample			~	
a. Number of individuals/seine hual		18.16666667	1	3*
b. Number of individuals/min. electroshocking		10	5	
11. Percentage of individuals as non-native species		0.019305019	5	
12. Percentage of individuals with disease/anomolies		0	5	
Aquatic Life Use: HIGH		Total Points:	48	

*Average of 10a and 10b

Drainage area upstream of Station 12454 = 85 sq. km.

Stream: Onion (Region30)	Date: 9/18/03	Location: 12452	County: Hays	
Metric		**Value**	**Score**	
1. Total # of fish species		9	3	
2.Total Number of cyprinid species		2	1	
3. Number of benthic invertivore species		0	1	
4. Number of sunfish species (exc. bass)		4	5	
5. Number of intolerant species		1	3	
6. Percentage of individuals as tolerants (exc. *G.affinis*)		1.525054466	5	
7. Percentage of individuals as omnivores		1.307189542	5	
8. Percentage of individuals as insectivores		71.24183007	5	
9. Percentage of individuals as piscivores		3.48583878	1	
10. Number of individuals in sample			~	
a. Number of individuals/seine hual		61.83333333	5	5*
b. Number of individuals/min. electroshocking		6.866666667	5	
11. Percentage of individuals as non-native species		5.063291139	1	
12. Percentage of individuals with disease/anomolies		0	5	
Aquatic Life Use: INTERMEDIATE		Total Points:	40	

*Average of 10a and 10b

Drainage area upstream of Station 12452 = 271 sq. km.

Stream: Onion (Region30)	Date: 9/18/03	Location: 12449	County: Hays	
Metric		**Value**	**Score**	
1. Total # of fish species		13	5	
2.Total Number of cyprinid species		2	1	
3. Number of benthic invertivore species		0	1	
4. Number of sunfish species (exc. bass)		7	5	
5. Number of intolerant species		1	3	
6. Percentage of individuals as tolerants (exc. *G.affinis*)		18.43137255	5	
7. Percentage of individuals as omnivores		0.392156863	5	
8. Percentage of individuals as insectivores		86.66666667	5	
9. Percentage of individuals as piscivores		11.37254902	5	
10. Number of individuals in sample			~	
a. Number of individuals/seine hual		11.33333333	1	3*
b. Number of individuals/min. electroshocking		15.26666667	5	
11. Percentage of individuals as non-native species		0.336700337	5	
12. Percentage of individuals with disease/anomolies		0	5	
Aquatic Life Use: HIGH		Total Points:	48	

*Average of 10a and 10b

Drainage area upstream of Station 12449 = 429 sq. km.

Stream: Onion (Region32)	**Date: 9/19/03**	**Location: 12444**	**County: Travis**	
Metric			**Value**	**Score**
1. Total # of fish species			12	3
2.Total Number of cyprinid species			2	3
3. Number of benthic invertivore species			0	1
4. Number of sunfish species (exc. bass)			6	5
5. Percentage of individuals as tolerants (exc. *G.affinis*)			1.538461538	5
6. Percentage of individuals as omnivores			0.512820513	5
7. Percentage of individuals as insectivores			95.8974359	5
8. Percentage of individuals as piscivores			2.564102564	1
9.. Number of individuals in sample				~
a. Number of individuals/seine hual			22.83333333	1
b. Number of individuals/min. electroshocking			4.6	3
10. Percentage of individuals as non-native species			6.796116505	1
11. Percentage of individuals with disease/anomolies			0	5
Aquatic Life Use: INTERMEDIATE			Total Points:	36

2*

*Average of 9a and 9b

Drainage area upstream of Station 12444 = 742 sq. km.

Stream: Onion (Region32)	**Date: 9/19/03**	**Location: 12436**	**County: Travis**	
Metric			**Value**	**Score**
1. Total # of fish species			14	5
2.Total Number of cyprinid species			3	3
3. Number of benthic invertivore species			3	5
4. Number of sunfish species (exc. bass)			5	5
5. Percentage of individuals as tolerants (exc. *G.affinis*)			3.921568627	5
6. Percentage of individuals as omnivores			0.653594771	5
7. Percentage of individuals as insectivores			73.85620915	5
8. Percentage of individuals as piscivores			1.960784314	1
9.. Number of individuals in sample				~
a. Number of individuals/seine hual			19.5	1
b. Number of individuals/min. electroshocking			2.666666667	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 upstream of Station 12436 = 838 sq. km.

HABITAT ASSESSMENT

Part I – Stream Physical Characteristics Worksheet

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

Part I - Stream Physical Characteristics Worksheet

Observers: JW, BH, DL Date: 8/19 Time: 2p Weather conditions: Sunny

Stream: Onion Location of site: 12454 Length of stream reach: 310m

Stream Segment No.: 1427 Observed Stream Uses: Fish Aesthetics (circle one): (1) **wilderness** (2) **natural** (3) **common** (4) **offensive**

Stream Type (Circle One): **perennial** or **intermittent w/ perennial pools** Stream Bends: No. Well Defined 0; No. Moderately Defined 0; No. Poorly Defined 1

Channel Obstructions/Modifications: lo-water cross No. of Riffles: 3 Channel Flow Status (circle one): **high** **moderate** **low** **no flow**

Riparian Vegetation (%):
Left Bank: Trees 20 Shrubs 15 Grasses, Forbs 40 Cult. Fields _ Other 25
Right Bank: Trees 20 Shrubs 15 Grasses, Forbs 15 Cult. Fields _ Other 50

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect — Thalweg Depth:											Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
	3.25m	20	25%	0.10	0.10	0.10	0.15	0.13	0.23	0.15	0.15	0.15	0.11	0.10	10	25%	76%
D1 ~65m down from low water crossing	Habitat Type (Circle One) **Riffle** **Run** **Glide** **Pool**		Dominant Substrate Type Bedrock				Dominant Types Riparian Vegetation: Left Bank: 80% Tree; 15% Shrub; 5% Forb Right Bank: 25% Tree; 25% Forb; 50% Other										% Gravel or Larger 75%	
	Algae or Macrophytes (Circle One) **Abundant** **Common** **Rare** **Absent**		Width of Natural Buffer Vegetation (m) LB: 15 RB: >20				Instream Cover Types: Boulder, Cobble, Overhanging vegetation, Macrophytes										% Instream Cover 10%	

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect — Thalweg Depth:											Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
D2 just up from low water crossing	12.76m	20	0%	0.61	0.41	0.61	0.61	0.62	0.66	0.56	0.53	0.46	0.41	0.13	40	50%	0%
	Habitat Type (Circle One) **Riffle** **Run** **Glide** **Pool**		Dominant Substrate Type Bedrock				Dominant Types Riparian Vegetation: Left Bank: 100% Other Right Bank: Grasses-90% Forb; 5% Shrub; 5% Other										% Gravel or Larger 0%	
	Algae or Macrophytes (Circle One) **Abundant** **Common** **Rare** **Absent**		Width of Natural Buffer Vegetation (m) LB: 0 RB: 4m				Instream Cover Types: Macrophytes										% Instream Cover 2%	

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect											Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
				Thalweg Depth:													
D3	12.76m	15	50%	0.30	0.56	0.61	0.69	0.71	0.73	0.73	0.71	0.64	0.58	0.43	40	50%	6%
~55m up from low water crossing	Habitat Type (Circle One) Riffle Run Glide Pool ✔		Dominant Substrate Type: Bedrock												Dominant Types Riparian Vegetation: Left Bank: Grasses; 55% Fob; 25% Shrub; 15% Tree; 5% Other Right Bank: Grasses-50% Forb; 10% Tree; 15% Other; 25% Shrub		% Gravel or Larger: 0%	
	Algae or Macrophytes (Circle One) Abundant Common Rare Absent ✔		Width of Natural Buffer Vegetation (m) LB: 20 RB: 4m												Instream Cover Types: Boulder, Macrophyte		% Instream Cover: 5%	

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect											Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
				Thalweg Depth:													
D4	8.2m	20	75%	0.18	0.33	0.48	0.48	0.51	0.48	0.48	0.58	0.53	0.61	0.18	10	50%	18%
50m up from D3	Habitat Type (Circle One) Riffle Run Glide Pool ✔		Dominant Substrate Type: Bedrock												Dominant Types Riparian Vegetation: Left Bank: Sycamore-75% Other; 10% Tree; 10% Shrub; 5% Forb Right Bank: 80% Shrub; 10% Other; 10% Tree		% Gravel or Larger: 0%	
	Algae or Macrophytes (Circle One) Abundant Common Rare Absent ✔		Width of Natural Buffer Vegetation (m) LB: >20 RB: 8m												Instream Cover Types: Leaf pack, Root wad, Macrophytes, Boulder		% Instream Cover: 10%	

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect											Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
				Thalweg Depth:													
D5	13.67m	35	20%	0.08	0.13	0.20	0.28	0.30	0.38	0.36	0.23	0.10	0.18	0.13	40	30%	3%
~65m upstream from D4	Habitat Type (Circle One) Riffle Run Glide Pool ✔		Dominant Substrate Type: Bedrock												Dominant Types Riparian Vegetation: Left Bank: Grasses-60% Forb; 40% Other Right Bank: 50% Tree; 25% Forb; 5% Shrub; 20% Other		% Gravel or Larger: 0%	
	Algae or Macrophytes (Circle One) Abundant Common Rare Absent ✔		Width of Natural Buffer Vegetation (m) LB: 20 RB: 10												Instream Cover Types: Boulder, Macrophyte, Root wad, Overhanging vegetation, Cobble		% Instream Cover: 60%	

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect											Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
				Thalweg Depth:													
D6	13.22m	12	5%	0.10	0.13	0.10	0.10	0.10	0.03	0.03	0.06	0.08	0.08	0.03	18	20%	0
~55m up from D5	Habitat Type (Circle One) Riffle Run ✔ Glide Pool		Dominant Substrate Type: Gravel												Dominant Types Riparian Vegetation: Left Bank: Grasses-60% Forb; 35% Shrub; 5% Oter Right Bank: Grasses-60% Forb; 30% Tree; 10% Other		% Gravel or Larger: 100%	
	Algae or Macrophytes (Circle One) Abundant Common Rare Absent ✔		Width of Natural Buffer Vegetation (m) LB: >20 RB: 10												Instream Cover Types: Boulder, Cobble, Macophytes, Gravel		% Instream Cover: 75%	

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

Part I - Stream Physical Characteristics Worksheet

Observers: JW, BH Date: 8/20 Time: 11a Weather conditions: PC

Stream: Onion Location of site: 12452 Length of stream reach: 250m

Stream Segment No.: 1427 Observed Stream Uses: Rec Aesthetics (circle one): (1) **wilderness** (2) **natural** (3) **common** (4) **offensive**

Stream Type (Circle One): **perennial** or **intermittent w/ perennial pools** Stream Bends: No. Well Defined 0; No. Moderately Defined 1; No. Poorly Defined 0

Channel Obstructions/Modifications: small rock dam No. of Riffles: 2 Channel Flow Status (circle one): **high** **moderate** **low** **no flow**

Riparian Vegetation (%):
Left Bank: Trees 40 Shrubs 30 Grasses, Forbs 10 Cult. Fields _ Other 20
Right Bank: Trees 30 Shrubs 20 Grasses, Forbs 10 Cult. Fields _ Other 40

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect — Thalweg Depth:											Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
	10.94m	25	20%	0.08	0.41	0.48	0.58	0.58	0.61	0.64	0.69	0.53	0.36	0.13	33	75%	100%
D1 ~125m down from small rock dam at access point	Habitat Type (Circle One) **Riffle** **Run** **Glide** **Pool**		Dominant Substrate Type Cobble				Dominant Types Riparian Vegetation: Left Bank: 40% Other; 40% Tree; 15% Forb; 5% Shrub Right Bank: 60% Other; 35% Tree; 5% Forb								% Gravel or Larger 95%		
	Algae or Macrophytes (Circle One) **Abundant** **Common** **Rare** **Absent**		Width of Natural Buffer Vegetation (m) LB: >20 RB: >20				Instream Cover Types: Gravel, Cobble, Boulder, Cyprss roots								% Instream Cover 50%		

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect — Thalweg Depth:											Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
D2 ~40m up from D1	10.94m	38	75%	0.33	0.74	0.94	1.12	0.91	0.74	0.64	0.56	0.38	0.36	0.28	50	60%	88%
	Habitat Type (Circle One) **Riffle** **Run** **Glide** **Pool**		Dominant Substrate Type Cobble				Dominant Types Riparian Vegetation: Left Bank: 70% Other; 25% Shrub; 5% Forb Right Bank: 60% Other; 20% Tree; 15% Shrub; 5% Forb								% Gravel or Larger 90%		
	Algae or Macrophytes (Circle One) **Abundant** **Common** **Rare** **Absent**		Width of Natural Buffer Vegetation (m) LB: >20 RB: >20				Instream Cover Types: Gravel, Cobble, Boulder, Snag								% Instream Cover 50%		

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect — Thalweg Depth:											Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
D3 ~60m up from D2 @ kiddie dam and access point	10.94m	40	25%	0.46	0.61	0.84	0.84	0.76	0.69	0.53	0.48	0.53	0.51	0.41	30	35%	100%
Habitat Type (Circle One) Riffle Run Glide Pool ✔	Dominant Substrate Type: Cobble	Dominant Types Riparian Vegetation: Left Bank: 60% Shrub; 15% Forb; 15% Tree; 10% Other Right Bank: 60% Tree; 15% Shrub; 15% Forb; 10% Other														% Gravel or Larger: 100%	
Algae or Macrophytes (Circle One) Abundant Common Rare Absent ✔	Width of Natural Buffer Vegetation (m) LB: 10 RB: >20	Instream Cover Types: Gravel, Cobble, Boulder, Root wad														% Instream Cover: 50%	

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect — Thalweg Depth:											Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
D4 ~50m up from D3	7.29m	30	60%	0.33	0.28	0.28	0.30	0.30	0.28	0.25	0.20	0.10	0.05	0.03	5	30%	82%
Habitat Type (Circle One) Riffle Run ✔ Glide Pool	Dominant Substrate Type: Cobble	Dominant Types Riparian Vegetation: Left Bank: 50% Shrub; 10% Tree; 40% Other Right Bank: 30% Tree; 10% Shrub; 60% Other														% Gravel or Larger: 100%	
Algae or Macrophytes (Circle One) Abundant Common Rare Absent ✔	Width of Natural Buffer Vegetation (m) LB: 10 RB: >20	Instream Cover Types: Gravel, Cobble, Boulder, Roots														% Instream Cover: 50%	

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect — Thalweg Depth:											Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
D5 ~55m up from D4	11.85m	22	40%	0.05	0.13	0.13	0.18	0.25	0.30	0.26	0.18	0.13	0.10	0.03	12	30%	100%
Habitat Type (Circle One) Riffle Run ✔ Glide Pool	Dominant Substrate Type: Cobble	Dominant Types Riparian Vegetation: Left Bank: Grasses-70% Forb; 25% Tree; 5% Other Right Bank: 50% Other; 30% Tree; 20% Shrub														% Gravel or Larger: 100%	
Algae or Macrophytes (Circle One) Abundant Common Rare Absent ✔	Width of Natural Buffer Vegetation (m) LB: 4m RB: >20	Instream Cover Types: Gravel, Cobble, Boulder, Roots, Leaf pack														% Instream Cover: 50%	

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

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

Part I - Stream Physical Characteristics Worksheet

Observers: JW, BH, DL Date: 8/21 Time: noon Weather conditions: PC

Stream: Onion Location of site: 12449 Length of stream reach: 260m

Stream Segment No.: 1427 Observed Stream Uses: Rec Aesthetics (circle one): (1) **wilderness** (2) **natural** (3) **common** (4) **offensive**

Stream Type (Circle One): **perennial** or **intermittent w/ perennial pools** Stream Bends: No. Well Defined 0; No. Moderately Defined 1; No. Poorly Defined 2

Channel Obstructions/Modifications: none No. of Riffles: 2 Channel Flow Status (circle one): **high** **moderate** **low** **no flow**

Riparian Vegetation (%):
Left Bank: Trees 12 Shrubs 18 Grasses, Forbs 12 Cult. Fields _ Other 58
Right Bank: Trees 27 Shrubs 38 Grasses, Forbs 15 Cult. Fields _ Other 20

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect — Thalweg Depth:											Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
	25.52m	25	40%	0.76	0.89	0.97	1.07	1.09	1.17	1.19	1.22	1.22	1.09	0.38	30	25%	71%
U1 @ large pool up from narrow channel	Habitat Type (Circle One) **Riffle** **Run** **Glide** **Pool** ✔	Dominant Substrate Type Bedrock		Dominant Types Riparian Vegetation: Left Bank: 40% Tree; 20% Shrub; 30% Forb; 10% Other Right Bank: 60% Tree; 20% Shrub; 10% Forb; 10% Other												% Gravel or Larger 90%	
	Algae or Macrophytes (Circle One) **Abundant** **Common** **Rare** **Absent** ✔	Width of Natural Buffer Vegetation (m) LB: >20 RB: >20		Instream Cover Types: Boulder, Cobble, Macrophytes, Leaf pack												% Instream Cover 30%	

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect — Thalweg Depth:											Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
	7.29m	15	40%	0.03	0.10	0.15	0.23	0.41	0.46	0.48	0.48	0.53	0.56	0.23	5	40%	0%
U2 ~35m down from U1	Habitat Type (Circle One) **Riffle** **Run** **Glide** **Pool** ✔	Dominant Substrate Type Bedrock		Dominant Types Riparian Vegetation: Left Bank: 80% Shrub; 20% Forb Right Bank: 80% Shrub; 20% Forb												% Gravel or Larger 95%	
	Algae or Macrophytes (Circle One) **Abundant** **Common** **Rare** **Absent** ✔	Width of Natural Buffer Vegetation (m) LB: >20 RB: >20		Instream Cover Types: Macrophytes												% Instream Cover 40%	

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect											Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
				Thalweg Depth:													
U3	3.05m	5	0%	0.01	0.05	0.08	0.10	0.10	0.13	0.13	0.15	0.18	0.15	0.05	20	20%	53%
~40m down from U2	Habitat Type (Circle One) Riffle Run Glide Pool ✔		Dominant Substrate Type: Bedrock												Dominant Types Riparian Vegetation: Left Bank: 80% Other; 10% Forb; 10% Tree Right Bank: 40% Tree; 40% Shrub; 20% Other		% Gravel or Larger: 100%	
	Algae or Macrophytes (Circle One) Abundant Common Rare Absent ✔		Width of Natural Buffer Vegetation (m) LB: >20 RB: >20												Instream Cover Types: Macrophytes		% Instream Cover: 5%	

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect											Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
				Thalweg Depth:													
U4	9.11m	10	0%	0.01	0.01	0.01	0.01	0.01	0.03	0.01	0.02	0.01	0.01	0.01	10	20%	0%
~40m downstream from U3	Habitat Type (Circle One) Riffle Run Glide Pool ✔		Dominant Substrate Type: Bedrock												Dominant Types Riparian Vegetation: Left Bank: 90% Other; 10% Forb Right Bank: 60% Shrub; 20% Tree; 20% Forb		% Gravel or Larger: 100%	
	Algae or Macrophytes (Circle One) Abundant Common Rare Absent ✔		Width of Natural Buffer Vegetation (m) LB: >20 RB: >20												Instream Cover Types: Leaf pack, Macrophytes		% Instream Cover: 5%	

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect											Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
				Thalweg Depth:													
U5	8.20m	10	0%	0.01	0.01	0.01	0	0	0.03	0.01	0.01	0.02	0.08	0.03	7	15%	0%A
~40m downstream from U4	Habitat Type (Circle One) Riffle Run Glide Pool ✔		Dominant Substrate Type: Bedrock												Dominant Types Riparian Vegetation: Left Bank: 90% Other; 10% Forb Right Bank: 30% Tree; 30% Shrub; 40% Other		% Gravel or Larger: 100%	
	Algae or Macrophytes (Circle One) Abundant Common Rare Absent ✔		Width of Natural Buffer Vegetation (m) LB: >20 RB: >20												Instream Cover Types: Gravel, Cobble		% Instream Cover: 10%	

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect											Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
				Thalweg Depth:													
U6	10.93m	7	10%	0.04	0.26	0.46	0.43	0.41	0.43	0.41	0.41	0.30	0.15	0.04	20	20%	0%
~ 40m downstream from U5	Habitat Type (Circle One) Riffle Run Glide Pool ✔		Dominant Substrate Type: Bedrock												Dominant Types Riparian Vegetation: Left Bank: 80% Other; 10% Forb, 10% Shrub Right Bank: 50% Other; 20% Forb; 30% Tree		% Gravel or Larger: 100%	
	Algae or Macrophytes (Circle One) Abundant Common Rare Absent ✔		Width of Natural Buffer Vegetation (m) LB: >20 RB: >20												Instream Cover Types: Cobble, Boulder		% Instream Cover: 5%	

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

Part I - Stream Physical Characteristics Worksheet

Observers: JW, BH Date: 8/22 Time: 2p Weather conditions: PC

Stream: Onion Location of site: 12444 Length of stream reach: 300m

Stream Segment No.: 1427 Observed Stream Uses: dump Aesthetics (circle one): (1) **wilderness** (2) **natural** (3) **common** (4) **offensive**

Stream Type (Circle One): **perennial** or **intermittent w/ perennial pools** Stream Bends: No. Well Defined 0; No. Moderately Defined 0; No. Poorly Defined 1

Channel Obstructions/Modifications: none No. of Riffles: 1 Channel Flow Status (circle one): **high** **moderate** **low** **no flow**

Riparian Vegetation (%):
Left Bank: Trees 40 Shrubs 25 Grasses, Forbs 8 Cult. Fields _ Other 27
Right Bank: Trees 35 Shrubs 23 Grasses, Forbs 18 Cult. Fields _ Other 24

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect — Thalweg Depth:											Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
	18.23m	23	20%	0.05	0.48	0.89	0.94	0.94	0.79	0.64	0.56	0.56	0.84	0.71	90	50%	94%Gravel
U1 ~90m downstream from William Cannon bridge	Habitat Type (Circle One) **Riffle** **Run** **Glide** **Pool** ✔	Dominant Substrate Type Gravel		Dominant Types Riparian Vegetation: Left Bank: 50% Other; 30% Tree; 10% Forb; 10% Shrub Right Bank: 20% Tree; 30% Other; 20% Shrub; 30% Forb												% Gravel or Larger 50%	
	Algae or Macrophytes (Circle One) **Abundant** **Common** **Rare** ✔ **Absent**	Width of Natural Buffer Vegetation (m) LB: >20 RB: >20		Instream Cover Types: Gravel, Cobble, Snag, Roots, Leaf pack												% Instream Cover 40%	

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect — Thalweg Depth:											Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
	11.39m	20	25%	0.03	0	0	0.03	0.05	0.08	0.05	0	0.01	0.01	0.01	30	25%	0%
U2 ~35m down from bridge	Habitat Type (Circle One) **Riffle** ✔ **Run** **Glide** **Pool**	Dominant Substrate Type Cobble		Dominant Types Riparian Vegetation: Left Bank: 30% Tree; 30% Shrub; 30% Other; 10% Forb Right Bank: 70% Tree; 20% Other; 10% Shrub												% Gravel or Larger 95%	
	Algae or Macrophytes (Circle One) **Abundant** **Common** ✔ **Rare** **Absent**	Width of Natural Buffer Vegetation (m) LB: >20 RB: >20		Instream Cover Types: Log, Cobble, Artificial (scrap metal), Leaf pack												% Instream Cover 70%	

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect											Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
				Thalweg Depth:													
U3	10.03m	20	25%	0.28	0.43	0.41	0.30	0.20	0.15	0.05	0.04	0.05	0.03	0.03	50	60%	12%
~20m upstream from bridge	Habitat Type (Circle One) Riffle Run Glide Pool ✔		Dominant Substrate Type: Cobble												Dominant Types Riparian Vegetation: Left Bank: 40% Tree; 40% forb; 20% Other Right Bank: 90% Shrub; 10% Other		% Gravel or Larger: 90%
	Algae or Macrophytes (Circle One) Abundant Common ✔ Rare Absent		Width of Natural Buffer Vegetation (m) LB: >20 RB: >20												Instream Cover Types: Cobble, Macrophytes, Snag, Boulder, Algae		% Instream Cover: 50%

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect											Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
				Thalweg Depth: 1.78													
U4	15.49m	60	40%	0.15	1.19	1.22	1.68	1.52	1.17	0.76	0.56	0.56	0.20	0.26	100	70%	76%
~60m upstream from U3	Habitat Type (Circle One) Riffle Run Glide Pool ✔		Dominant Substrate Type: Silt												Dominant Types Riparian Vegetation: Left Bank: 75% Tree; 15% Other; 10% Shrub Right Bank: 50% Other; 40% Tree; 5% Shrub; 5% Forb		% Gravel or Larger: 50%
	Algae or Macrophytes (Circle One) Abundant Common ✔ Rare Absent		Width of Natural Buffer Vegetation (m) LB: >20 RB: >20												Instream Cover Types: Leaf pack, Roots, Cobble, Overhanging vegetation		% Instream Cover: 30%

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect											Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
				Thalweg Depth:													
U5	16.41m	80	80%	0.03	0.81	0.64	0.69	0.56	0.46	0.33	0.15	0.05	0.05	0.05	60	90%	65%
~55m upstream from U4	Habitat Type (Circle One) Riffle Run Glide Pool ✔		Dominant Substrate Type: Gravel												Dominant Types Riparian Vegetation: Left Bank: 80% Tree; 10% Shrub; 10% Other Right Bank: 40% Tree; 40% Forb; 10% Other; 10% Shrub		% Gravel or Larger: 80%
	Algae or Macrophytes (Circle One) Abundant Common ✔ Rare Absent		Width of Natural Buffer Vegetation (m) LB: >20 RB: >20												Instream Cover Types: Scrap wood, Gravel, Cobble, Log, Roots		% Instream Cover: 35%

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect											Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
				Thalweg Depth:													
U6	4.56m	60	60%	0.05	0.79	0.64	0.61	0.61	0.74	0.79	0.64	0.64	0.48	0.26	50	70%	35%
~55m upstream from U5	Habitat Type (Circle One) Riffle Run Glide Pool ✔		Dominant Substrate Type: Gravel												Dominant Types Riparian Vegetation: Left Bank: 50% Other; 25% Forb; 25% Tree Right Bank: 30% Other; 40% Tree; 30% Forb		% Gravel or Larger: 605
	Algae or Macrophytes (Circle One) Abundant Common ✔ Rare Absent		Width of Natural Buffer Vegetation (m) LB: >20 RB: >20												Instream Cover Types: Gravel, Cobble, Algae, Macrophytes		% Instream Cover: 35%

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

Part I - Stream Physical Characteristics Worksheet

Observers: DL, BH Date: 8/23 Time: pm Weather conditions: Sunny

Stream: Onion Location of site: 12436 Length of stream reach: 150m

Stream Segment No.: 142? Observed Stream Uses: pump Aesthetics (circle one): (1) **wilderness** (2) **natural** (3) **common** (4) **offensive**

Stream Type (Circle One): **perennial** or **intermittent w/ perennial pools** Stream Bends: No. Well Defined 1; No. Moderately Defined 1; No. Poorly Defined 0

Channel Obstructions/Modifications: 183 bridge No. of Riffles: 5 Channel Flow Status (circle one): **high** **moderate** **low** **no flow**

Riparian Vegetation (%):
Left Bank: Trees 29 Shrubs 23 Grasses, Forbs 18 Cult. Fields _ Other 30
Right Bank: Trees 20 Shrubs 42 Grasses, Forbs 10 Cult. Fields _ Other 28

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect (Thalweg Depth:)											Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
	4.19m	10	20%	0.03	0.07	0.08	0.04	0.04	0.03	0.08	0.10	0.02	0.05	0.02	10	20%	0%
D1 ~25m down from bridge	Habitat Type (Circle One) **Riffle** **Run** **Glide** **Pool**		Dominant Substrate Type Cobble				Dominant Types Riparian Vegetation: Left Bank: 60% Other; 30% Shrub; 10% Forb Right Bank: 40% Other; 40% Shrub; 20% Tree								% Gravel or Larger 100%		
	Algae or Macrophytes (Circle One) **Abundant** **Common** **Rare** **Absent**		Width of Natural Buffer Vegetation (m) LB: >20 RB: >20				Instream Cover Types: Gravel, Cobble								% Instream Cover 50%		

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect (Thalweg Depth:)											Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
	5.00m	2	10%	0.03	0.08	0.08	0.10	0	0.03	0.13	0.23	0.23	0.18	0.13	22	10%	0
D2 under southbound bridge	Habitat Type (Circle One) **Riffle** **Run** **Glide** **Pool**		Dominant Substrate Type Boulder				Dominant Types Riparian Vegetation: Left Bank: 60% Other; 35% Shrub; 5% Forb Right Bank: 50% Tree; 30% Forb; 10% Shrub; 10% Other								% Gravel or Larger 100%		
	Algae or Macrophytes (Circle One) **Abundant** **Common** **Rare** **Absent**		Width of Natural Buffer Vegetation (m) LB: 10m RB: >20				Instream Cover Types: Cobble, Boulder								% Instream Cover 50%		

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect											Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
				Thalweg Depth:													
D3 @end of gravel bar, 1st bend above D2	0.66m	110	90%	0.03	0.18	0.23	0.30	0.30	0.30	0.33	0.33	0.36	0.20	0.05	5	30%	0%
	Habitat Type (Circle One) Riffle Run Glide Pool ✔		Dominant Substrate Type Cobble												Dominant Types Riparian Vegetation: Left Bank: 60% Forb; 15% Tree; 10% Other; 10% Shrub Right Bank: 80% Other; 20% Forb		% Gravel or Larger 100%	
	Algae or Macrophytes (Circle One) Abundant Common Rare Absent ✔		Width of Natural Buffer Vegetation (m) LB: >20 RB: >20												Instream Cover Types: Undercut bank, Roots, Gravel, Boulder, Cobble, Algae		% Instream Cover 55%	

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect											Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
				Thalweg Depth:													
D4 ~105m up from D3 near bottom of riffle	5.49m	16	70%	0.08	0.15	0.10	0.08	0.04	0	0	0.01	0.13	0.09	0.02	3	10%	12%
	Habitat Type (Circle One) Riffle ✔ Run Glide Pool		Dominant Substrate Type Boulder												Dominant Types Riparian Vegetation: Left Bank: 70% Tree; 20% Shrub; 10% Other Right Bank: 80% Shrub; 10% Other; 10% Tree		% Gravel or Larger 100%	
	Algae or Macrophytes (Circle One) Abundant Common Rare ✔ Absent		Width of Natural Buffer Vegetation (m) LB: >20 RB: >20												Instream Cover Types: Boulder, Cobble, Macrophyte		% Instream Cover 55%	

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect											Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
				Thalweg Depth:													
D5 ~130m up from D4	9.14m	10	40%	0.02	0.08	0.20	0.20	0.20	0.19	0.15	0.15	0.18	0.13	0.03	10	30%	29%
	Habitat Type (Circle One) Riffle ✔ Run Glide Pool		Dominant Substrate Type Cobble												Dominant Types Riparian Vegetation: Left Bank: 40% Tree; 20% Shrub; 25% Forb; 15% Other Right Bank: 80% Shrub; 20% Tree		% Gravel or Larger 100%	
	Algae or Macrophytes (Circle One) Abundant Common Rare ✔ Absent		Width of Natural Buffer Vegetation (m) LB: >20 RB: >20												Instream Cover Types: Cobble, Boulder, Gravel, Macrophytes		% Instream Cover 50%	

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

Riparian

Pool 1
R. Ale - 11
Glide
Run - 1
Bank - Poor

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

Part I - Stream Physical Characteristics Worksheet

Observers: DL JW Date: 4/6/03 Time: 12 Weather conditions: cloudy

Stream: Onion Location of site: [illegible] Length of stream reach: 3km

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

Stream Type (Circle One): perennial or intermittent w/ perennial pools Stream Bends: No. Well Defined _ ; No. Moderately Defined _: No. Poorly Defined 1

Channel Obstructions/Modifications: LWC No. of Riffles: 2 Channel Flow Status (circle one): high moderate low no flow

Riparian Vegetation (%):
Left Bank: Trees 16 Shrubs 11 Grasses, Forbs 22 Cult. Fields _ Other 51
Right Bank: Trees 3 Shrubs 0 Grasses, Forbs 43 Cult. Fields _ Other 54

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect — Thalweg Depth: 1.38m/21 =											Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
	4.2	30	55%	0.10	0.05	0.10	0.09	0.12	0.15	0.16	0.23	0.20	0.14	0.04	20°	5%	11/17

	Habitat Type (Circle One) Riffle Run Glide Pool	Dominant Substrate Type	Dominant Types Riparian Vegetation	% Gravel or Larger
D1 65m down from LWC		Bedrock	Left Bank: 40% T; 20% F; 30% O; 10% S Right Bank: 90% O; 5% T; 5% F	95%
	Algae or Macrophytes (Circle One) Abundant Common Rare Absent	Width of Natural Buffer Vegetation (m) LB: 15m RB: >20m	Instream Cover Types: Gravel, Cobble, Boulder, Snag, Macrophytes, Algae	% Instream Cover 30%

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect — Thalweg Depth: .47											Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
	4.8m	35°	60%	0.22	0.46	0.49	0.51	0.50	0.45	0.56	0.58	0.53	1.64	0.24	90°	75%	0

	Habitat Type (Circle One) Riffle Run Glide Pool	Dominant Substrate Type	Dominant Types Riparian Vegetation	% Gravel or Larger
D2 Just above LWC		Bedrock	Left Bank: 100% Grass Right Bank: 80% F; 5% T; 15% O	100%
	Algae or Macrophytes (Circle One) Abundant Common Rare Absent	Width of Natural Buffer Vegetation (m) LB: 0m RB: 5m	Instream Cover Types: Algae, Macrophytes,	% Instream Cover 5%

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect — Thalweg Depth:	Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
D3 ~55m up from LWC	15m	20°	45%	0.03 0.47 0.51 0.55 0.63 0.63 0.66 0.66 0.62 0.56 0.16	35°	5%	2/17
	Habitat Type (Circle One) Riffle Run Glide Pool	Dominant Substrate Type: Bedrock	Dominant Types Riparian Vegetation: Left Bank: 20%T; 80%O; 20%F Right Bank: 35%O; 5%; 20%F			% Gravel or Larger: 100%	
	Algae or Macrophytes (Circle One) Abundant Common Rare Absent	Width of Natural Buffer Vegetation (m) LB: 20 RB: 5m	Instream Cover Types: Macrophytes, Algae (Benthic)			% Instream Cover: 15%	

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect — Thalweg Depth:	Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
D4 50m up from D3	7.9m	30°	30%	0.15 0.34 0.32 0.42 0.40 0.44 0.46 0.48 0.42 0.38 0.14	10°	60	2.5/17
	Habitat Type (Circle One) Riffle Run Glide Pool	Dominant Substrate Type: Bedrock	Dominant Types Riparian Vegetation: Left Bank: 40%O; 20%T; 10% F Right Bank: 65%O; 20%T; 15%F			% Gravel or Larger: 95%	
	Algae or Macrophytes (Circle One) Abundant Common Rare Absent	Width of Natural Buffer Vegetation (m) LB: 20 RB: 8m	Instream Cover Types: Macrophytes / Boulder, Algae			% Instream Cover: 5%	

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect — Thalweg Depth:	Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
65m up	19m	15°	70%	0.04 0.12 0.20 0.18 0.30 0.30 0.29 0.32 0.29 0.26 0.02	40°	95%	0
	Habitat Type (Circle One) Riffle Run Glide Pool	Dominant Substrate Type: Bedrock	Dominant Types Riparian Vegetation: Left Bank: 15%T; 15%S; 30%O, 40%F Right Bank: 10%T; 80%F; 10%O			% Gravel or Larger: 90%	
	Algae or Macrophytes (Circle One) Abundant Common Rare Absent	Width of Natural Buffer Vegetation (m) LB: 10m RB: 10m	Instream Cover Types: Gravel / Macrophytes, Algae, Cobble			% Instream Cover: 60%	

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect — Thalweg Depth:	Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
D6 55 up	15m	19°	0	0.04 0.13 0.20 0.17 0.15 0.04 0.04 0.07 0.08 0.02 0.02	10°	90%	0
	Habitat Type (Circle One) Riffle Run Glide Pool	Dominant Substrate Type: Bedrock	Dominant Types Riparian Vegetation: Left Bank: 40%S; 40%F; 20%O Right Bank: 60%F; 30%O; 10%T			% Gravel or Larger: 95%	
	Algae or Macrophytes (Circle One) Abundant Common Rare Absent	Width of Natural Buffer Vegetation (m) LB: 10 RB: 10m	Instream Cover Types: Gravel, Boulder, Cobble, Macrophytes			% Instream Cover: 60%	

Photos → D6 → D1
First

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

Part I - Stream Physical Characteristics Worksheet

Observers: PL, BB Date: 4/?/03 Time:__ Weather conditions:________

Stream: Drum Location of site: 19452 Length of stream reach: 250m

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

Stream Type (Circle One): perennial or intermittent w/ perennial pools Stream Bends: No. Well Defined_; No. Moderately Defined 1; No. Poorly Defined_

Channel Obstructions/Modifications: small cycle dam No. of Riffles: 2 Channel Flow Status (circle one): high moderate low no flow

Riparian Vegetation (%):
Left Bank: Trees 15 Shrubs 19 Grasses, Forbs 9? Cult. Fields_ Other 17
Right Bank: Trees 24 Shrubs 6 Grasses, Forbs 24 Cult. Fields_ Other 33

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect (Thalweg Depth:)											Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
D1 ~125m down from access pt	13	35°	30	10	30	44	49	53	53	70	92	73	87	12	30	85%	[illegible]

- Habitat Type (Circle One) Riffle Run Glide Pool
- Dominant Substrate Type: cobble
- Dominant Types Riparian Vegetation: Left Bank: 50% tree, 50% forb; Right Bank: ~~shrub, cypress, forb~~ 50% each
- % Gravel or Larger: 100
- Algae or Macrophytes (Circle One) Abundant Common Rare Absent
- Width of Natural Buffer Vegetation (m) LB: 220 RB: 220
- Instream Cover Types: cobble, gravel, boulder, cypress roots
- % Instream Cover: 60

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect (Thalweg Depth:)											Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
~40 up from D1	13	35	80%	14	62	112	120	112	105	116	96	74	56	3	60	30%	76

- Habitat Type (Circle One) Riffle Run Glide Pool
- Dominant Substrate Type: cobble
- Dominant Types Riparian Vegetation: Left Bank: ~~40% cypress, forbs~~ 35% shrub, 55% forb, 10% tree; Right Bank: 50% tree, 50% forb
- % Gravel or Larger: 50%
- Algae or Macrophytes (Circle One) Abundant Common Rare Absent
- Width of Natural Buffer Vegetation (m) LB: 220 RB: 220
- Instream Cover Types: cypress roots, cobble, gravel
- % Instream Cover: 50%

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect (Thalweg Depth)											Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
D3 ~60m up from D @ kiddie dam @ access point	12	35°		8	51	51	28	28	37	58	72	73	67	5	90	40%	[illegible]

Habitat Type (Circle One) Riffle Run Glide Pool

Dominant Substrate Type: cobble

Dominant Types Riparian Vegetation:
Left Bank:
Right Bank: 60% forb 30% shrub

% Gravel or Larger: 100

Algae or Macrophytes (Circle One) Abundant Common Rare Absent

Width of Natural Buffer Vegetation (m) LB: >20 RB: >20

Instream Cover Types: undercut bank, gravel, cobble

% Instream Cover: 75%

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect (Thalweg Depth)											Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
D4 ~50m up from D3	7m	40°	50%	2	9	12	23	29	38	56	60	60	34	3	10%	20%	11/17

Habitat Type (Circle One) Riffle Run Glide Pool

Dominant Substrate Type: cobble

Dominant Types Riparian Vegetation:
Left Bank: 5% tree 90% forb 15% shrub
Right Bank: 90% other, 15% tree, 10% shrub

% Gravel or Larger: 100

Algae or Macrophytes (Circle One) Abundant Common Rare Absent

Width of Natural Buffer Vegetation (m) LB: >20 RB: >20

Instream Cover Types: cobble, pool area, boulders 100%

% Instream Cover: 50%

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect (Thalweg Depth)											Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
D5 ~55m up from D4	13	22°	50%	5	23	38	20	23	22	22	11	10	7	2	15°	30	15/17

Habitat Type (Circle One) Riffle Run Glide Pool

Dominant Substrate Type: cobble

Dominant Types Riparian Vegetation:
Left Bank: 65% other, 25% forb, 10% tree
Right Bank: 10% tree, 90% other

% Gravel or Larger: 100

Algae or Macrophytes (Circle One) Abundant Common Rare Absent

Width of Natural Buffer Vegetation (m) LB: >20 RB: >20

Instream Cover Types: cobble, boulder

% Instream Cover: 50%

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect (Thalweg Depth)											Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)

Habitat Type (Circle One) Riffle Run Glide Pool

Dominant Substrate Type

Dominant Types Riparian Vegetation:
Left Bank:
Right Bank:

% Gravel or Larger

Algae or Macrophytes (Circle One) Abundant Common Rare Absent

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

Instream Cover Types:

% Instream Cover

Pool - 1
Raft
Glide 1
Run 1
Bend - 11P

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

Part I - Stream Physical Characteristics Worksheet

Observers: EH JW Date: 6/24/13 Time: 13 Weather conditions: S

Stream: Onion Location of site: [illegible] Length of stream reach: 200m

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

Stream Type (Circle One): perennial or intermittent w/ perennial pools Stream Bends: No. Well Defined: ; No. Moderately Defined: ; No. Poorly Defined: 2

Channel Obstructions/Modifications: None No. of Riffles: 0 Channel Flow Status (circle one): high moderate low no flow

Riparian Vegetation (%):
Left Bank: Trees: 8 Shrubs: 15 Grasses, Forbs: 19 Cult. Fields: Other: 63
Right Bank: Trees: 11 Shrubs: 21 Grasses, Forbs: 19 Cult. Fields: Other: 45

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect — Thalweg Depth: .7										Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
	Hm	25°	55%	0.10	0.72	0.10	0.18	0.66	0.67	0.14	0.05	0.05	0.10	0.03	39°	50%	9.5/17

U1 @ lg pool upstream narrow channel

Habitat Type (Circle One) Riffle Run Glide Pool	Dominant Substrate Type	Dominant Types Riparian Vegetation: Left Bank: 35%T; 10%S; 25%F; 30%O Right Bank: 25%T; 35%S; 30%O; 10%R	% Gravel or Larger
	Bedrock		80%

Algae or Macrophytes (Circle One) Abundant Common Rare Absent	Width of Natural Buffer Vegetation (m) LB: 720 RB: 720	Instream Cover Types: Root Wad Boulder, Macrophytes, Algae, Cobble	% Instream Cover
			35%

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect — Thalweg Depth: 0.73 .3/0										Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
	9.3m	34°	55%	0.02	0.24	0.20	0.20	0.37	0.45	0.54	0.52	0.46	0.44	0.40	105°	60%	0

U2 ~35 l min

Habitat Type (Circle One) Riffle Run Glide Pool	Dominant Substrate Type	Dominant Types Riparian Vegetation: Left Bank: 60%S; 20%F; 15%O Right Bank: 30%T; 30%S; 20%F; 20%O	% Gravel or Larger
	Bedrock		85%

Algae or Macrophytes (Circle One) Abundant Common Rare Absent	Width of Natural Buffer Vegetation (m) LB: 720m RB: 720m	Instream Cover Types: Undercut bank Boulder, Cobble, Macrophytes, Algae	% Instream Cover
			25%

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect — Thalweg Depth: .09											Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
U3 ~40 down from U2	3.4m	5°	0%	0.01	0.01	0.02	0.03	0.14	0.21	0.21	0.20	0.06	0.03	0.01	9°	10%	9.5/17

Habitat Type (Circle One) Riffle Run Glide Pool	Dominant Substrate Type	Dominant Types Riparian Vegetation	% Gravel or Larger
	Bedrock	Left Bank: 90% O 6% T; 5% S Right Bank: 80% S; 10% F 10% O	100%

Algae or Macrophytes (Circle One) Abundant Common Rare Absent	Width of Natural Buffer Vegetation (m) LB: RB:	Instream Cover Types:	% Instream Cover
	720 720	Cobble, Macrophytes, Algae	20%

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect — Thalweg Depth: .01											Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
U4 ~40 down from U3	5.0m	23°	60%	0.01	0.01	0.01	0.02	0	0.01	0	0.02	0	0.03	0.01	8°	10%	7/17

Habitat Type (Circle One) Riffle Run Glide Pool	Dominant Substrate Type	Dominant Types Riparian Vegetation	% Gravel or Larger
	Bedrock	Left Bank: 60% O 5% T; 5% S; 30% T Right Bank: 50% O 20% T; 15% S, 15% F	100%

Algae or Macrophytes (Circle One) Abundant Common Rare Absent	Width of Natural Buffer Vegetation (m) LB: RB:	Instream Cover Types:	% Instream Cover
	720 720	Cobble, Algae, Macrophyte	15%

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect — Thalweg Depth: 0.01											Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
U5 ~40m down from U4	8.8m	26°	0%	0.01	0.03	[illegible]	0	0.01	0.01	0.01	0	0.02	0.03	0.02	7°	30%	1/17

Habitat Type (Circle One) Riffle Run Glide Pool	Dominant Substrate Type	Dominant Types Riparian Vegetation	% Gravel or Larger
	Bedrock	Left Bank: 100% O [illegible] Right Bank: 10% T; 60% O; 30% S	75%

Algae or Macrophytes (Circle One) Abundant Common Rare Absent	Width of Natural Buffer Vegetation (m) LB: RB:	Instream Cover Types:	% Instream Cover
	720m 720m	Artificial, Leaf, Cobble	5%

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect — Thalweg Depth: .13											Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
U6 ~50m down	13.4m	5°	0	0.01	0.12	0.20	0.21	0.20	0.20	0.2	0.21	0.19	0.13	0.01	6°	0	0

Habitat Type (Circle One) Riffle Run Glide Pool	Dominant Substrate Type	Dominant Types Riparian Vegetation	% Gravel or Larger
	Bedrock	Left Bank: 80% O, 10% F 5% S; 5% T Right Bank: 100% O	90%

Algae or Macrophytes (Circle One) Abundant Common Rare Absent	Width of Natural Buffer Vegetation (m) LB: RB:	Instream Cover Types:	% Instream Cover
	720 720	Cobble Algae	2%

Glide
Run
Riffle - 1
Bend - M

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

Part I - Stream Physical Characteristics Worksheet

Observers: DL, JW, BH Date: 4/[illegible] Time: 8 Weather conditions: 5

Stream: Onion Location of site: [illegible] Length of stream reach: 300m

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

Stream Type (Circle One): perennial or intermittent w/ perennial pools Stream Bends: No. Well Defined_; No. Moderately Defined 1; No. Poorly Defined_

Channel Obstructions/Modifications: None No. of Riffles: 1 Channel Flow Status (circle one): high moderate low no flow

Riparian Vegetation (%):
Left Bank: Trees 15 Shrubs 24 Grasses, Forbs 34 Cult. Fields_ Other 19
Right Bank: Trees 18 Shrubs 13 Grasses, Forbs 42 Cult. Fields_ Other 27

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect — Thalweg Depth: .63										Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
	17.0m	30°	10%	0.05	0.55	0.86	0.63	0.56	0.54	0.54	0.55	0.84	1.10	0.06	30°	70%	11 | 17
D1 10m down from Cannon Bridge	Habitat Type (Circle One) Riffle Run Glide Pool	Dominant Substrate Type: Gravel	Dominant Types Riparian Vegetation: Left Bank: 65% F, 25% T, 10% S; Right Bank: 60% O, 30% F, 10% T												% Gravel or Larger: 100%	
	Algae or Macrophytes (Circle One) Abundant Common Rare Absent	Width of Natural Buffer Vegetation (m) LB: >20m RB: >20m	Instream Cover Types: Algae, Gravel, Cobble, Snag												% Instream Cover: 15%	

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect — Thalweg Depth: .07										Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
D2 ~30 down from bridge	11m	4°	15%	0.02	0.03	0.09	0.10	0.19	0.16	0.09	0.01	0.02	0.04	0.01	5	35%	0
	Habitat Type (Circle One) Riffle Run Glide Pool	Dominant Substrate Type: Cobble	Dominant Types Riparian Vegetation: Left Bank: 20% T, 40% O, 20% F, 20% S; Right Bank: 45% O, 30% T, 15% S, 10% F												% Gravel or Larger: 10%	
	Algae or Macrophytes (Circle One) Abundant Common Rare Absent	Width of Natural Buffer Vegetation (m) LB: >20 RB: >20	Instream Cover Types: Gravel, Cobble, Boulder, Macrophytes, Artificial												% Instream Cover: 60%	

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect — Thalweg Depth: .27											Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
D3 - ~20m Up from bridge	22m	29°	65%	0.09	0.41	0.24	0.30	0.22	0.23	0.25	0.35	0.33	0.31	0.05	57	40%	3/17

Habitat Type (Circle One) Riffle Run Glide Pool	Dominant Substrate Type	Dominant Types Riparian Vegetation: Left Bank: 15%T, 40% S 35% F, 10% O Right Bank:	% Gravel or Larger
	Gravel		100%

Algae or Macrophytes (Circle One) Abundant Common Rare Absent	Width of Natural Buffer Vegetation (m) LB: >10 RB: 5m	Instream Cover Types: Macrophyte, Algae, overhanging Veg, Artificial, Snag, Gravel, Cobble, Boulder	% Instream Cover
			35%

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect — Thalweg Depth: .87											Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
D4 100 up from bridge	15m	75°	90%	1.70	1.70	1.60	1.89	0.97	0.50	0.64	0.55	0.38	0.24	0.03	5°	50%	5.5/17

Habitat Type (Circle One) Riffle Run Glide Pool	Dominant Substrate Type	Dominant Types Riparian Vegetation: Left Bank: 50%T, 20%S 5% O; 25%F Right Bank: 30%T, 30% O, 30%F, 10% S	% Gravel or Larger
	Gravel		90%

Algae or Macrophytes (Circle One) Abundant Common Rare Absent	Width of Natural Buffer Vegetation (m) LB: >20 RB: >20	Instream Cover Types: Gravel, Cobble, Roots, Algae	% Instream Cover
			15%

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect — Thalweg Depth: .61											Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
D5 - 55 up from D4	15m	74°	85%	0.03	0.56	0.62	0.65	0.64	0.63	0.61	0.56	0.50	0.92	0.03	55°	85%	7.5/17

Habitat Type (Circle One) Riffle Run Glide Pool	Dominant Substrate Type	Dominant Types Riparian Vegetation: Left Bank: 25%T, 30% F 25% S, 20% O Right Bank: 85% F, 5% S, 10% O, 2%T	% Gravel or Larger
	Cobble		95%

Algae or Macrophytes (Circle One) Abundant Common Rare Absent	Width of Natural Buffer Vegetation (m) LB: >20 RB: >20	Instream Cover Types: Gravel, Cobble, Algae, Overhang Veg, Snag	% Instream Cover
			15%

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect — Thalweg Depth: .76											Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
D6 up from	15m	60	80%	0.03	0.71	0.45	0.79	0.79	0.81	0.88	0.83	0.97	1.01	0.64	90°	50%	100

Habitat Type (Circle One) Riffle Run Glide Pool	Dominant Substrate Type	Dominant Types Riparian Vegetation: Left Bank: 20%T, 20%S, 30% F, 10% O Right Bank: 60% F, 20%T, 10% S, 10% O	% Gravel or Larger
	Cobble		95%

Algae or Macrophytes (Circle One) Abundant Common Rare Absent	Width of Natural Buffer Vegetation (m) LB: >20 RB: >20	Instream Cover Types: Snag Overhanging, Algae, Macrophyte, Cobble, Gravel	% Instream Cover
			20%

Pool - 卌 11
Riffle - 卌
Run
Glide
Bend - W, W

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

Part I - Stream Physical Characteristics Worksheet

Observers: JW, BH Date: 4/15/07 Time: 12 Weather conditions: S

Stream: Dairon Location of site: 12436 Length of stream reach: 200m

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

Stream Type (Circle One): perennial or intermittent w/ perennial pools Stream Bends: No. Well Defined 4; No. Moderately Defined _; No. Poorly Defined _

Channel Obstructions/Modifications: Culvert No. of Riffles: 5 Channel Flow Status (circle one): high moderate low no flow

Riparian Vegetation (%):
Left Bank: Trees 15 Shrubs 14 Grasses, Forbs 14 Cult. Fields _ Other 42
Right Bank: Trees 15 Shrubs 15 Grasses, Forbs 15 Cult. Fields _ Other 51

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect; Thalweg Depth: 0.14											Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
D1 riffle - 15m from first bridge	5.9m	29°	0%	0.02	0.16	0.21	0.23	0.23	0.17	0.12	0.14	0.10	0.10	0.01	17°	0%	2.5/17

- Habitat Type (Circle One): Riffle Run Glide Pool — Riffle
- Dominant Substrate Type: Cobble
- Dominant Types Riparian Vegetation: Left Bank: 40% O, 40% F, 10% T, 10% S; Right Bank: 80% O, 15% S, 5% T
- % Gravel or Larger: 100%
- Algae or Macrophytes (Circle One): Abundant Common Rare Absent — Rare
- Width of Natural Buffer Vegetation (m): LB: >20 RB: >20
- Instream Cover Types: Gravel, Cobble, Boulder, Macrophytes, Algae
- % Instream Cover: 50%

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect; Thalweg Depth: 0.19											Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
D2 Under southbound bridge	4.1m	6°	50%	0.02	0.04	0.09	0.15	0.17	0.18	0.24	0.24	0.19	0.24	0.04	23°	70%	0

- Habitat Type (Circle One): Riffle Run Glide Pool — Riffle
- Dominant Substrate Type: Boulder
- Dominant Types Riparian Vegetation: Left Bank: 85% O, 15% F; Right Bank: 35% T, 30% S, 20% F, 15% O
- % Gravel or Larger: 100%
- Algae or Macrophytes (Circle One): Abundant Common Rare Absent — Common
- Width of Natural Buffer Vegetation (m): LB: 10m RB: >20m
- Instream Cover Types: Macrophytes, Gravel, Cobble, Boulder
- % Instream Cover: 65%

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect (Thalweg Depth: 0.45)											Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
D3 @ end of gravel bar, 1st bend above D2	9.6m	132°	75%	0.31	0.40	0.55	0.63	0.51	0.58	0.92	0.45	0.44	0.24	0.32	16°	0%	0

- Habitat Type (Circle One) Riffle Run Glide Pool: Pool (circled)
- Dominant Substrate Type: Silt
- Dominant Types Riparian Vegetation: Left Bank: 70% G; 15% S; 10% T; 5% F. Right Bank: 30% G; 20% T; 40% S; 10% F
- % Gravel or Larger: 35%
- Algae or Macrophytes (Circle One) Abundant Common Rare Absent: Abundant (circled)
- Width of Natural Buffer Vegetation (m) LB: >20 RB: >20
- Instream Cover Types: Gravel, Cobble, Algae; Overhang Veg, Roots, Undercut Bank
- % Instream Cover: 15%

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect (Thalweg Depth:)											Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
D4 @ 2nd riffle above D3 (400m)	6.3m	104°	60%	0.02	0.5	0.28	0.30	0.25	0.2	0.13	0.14	0.04	0.02	0.02	5°	0%	0%

- Habitat Type (Circle One) Riffle Run Glide Pool: Riffle
- Dominant Substrate Type: Cobble
- Dominant Types Riparian Vegetation: Left Bank: 30% F; 20% G; 25% S; 25% T. Right Bank: 70% G; 25% F; 5% S
- % Gravel or Larger: 100%
- Algae or Macrophytes (Circle One) Abundant Common Rare Absent: Common (circled)
- Width of Natural Buffer Vegetation (m) LB: >20 RB: >20
- Instream Cover Types: Algae, Gravel, Cobble, Boulder, Roots, Undercut Bank
- % Instream Cover: 40%

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect (Thalweg Depth:)											Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
D5 ~55 m up from D4	10.3m	51°	70%	0.03	0.23	0.32	0.44	0.45	0.45	0.48	0.48	0.42	0.20	0.02	11°	10%	3/17

- Habitat Type (Circle One) Riffle Run Glide Pool: Pool (circled)
- Dominant Substrate Type: Cobble
- Dominant Types Riparian Vegetation: Left Bank: 30% T; 50% F; 20% S; 20% G. Right Bank: 60% G; 35% F; 5% S
- % Gravel or Larger: 95%
- Algae or Macrophytes (Circle One) Abundant Common Rare Absent: Abundant
- Width of Natural Buffer Vegetation (m) LB: >20 RB: >20
- Instream Cover Types: Macrophytes, Snag, Gravel, Cobble
- % Instream Cover: 15%

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect (Thalweg Depth:)											Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)

- Habitat Type (Circle One) Riffle Run Glide Pool:
- Dominant Substrate Type:
- Dominant Types Riparian Vegetation: Left Bank: Right Bank:
- % Gravel or Larger:
- Algae or Macrophytes (Circle One) Abundant Common Rare Absent:
- Width of Natural Buffer Vegetation (m) LB: RB:
- Instream Cover Types:
- % Instream Cover:

12/23/03

Photos
D1 - U, DL, R
D2

Pool - II
Riffle - III
Glide - II
Run -
Bend - P

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

Part I - Stream Physical Characteristics Worksheet

Observers: VW, BH Date: 9/18/03 Time: Tm Weather conditions: Rain

Stream: Onion Location of site: 12454 Length of stream reach: 310m

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

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

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

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

4/5mm snag
5mm Lich

12/102

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect — Thalweg Depth: 0.25										Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
	4.3m	35°	0%	0.01	0.02	0.01	0.02	0.02	0.03	0.04	0.03	0.03	0.04	0.02	10°	10%	3.5/17
D1 65m down from LWC	Habitat Type (Circle One) Riffle Run Glide Pool	Dominant Substrate Type: Bedrock	Dominant Types Riparian Vegetation: Left Bank: 70% other; 15% T; 15% Forb Right Bank: 70% other; 5% T; 10% S; 15% F												% Gravel or Larger: 100%	
	Algae or Macrophytes (Circle One) Abundant Common Rare Absent	Width of Natural Buffer Vegetation (m) LB: 10m RB: >20m	Instream Cover Types: Leaf Pack; Boulder; Algae; Overhanging Veg												% Instream Cover: 15%	

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect — Thalweg Depth: 0.145										Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
	9.1m	3°	15%	0.01	0.11	0.16	0.18	0.19	0.20	0.19	0.20	0.19	0.15	0.01	8°	10%	0
D2 Just above LWC	Habitat Type (Circle One) Riffle Run Glide Pool	Dominant Substrate Type: Bedrock	Dominant Types Riparian Vegetation: Left Bank: 100% other Right Bank: 90% F; 10% other												% Gravel or Larger: 95%	
	Algae or Macrophytes (Circle One) Abundant Common Rare Absent	Width of Natural Buffer Vegetation (m) LB: 0m RB: 5m	Instream Cover Types: Algae, Macrophyte;												% Instream Cover: 35%	

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect — Thalweg Depth: 0.212											Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
D3 ~55m up from LWC	11.4m	15°	45%	0.02	0.13	0.16	0.23	0.27	0.32	0.33	0.32	0.27	0.22	0.06	22°	15%	1/17
	Habitat Type (Circle One) Riffle Run Glide Pool		Dominant Substrate Type: Bedrock			Dominant Types Riparian Vegetation: Left Bank: 10%T; 30%F; 30%S; 30% other Right Bank:									% Gravel or Larger: 95%		
	Algae or Macrophytes (Circle One) Abundant Common Rare Absent		Width of Natural Buffer Vegetation (m) LB: 16m RB: 10m			Instream Cover Types: Algae; Macrophytes; Leaf Pack									% Instream Cover: 35%		

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect — Thalweg Depth: 0.019											Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
D2 50m up from D3	4.8m	3°	5%	0.01	0.02	0.02	0.01	0.01	0.02	0.03	0.03	0.02	0.03	0.01	16°	20%	3.5/17
	Habitat Type (Circle One) Riffle Run Glide Pool		Dominant Substrate Type: Bedrock			Dominant Types Riparian Vegetation: Left Bank: 20%T; 20%F; 10%S; 50% other Right Bank:									% Gravel or Larger: 100%		
	Algae or Macrophytes (Circle One) Abundant Common Rare Absent		Width of Natural Buffer Vegetation (m) LB: >20m RB: 15m			Instream Cover Types: Leaf Packs; Algae;									% Instream Cover: 15%		

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect — Thalweg Depth: 0.017											Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
60m up D5	9.1m	5°	25%	0.01	0.10	0.12	0.06	0.00	0.01	0.05	0.13	0.15	0.15	0.04	30°	60%	2/17
	Habitat Type (Circle One) Riffle Run Glide Pool		Dominant Substrate Type: Gravel			Dominant Types Riparian Vegetation: Left Bank: 80%F; 5% Shr; 15% other Right Bank: 10%T; 65%F; 25% other									% Gravel or Larger: 90%		
	Algae or Macrophytes (Circle One) Abundant Common Rare Absent		Width of Natural Buffer Vegetation (m) LB: >20m RB: >20m			Instream Cover Types: Overhang; Undercut Gravel; Cobble; Algae; Leaf Pack; Macro									% Instream Cover: 50%		

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect — Thalweg Depth: 0.065											Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
55m?	12.1m	40°	5%	0.01	0.10	0.18	0.13	0.03	0.03	0.03	0.03	0.05	0.10	0.02	7°	10%	0
	Habitat Type (Circle One) Riffle Run Glide Pool		Dominant Substrate Type: Bedrock			Dominant Types Riparian Vegetation: Left Bank: 10%T; 10%S; 70%F; 10% Other Right Bank: 10%T; 5%S; 70%F; 15% other									% Gravel or Larger: 90%		
	Algae or Macrophytes (Circle One) Abundant Common Rare Absent		Width of Natural Buffer Vegetation (m) LB: >20m RB: 20m			Instream Cover Types: Algae; Leaf; Cobble; Macrophytes									% Instream Cover: 35%		

12/23/05

Ph.6 - D1 - Down

Riffle - 1
Pool - 11
Run -
Glide -
Rapid - M

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

Part I - Stream Physical Characteristics Worksheet

Observers: JW, BH Date: 9/18/03 Time: 1400 Weather conditions: PC

Stream: Onion Location of site: 12452 Length of stream reach: 250m

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

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

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

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

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect — Thalweg Depth: 0.175											Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
	8.4m	4°	20%	0.02	0.10	0.15	0.24	0.28	0.25	0.23	0.26	0.22	0.14	0.01	10°	20%	100%
D1 ~175m down from access pt.	Habitat Type (Circle One) Riffle Run Glide Pool	Dominant Substrate Type: Cobble	Dominant Types Riparian Vegetation: Left Bank: 25% T; 5% Sh; 40% F; 30% other. Right Bank: 15% T; 10% Sh; 40% F; 35% other													% Gravel or Larger: 100%	
	Algae or Macrophytes (Circle One) Abundant Common Rare Absent	Width of Natural Buffer Vegetation (m) LB: >20m RB: >20m	Instream Cover Types: Algae; Cobble; Gravel; Macrophyte; Roots													% Instream Cover: 40%	

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect — Thalweg Depth: 0.654											Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
	8.5m	20°	50%	0.30	0.87	0.93	0.91	0.90	0.86	0.81	0.70	0.51	0.32	0.03	44°	50%	11/17
D2 ~40m up	Habitat Type (Circle One) Riffle Run Glide Pool	Dominant Substrate Type: Gravel	Dominant Types Riparian Vegetation: Left Bank: 15% T; 10% S; 50% F; 25% O. Right Bank: 20% T; 10% S; 20% F; 40% O													% Gravel or Larger: 65%	
	Algae or Macrophytes (Circle One) Abundant Common Rare Absent	Width of Natural Buffer Vegetation (m) LB: >20 RB: >20	Instream Cover Types: Gravel, Algae, Roots, Macrophytes, Snags													% Instream Cover: 20%	

62.5/05

D3 Down UP

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect — Thalweg Depth: 0.193	Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
D3 just above small rock dock @ access pt	3.7m	7°	50%	0.02 | 0.10 | 0.12 | 0.12 | 0.19 | 0.21 | 0.29 | 0.35 | 0.38 | 0.29 | 0.01	86°	50%	6/17

Habitat Type (Circle One) Riffle Run Glide Pool	Dominant Substrate Type	Dominant Types Riparian Vegetation	% Gravel or Larger
	Gravel	Left Bank: 15%T; 35%S; 40%F; 10%O Right Bank: 20%T; 40%S; 30%F; 10%O	100%

Algae or Macrophytes (Circle One) Abundant Common Rare Absent	Width of Natural Buffer Vegetation (m) LB: RB:	Instream Cover Types:	% Instream Cover
	>20 >20	Gravel; Cobble; Algae; Snag; Boulder	35%

45 Each

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect — Thalweg Depth: 0.118	Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
D4 ~50 up from D3	5.1m	46°	55°	0.02 | 0.12 | 0.17 | 0.18 | 0.20 | 0.18 | 0.16 | 0.14 | 0.07 | 0.04 | 0.02	3°	0%	15/17

Habitat Type (Circle One) Riffle Run Glide Pool	Dominant Substrate Type	Dominant Types Riparian Vegetation	% Gravel or Larger
	Cobble	Left Bank: 15%T; 15%S; 50%F; 20%O Right Bank: 10%T; 25%S; 60%F; 5%O	80%

Algae or Macrophytes (Circle One) Abundant Common Rare Absent	Width of Natural Buffer Vegetation (m) LB: RB:	Instream Cover Types:	% Instream Cover
	>20 >20	Gravel; Cobble; Algae; Snag; Roots	35%

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect — Thalweg Depth: 0.034	Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
~55m up from D4	4.9m	11°	30%	0.01 | 0.05 | 0.03 | 0.05 | 0.04 | 0.04 | 0.03 | 0.03 | 0.05 | 0.03 | 0.01	3°	0%	100%

Habitat Type (Circle One) Riffle Run Glide Pool	Dominant Substrate Type	Dominant Types Riparian Vegetation	% Gravel or Larger
	Cobble	Left Bank: 15%T; 80%F; 5%O Right Bank: 25%T; 25%B; 40%F; 10%O	100%

Algae or Macrophytes (Circle One) Abundant Common Rare Absent	Width of Natural Buffer Vegetation (m) LB: RB:	Instream Cover Types:	% Instream Cover
	5m >20	Gravel; Cobble; Boulder; Leaf Pack; Snag; Algae	55%

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect — Thalweg Depth:	Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)

Habitat Type (Circle One) Riffle Run Glide Pool	Dominant Substrate Type	Dominant Types Riparian Vegetation	% Gravel or Larger
		Left Bank: Right Bank:	

Algae or Macrophytes (Circle One) Abundant Common Rare Absent	Width of Natural Buffer Vegetation (m) LB: RB:	Instream Cover Types:	% Instream Cover

U3 - Dam UP

12/23/03

Glide - 1
Pool - 11

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

Part I - Stream Physical Characteristics Worksheet

Observers: JW, BH Date: 9/18/03 Time: 1600 Weather conditions: S

Stream: Onion Location of site: 124+91 Length of stream reach: 26 am

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

Stream Type (Circle One): perennial or intermittent w/ perennial pools Stream Bends: No. Well Defined ; No. Moderately Defined : No. Poorly Defined 1

Channel Obstructions/Modifications: No. of Riffles: 0 Channel Flow Status (circle one): high moderate low no flow

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

3.5/102

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect — Thalweg Depth: 0.46											Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
	17.6m	6°	55%	0.02	0.60	0.67	0.72	0.57	0.53	0.60	0.54	0.49	0.30	0.02	38°	45%	3/17
@ lg pool	Habitat Type (Circle One) Riffle Run Glide Pool		Dominant Substrate Type: Bedrock				Dominant Types Riparian Vegetation: Left Bank: 20% T, 25% S, 35% F 20% other; Right Bank: 35% T, 30% S, 25% other 10% F								% Gravel or Larger: 80%		
	Algae or Macrophytes (Circle One) Abundant Common Rare Absent		Width of Natural Buffer Vegetation (m) LB: >20 RB: >20				Instream Cover Types: Algae, Macrophyte, Boulder, Snag, Overhang, Art.								% Instream Cover: 30%		

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect — Thalweg Depth: 0.16											Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
	6.4m	8°	55%	0.01	0.05	0.12	0.22	0.25	0.30	0.28	0.28	0.27	0.11	0.04	102°	60%	0
U2 - 35m down Under utility line	Habitat Type (Circle One) Riffle Run Glide Pool		Dominant Substrate Type: Bedrock				Dominant Types Riparian Vegetation: Left Bank: 90% F, 10% other; Right Bank: 90% F, 10% Other								% Gravel or Larger: 100%		
	Algae or Macrophytes (Circle One) Abundant Common Rare Absent		Width of Natural Buffer Vegetation (m) LB: 0 RB: 0				Instream Cover Types: Undercut Bank/Algae, Macrophytes								% Instream Cover: 25%		

New utility easement has been cleared

NO FLOW/WATER

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect — Thalweg Depth: 0	Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
U3 40 down from U2	0m	3°	0	0 →	20°	0%	0.5/17

Habitat Type (Circle One) Riffle Run Glide Pool	Dominant Substrate Type	Dominant Types Riparian Vegetation	% Gravel or Larger
Dry	Bedrock	Left Bank: 85%00 ; 10%T ; 5%F Right Bank: 25%T 25%S 35%F 15%0	100%

Algae or Macrophytes (Circle One) Abundant Common Rare Absent	Width of Natural Buffer Vegetation (m) LB: RB:	Instream Cover Types:	% Instream Cover
	720 720	Macrophytes	0%

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	0.018 Stream Depths (m) at Points Across Transect — Thalweg Depth:	Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
U4 ~40m down from U3	8.8m	2°	0%	0.01 0.02 0.02 0.02 0.03 0.01 0 0 0.01 0.01 0.01	10°	10%	0

Habitat Type (Circle One) Riffle Run Glide Pool	Dominant Substrate Type	Dominant Types Riparian Vegetation	% Gravel or Larger
	Bedrock	Left Bank: 75%00 ; 15%T ; 10%S ; 5%F Right Bank: 40%F ; 20%Sh 20%00 ; 20%F	100%

Algae or Macrophytes (Circle One) Abundant Common Rare Absent	Width of Natural Buffer Vegetation (m) LB: RB:	Instream Cover Types:	% Instream Cover
	720 720	Macrophytes' Algae	30%

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect 0.0058 — Thalweg Depth:	Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
U5 ~40m down from U4	8.9m	3°	0%	0.01 0.01 0.01 0 0 0.01 0.01 0.01 0.01 0.00 0.01	7°	0%	0

Habitat Type (Circle One) Riffle Run Glide Pool	Dominant Substrate Type	Dominant Types Riparian Vegetation	% Gravel or Larger
	Bedrock	Left Bank: 75%Other ; 15%T ; 5%Sh ; 5%F Right Bank: 25%T ; 35%Other ; 30%F ; 10%Sh	100%

Algae or Macrophytes (Circle One) Abundant Common Rare Absent	Width of Natural Buffer Vegetation (m) LB: RB:	Instream Cover Types:	% Instream Cover
	720 720	Algae	50%

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect .173 — Thalweg Depth:	Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
U6 55m down	7.0m	90	0%	0.01 0.11 0.21 0.24 0.25 0.26 0.26 0.29 0.28 0.22 0.03	14°	0%	0

Habitat Type (Circle One) Riffle Run Glide Pool	Dominant Substrate Type	Dominant Types Riparian Vegetation	% Gravel or Larger
	Bedrock	Left Bank: 30%T ; 20%S ; 10%F ; 30%Other Right Bank: 35%T 30% ; 10%F ; 25%Other	100%

Algae or Macrophytes (Circle One) Abundant Common Rare Absent	Width of Natural Buffer Vegetation (m) LB: RB:	Instream Cover Types:	% Instream Cover
	720 720	Algae ; Boulder ; Macrophyte	30%

12/23/03

1 pool
1 mod. bend

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

Part I - Stream Physical Characteristics Worksheet

Observers: MB, JW Date: 9/17/03 Time: 10 Weather conditions: PC

Stream: Onion Location of site: 12444 Length of stream reach: 300m

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

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

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

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

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect (Thalweg Depth: 0.533)	Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
	16.9	18°	60%	.01 | .71 | .40 | .29 | .38 | .55 | .70 | .86 | .84 | .63 | .49	13°	85%	12.5/17

32.5

D1 90m down from Wm Canon Bridge

Habitat Type (Circle One) Riffle Run Glide Pool

Dominant Substrate Type: gravel

Dominant Types Riparian Vegetation:
Left Bank: 20% tree 20% shrub 40% other 20% forbs
Right Bank: 15% tree 15% shrub 60% forbes 10% other

% Gravel or Larger: 70%

Algae or Macrophytes (Circle One) Abundant Common Rare Absent

Width of Natural Buffer Vegetation (m) LB: >20 RB: >20

Instream Cover Types: overhang ves. macrophytes gravel cobble, algae leaf pak snags undercut bank

% Instream Cover: 30%

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect (Thalweg Depth: 0.038)	Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
D2	10.8	69°	75%	.02 | .05 | 0 | 0 | 0 | 0 | .01 | .08 | .13 | .12 | .01	9°	45%	1.5/17

~30m down From bridge

Habitat Type (Circle One) Riffle Run Glide Pool

Dominant Substrate Type: cobble

Dominant Types Riparian Vegetation:
Left Bank: 15% tree 15% shrub 60% forbes 10% other
Right Bank: 35% tree 10% shrub 35% forbes 20% other

% Gravel or Larger: 95%

Algae or Macrophytes (Circle One) Abundant Common Rare Absent

Width of Natural Buffer Vegetation (m) LB: >20 RB: >20

Instream Cover Types: macrophytes, gravel, cobble, overhang veg snags, artificial

% Instream Cover: 50%

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect (Thalweg Depth: 0.24)											Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
D3 ~20m up from bridge	8.8	25°	65%	.15	.28	.43	.49	.41	.33	.21	.16	.10	.07	.01	20°	5%	0

Habitat Type (Circle One) Riffle Run Glide Pool	Dominant Substrate Type	Dominant Types Riparian Vegetation	% Gravel or Larger
	cobble	Left Bank: 5% tree 20% shrub 50% forbes 25% other Right Bank: 85% forbes 15% other	70%

Algae or Macrophytes (Circle One) Abundant Common Rare Absent	Width of Natural Buffer Vegetation (m)	Instream Cover Types	% Instream Cover
	LB: 0 RB: 0 utility easement overgrown	gravel cobble boulder macro. snags, artificial overhangs	20%

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect (Thalweg Depth: 0.83)											Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
D4 80m up from bridge	11.5	80°	90%	.90	1.10	1.27	1.20	1.15	.87	.76	.64	.51	.41	.31	12°	5%	7.5/17

Habitat Type (Circle One) Riffle Run Glide Pool	Dominant Substrate Type	Dominant Types Riparian Vegetation	% Gravel or Larger
	cobble	Left Bank: 40 tree 15 shrub 35 forbes 10 other Right Bank: 30 tree 20 shrub 25 forbes 25 other	80%

Algae or Macrophytes (Circle One) Abundant Common Rare Absent	Width of Natural Buffer Vegetation (m)	Instream Cover Types	% Instream Cover
	LB: >20 RB: >20	algae, macro, artificial gravel, cobble, boulder, leaf pac, roots	10%

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect (Thalweg Depth: 0.46)											Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
D5 140 m up from bridge	16.5	80°	95%	.01	.55	.61	.60	.61	.61	.58	.51	.48	.37	.09	46°	80%	4.5/17

Habitat Type (Circle One) Riffle Run Glide Pool	Dominant Substrate Type	Dominant Types Riparian Vegetation	% Gravel or Larger
	bedrock	Left Bank: 40 tree 25 shrub 25 forbes 10 other Right Bank: 80 tree 20 shrub 40 forbes 20 other	80%

Algae or Macrophytes (Circle One) Abundant Common Rare Absent	Width of Natural Buffer Vegetation (m)	Instream Cover Types	% Instream Cover
	LB: >20 RB: >20	gravel, cobble, algae, macro. leaf pak, overhang ves, artificial	25%

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect (Thalweg Depth: 0.66)											Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
D6 60m up From D5	15.1	38°	85%	.05	.65	.69	.69	.74	.75	.88	.90	.91	.86	.85	75°	90%	6.5/17

Habitat Type (Circle One) Riffle Run Glide Pool	Dominant Substrate Type	Dominant Types Riparian Vegetation	% Gravel or Larger
	gravel	Left Bank: 30 tree 45 grass 20 shrub 10 other Right Bank: 35 tree 10 shrub 35 forbes 20 other	60%

Algae or Macrophytes (Circle One) Abundant Common Rare Absent	Width of Natural Buffer Vegetation (m)	Instream Cover Types	% Instream Cover
	LB: >20 RB: >20	gravel, cobble, algae, leaf pak macro.	10%

12/23/03

riffle - 𝍸𝍷
pool - 𝍸 I
bend - II (well defined)
run - II
slide I

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

Part I - Stream Physical Characteristics Worksheet

Observers: [illegible] Date: [illegible]/19/03 Time: [illegible] Weather conditions: S/PC

Stream: Orion Location of site: 12436 Length of stream reach: 200m

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

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

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

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

4.5/85

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect (Thalweg Depth: 0.03)											Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
	2.95	6°	0%	.01	.04	.05	.08	.04	.03	.04	0	.01	.01	.01	30	0%	25/17
D1 @ riffle - 25m down from bridge	Habitat Type (Circle One) Riffle Run Glide Pool		Dominant Substrate Type: cobble	Dominant Types Riparian Vegetation: Left Bank: 10 tree 40 shrub 40 forbos 10 other; Right Bank: 70 other 10 tree 5 shrub 15 forbes												% Gravel or Larger: 100%	
	Algae or Macrophytes (Circle One) Abundant Common Rare Absent		Width of Natural Buffer Vegetation (m) LB: >20 RB: >20	Instream Cover Types: gravel, cobble, boulder, algae macro. overhang. veg.												% Instream Cover: 50%	

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect (Thalweg Depth: 0.08)											Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
D2 under south-bound bridge	5.9	15°	10%	.01	.01	.10	.09	.12	.08	.10	.12	.14	.10	.03	17°	35%	100% artificial
	Habitat Type (Circle One) Riffle Run Glide Pool		Dominant Substrate Type: cobble	Dominant Types Riparian Vegetation: Left Bank: 60 forbes 5 shrub 35 other; Right Bank: 15 tree 50 other 15 shrub 20 forbes												% Gravel or Larger: 95%	
	Algae or Macrophytes (Circle One) Abundant Common Rare Absent		Width of Natural Buffer Vegetation (m) LB: 0 RB: 0	Instream Cover Types: cobble, boulder, gravel, algae, artificial												% Instream Cover: 45%	

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect (Thalweg Depth: 0.165)											Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
D3 end of gravel bar, 1st bend above D2	8.1	80°	95%	.01	.22	.31	.27	.52	.26	.23	.11	.05	.03	.01	12°	5%	0
	Habitat Type (Circle One) Riffle Run Glide Pool		Dominant Substrate Type: cobble												Dominant Types Riparian Vegetation: Left Bank: 5 tree 20 shrub 40 forbes 35 other; Right Bank: 65 other 35 forbes		% Gravel or Larger: 75%
	Algae or Macrophytes (Circle One) Abundant Common Rare Absent		Width of Natural Buffer Vegetation (m) LB: >20 RB: >20												Instream Cover Types: overhang veg. algae macro. gravel cobble, snags		% Instream Cover: 25%

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect (Thalweg Depth: 0.044)											Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
D4 riffle 60m above D3	2.6	90	5%	.01	.03	.06	.11	.09	.07	.04	.02	.01	.03	.01	2°	0%	2/17
	Habitat Type (Circle One) Riffle Run Glide Pool		Dominant Substrate Type: cobble												Dominant Types Riparian Vegetation: Left Bank: 10 tree 15 shrub 40 forbes 15 other; Right Bank: 5 tree 10 shrub 45 forbes 40 other		% Gravel or Larger: 100%
	Algae or Macrophytes (Circle One) Abundant Common Rare Absent		Width of Natural Buffer Vegetation (m) LB: >20 RB: >20												Instream Cover Types: gravel, cobble, boulder, leaf pak, algae, macro.		% Instream Cover: 50%

Location of Transect	Stream Width (m)	Left Bank Slope (°)	Left Bank Erosion Potential (%)	Stream Depths (m) at Points Across Transect (Thalweg Depth: 0.079)											Right Bank Slope (°)	Right Bank Erosion Potential (%)	Tree Canopy (%)
D5 55.m up From D4	6.9	90	50%	.02	.04	.08	.13	.05	.10	.09	.06	.12	.13	.05	14°	50%	0
	Habitat Type (Circle One) Riffle Run Glide Pool		Dominant Substrate Type: cobble												Dominant Types Riparian Vegetation: Left Bank: 10 tree 15 shrub 40 forbes 35 other; Right Bank: 15 tree 30 shrub 40 forbes 15 other		% Gravel or Larger: 95%
	Algae or Macrophytes (Circle One) Abundant Common Rare Absent		Width of Natural Buffer Vegetation (m) LB: >20 RB: >20												Instream Cover Types: gravel, cobble, boulder, leaf pak, macro, algae		% Instream Cover: 50%

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

HABITAT ASSESSMENT

Part II – Summary of Physical Characteristics of Water Body

Part II - Summary of Physical Characteristics of Water Body

Stream name	Onion 12454
Date of assessment	8/19/2002
Stream bed slope over evaluated reach	0.0039
Approximate drainage area above transect furthest downstream	85km²
Stream order	4
Length of stream evaluated	310m
Number of lateral transects made	6
Average stream width	10.68m
Average stream depth	0.36m
Instantaneous flow	7.7 ft^3/sec
Indicate flow measurement method	Current Meter
Channel flow status	Moderate
Maximum pool width	8m
Maximum pool depth	.75m
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	3
Dominant substrate type	Bedrock
Average percent of substrate gravel sized or larger	29%
Average percent instream cover	27%
Number of stream cover types	7
Average percent stream bank erosion potential	33%
Average stream bank slope	23°
Average width of vegetative buffer	8m
Average riparian vegetation percent composition by:	
Trees	21%
Shrubs	14%
Grasses/Forbes	38%
Cultivated Fields	
Other	27%
Average percent tree canopy coverage	17%
Overall aesthetic appraisal of stream	Natural

Part II - Summary of Physical Characteristics of Water Body

Stream name	Onion 12452
Date of assessment	8/20/2002
Stream bed slope over evaluated reach	0.011
Approximate drainage area above transect furthest downstream	271km²
Stream order	4
Length of stream evaluated	250m
Number of lateral transects made	5
Average stream width	10.39m
Average stream depth	0.46m
Instantaneous flow	20.05 ft^3/sec
Indicate flow measurement method	Current Meter
Channel flow status	Moderate
Maximum pool width	10m
Maximum pool depth	>1m
Total number of stream bends	1
Number of well defined bends	0
Number of moderately defined bends	1
Number of poorly defined bends	0
Total number of riffles	2
Dominant substrate type	Cobble
Average percent of substrate gravel sized or larger	97%
Average percent instream cover	50%
Number of stream cover types	5
Average percent stream bank erosion potential	38%
Average stream bank slope	24°
Average width of vegetative buffer	13m
Average riparian vegetation percent composition by:	
Trees	27%
Shrubs	20%
Grasses/Forbes	13%
Cultivated Fields	
Other	40%
Average percent tree canopy coverage	94%
Overall aesthetic appraisal of stream	Natural

Part II - Summary of Physical Characteristics of Water Body

Stream name	Onion 12449
Date of assessment	8/21/2002
Stream bed slope over evaluated reach	0.0034
Approximate drainage area above transect furthest downstream	429km²
Stream order	4
Length of stream evaluated	180m
Number of lateral transects made	6
Average stream width	10.68m
Average stream depth	0.46m
Instantaneous flow	0.219 ft^3/sec
Indicate flow measurement method	Current Meter
Channel flow status	Low
Maximum pool width	25.6m
Maximum pool depth	1.21m
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	2
Dominant substrate type	Bedrock
Average percent of substrate gravel sized or larger	8%
Average percent instream cover	16%
Number of stream cover types	6
Average percent stream bank erosion potential	19%
Average stream bank slope	13°
Average width of vegetative buffer	>20m
Average riparian vegetation percent composition by:	
Trees	19%
Shrubs	28%
Grasses/Forbes	13%
Cultivated Fields	
Other	40%
Average percent tree canopy coverage	21%
Overall aesthetic appraisal of stream	Natural

Part II - Summary of Physical Characteristics of Water Body

Stream name	Onion 12444
Date of assessment	8/22/2002
Stream bed slope over evaluated reach	0.0054
Approximate drainage area above transect furthest downstream	742km²
Stream order	4
Length of stream evaluated	280m
Number of lateral transects made	6
Average stream width	12.69m
Average stream depth	0.48m
Instantaneous flow	2.312 ft^3/sec
Indicate flow measurement method	Current Meter
Channel flow status	Moderate
Maximum pool width	8m
Maximum pool depth	1.9m
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	Gravel
Average percent of substrate gravel sized or larger	73%
Average percent instream cover	43%
Number of stream cover types	8
Average percent stream bank erosion potential	51%
Average stream bank slope	54°
Average width of vegetative buffer	>20m
Average riparian vegetation percent composition by:	
Trees	38%
Shrubs	24%
Grasses/Forbes	12%
Cultivated Fields	
Other	26%
Average percent tree canopy coverage	47%
Overall aesthetic appraisal of stream	Common

Part II - Summary of Physical Characteristics of Water Body

Stream name	Onion 12436
Date of assessment	8/23/2002
Stream bed slope over evaluated reach	0.0101
Approximate drainage area above transect furthest downstream	838km²
Stream order	4
Length of stream evaluated	150m
Number of lateral transects made	5
Average stream width	4.89m
Average stream depth	0.13m
Instantaneous flow	2.078 ft^3/sec
Indicate flow measurement method	Current Meter
Channel flow status	Low
Maximum pool width	15m
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	5
Dominant substrate type	Cobble
Average percent of substrate gravel sized or larger	100%
Average percent instream cover	52%
Number of stream cover types	6
Average percent stream bank erosion potential	33%
Average stream bank slope	19°
Average width of vegetative buffer	>20m
Average riparian vegetation percent composition by:	
Trees	22%
Shrubs	33%
Grasses/Forbes	15%
Cultivated Fields	
Other	30%
Average percent tree canopy coverage	9%
Overall aesthetic appraisal of stream	Natural

Part II - Summary of Physical Characteristics of Water Body

Stream name	Onion 12454
Date of assessment	4/23/2003
Stream bed slope over evaluated reach	0.0039
Approximate drainage area above transect furthest downstream	85km²
Stream order	4
Length of stream evaluated	310m
Number of lateral transects made	6
Average stream width	11.5m
Average stream depth	0.125m
Instantaneous flow	
Indicate flow measurement method	
Channel flow status	Moderate
Maximum pool width	15m
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	2
Dominant substrate type	Bedrock
Average percent of substrate gravel sized or larger	95%
Average percent instream cover	29%
Number of stream cover types	6
Average percent stream bank erosion potential	49%
Average stream bank slope	24°
Average width of vegetative buffer	15m
Average riparian vegetation percent composition by:	
Trees	12%
Shrubs	6%
Grasses/Forbes	39%
Cultivated Fields	
Other	43%
Average percent tree canopy coverage	15%
Overall aesthetic appraisal of stream	Natural

Part II - Summary of Physical Characteristics of Water Body

Stream name	Onion 12452
Date of assessment	4/24/2003
Stream bed slope over evaluated reach	0.011
Approximate drainage area above transect furthest downstream	271km²
Stream order	4
Length of stream evaluated	250m
Number of lateral transects made	5
Average stream width	11.6m
Average stream depth	0.47m
Instantaneous flow	
Indicate flow measurement method	
Channel flow status	Moderate
Maximum pool width	12m
Maximum pool depth	.5m-1m
Total number of stream bends	1
Number of well defined bends	0
Number of moderately defined bends	1
Number of poorly defined bends	0
Total number of riffles	2
Dominant substrate type	Cobble
Average percent of substrate gravel sized or larger	90%
Average percent instream cover	57%
Number of stream cover types	4
Average percent stream bank erosion potential	47%
Average stream bank slope	37°
Average width of vegetative buffer	>20m
Average riparian vegetation percent composition by:	
Trees	19%
Shrubs	10%
Grasses/Forbes	43%
Cultivated Fields	
Other	28%
Average percent tree canopy coverage	62%
Overall aesthetic appraisal of stream	Natural

Part II - Summary of Physical Characteristics of Water Body

Stream name	Onion 12449
Date of assessment	4/24/2003
Stream bed slope over evaluated reach	0.0034
Approximate drainage area above transect furthest downstream	429km²
Stream order	4
Length of stream evaluated	180m
Number of lateral transects made	6
Average stream width	9.8m
Average stream depth	.025m
Instantaneous flow	
Indicate flow measurement method	
Channel flow status	Low
Maximum pool width	19m
Maximum pool depth	0.5-1m
Total number of stream bends	2
Number of well defined bends	0
Number of moderately defined bends	0
Number of poorly defined bends	2
Total number of riffles	0
Dominant substrate type	Bedrock
Average percent of substrate gravel sized or larger	92%
Average percent instream cover	17%
Number of stream cover types	7
Average percent stream bank erosion potential	26%
Average stream bank slope	24°
Average width of vegetative buffer	>20m
Average riparian vegetation percent composition by:	
Trees	11%
Shrubs	23%
Grasses/Forbes	12%
Cultivated Fields	
Other	54%
Average percent tree canopy coverage	21%
Overall aesthetic appraisal of stream	Natural

Part II - Summary of Physical Characteristics of Water Body

Stream name	Onion 12444
Date of assessment	4/25/2003
Stream bed slope over evaluated reach	0.0054
Approximate drainage area above transect furthest downstream	742km²
Stream order	4
Length of stream evaluated	280m
Number of lateral transects made	6
Average stream width	15.8m
Average stream depth	0.52m
Instantaneous flow	
Indicate flow measurement method	
Channel flow status	Moderate
Maximum pool width	22m
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	1
Dominant substrate type	Gravel
Average percent of substrate gravel sized or larger	97%
Average percent instream cover	27%
Number of stream cover types	8
Average percent stream bank erosion potential	57%
Average stream bank slope	44°
Average width of vegetative buffer	>20m
Average riparian vegetation percent composition by:	
Trees	22%
Shrubs	17%
Grasses/Forbes	38%
Cultivated Fields	
Other	23%
Average percent tree canopy coverage	38%
Overall aesthetic appraisal of stream	Common

Part II - Summary of Physical Characteristics of Water Body

Stream name	Onion 12436
Date of assessment	4/25/2003
Stream bed slope over evaluated reach	0.0101
Approximate drainage area above transect furthest downstream	838km²
Stream order	4
Length of stream evaluated	150m
Number of lateral transects made	5
Average stream width	8.24m
Average stream depth	0.16m
Instantaneous flow	
Indicate flow measurement method	
Channel flow status	Low
Maximum pool width	11m
Maximum pool depth	0.5-1m
Total number of stream bends	2
Number of well defined bends	2
Number of moderately defined bends	0
Number of poorly defined bends	0
Total number of riffles	5
Dominant substrate type	Cobble
Average percent of substrate gravel sized or larger	86%
Average percent instream cover	33%
Number of stream cover types	7
Average percent stream bank erosion potential	34%
Average stream bank slope	40°
Average width of vegetative buffer	>20m
Average riparian vegetation percent composition by:	
Trees	14%
Shrubs	16%
Grasses/Forbes	21%
Cultivated Fields	
Other	49%
Average percent tree canopy coverage	6%
Overall aesthetic appraisal of stream	Natural

Part II - Summary of Physical Characteristics of Water Body

Stream name	Onion 12454
Date of assessment	9/18/2003
Stream bed slope over evaluated reach	0.0039
Approximate drainage area above transect furthest downstream	85km²
Stream order	4
Length of stream evaluated	310m
Number of lateral transects made	6
Average stream width	8.47m
Average stream depth	0.128m
Instantaneous flow	
Indicate flow measurement method	
Channel flow status	Moderate
Maximum pool width	12m
Maximum pool depth	<0.5m
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	3
Dominant substrate type	Bedrock
Average percent of substrate gravel sized or larger	95%
Average percent instream cover	31%
Number of stream cover types	8
Average percent stream bank erosion potential	19%
Average stream bank slope	16
Average width of vegetative buffer	15m
Average riparian vegetation percent composition by:	
Trees	9%
Shrubs	10%
Grasses/Forbes	41%
Cultivated Fields	
Other	40%
Average percent tree canopy coverage	12%
Overall aesthetic appraisal of stream	Natural

Part II - Summary of Physical Characteristics of Water Body

Stream name	Onion 12452
Date of assessment	9/18/2003
Stream bed slope over evaluated reach	0.011
Approximate drainage area above transect furthest downstream	271km²
Stream order	4
Length of stream evaluated	250m
Number of lateral transects made	5
Average stream width	8.08
Average stream depth	0.23m
Instantaneous flow	
Indicate flow measurement method	
Channel flow status	Low
Maximum pool width	14m
Maximum pool depth	0.9m
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	1
Dominant substrate type	Cobble
Average percent of substrate gravel sized or larger	89%
Average percent instream cover	37%
Number of stream cover types	7
Average percent stream bank erosion potential	33%
Average stream bank slope	28
Average width of vegetative buffer	>20m
Average riparian vegetation percent composition by:	
Trees	18%
Shrubs	17%
Grasses/Forbes	45%
Cultivated Fields	
Other	20%
Average percent tree canopy coverage	74%
Overall aesthetic appraisal of stream	Natural

Part II - Summary of Physical Characteristics of Water Body

Stream name	Onion 12449
Date of assessment	9/18/2003
Stream bed slope over evaluated reach	0.0034
Approximate drainage area above transect furthest downstream	429km²
Stream order	4
Length of stream evaluated	180m
Number of lateral transects made	6
Average stream width	8.1m
Average stream depth	0.14m
Instantaneous flow	
Indicate flow measurement method	
Channel flow status	Low
Maximum pool width	18m
Maximum pool depth	0.6m
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	Bedrock
Average percent of substrate gravel sized or larger	97%
Average percent instream cover	28%
Number of stream cover types	7
Average percent stream bank erosion potential	20%
Average stream bank slope	20
Average width of vegetative buffer	>20m
Average riparian vegetation percent composition by:	
Trees	21%
Shrubs	15%
Grasses/Forbes	31%
Cultivated Fields	
Other	33%
Average percent tree canopy coverage	3%
Overall aesthetic appraisal of stream	Natural

Part II - Summary of Physical Characteristics of Water Body

Stream name	Onion 12444
Date of assessment	9/19/2003
Stream bed slope over evaluated reach	0.0054
Approximate drainage area above transect furthest downstream	742km²
Stream order	4
Length of stream evaluated	280m
Number of lateral transects made	6
Average stream width	13.3m
Average stream depth	0.46m
Instantaneous flow	
Indicate flow measurement method	
Channel flow status	Moderate
Maximum pool width	17m
Maximum pool depth	1.27m
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	Cobble
Average percent of substrate gravel sized or larger	76%
Average percent instream cover	24%
Number of stream cover types	9
Average percent stream bank erosion potential	65%
Average stream bank slope	49
Average width of vegetative buffer	>20m
Average riparian vegetation percent composition by:	
Trees	24%
Shrubs	15%
Grasses/Forbes	43%
Cultivated Fields	
Other	18%
Average percent tree canopy coverage	32%
Overall aesthetic appraisal of stream	Common

Part II - Summary of Physical Characteristics of Water Body

Stream name	Onion 12436
Date of assessment	9/19/2003
Stream bed slope over evaluated reach	0.0101
Approximate drainage area above transect furthest downstream	838km²
Stream order	4
Length of stream evaluated	150m
Number of lateral transects made	5
Average stream width	5.27m
Average stream depth	0.08m
Instantaneous flow	
Indicate flow measurement method	
Channel flow status	Moderate
Maximum pool width	9m
Maximum pool depth	<0.5m
Total number of stream bends	2
Number of well defined bends	2
Number of moderately defined bends	0
Number of poorly defined bends	0
Total number of riffles	5
Dominant substrate type	Cobble
Average percent of substrate gravel sized or larger	93%
Average percent instream cover	44%
Number of stream cover types	8
Average percent stream bank erosion potential	25%
Average stream bank slope	17
Average width of vegetative buffer	>20m
Average riparian vegetation percent composition by:	
Trees	8%
Shrubs	15%
Grasses/Forbes	40%
Cultivated Fields	
Other	37%
Average percent tree canopy coverage	5%
Overall aesthetic appraisal of stream	Natural

HABITAT ASSESSMENT

Part III – Habitat Quality Indices

Part III - Habitat Quality Index

Habitat Parameter	Scoring Category		Location: 12454	Date: 8/19/02
Available Instream Cover	**Abundant** >50% of substrate favorable for colonization and fish cover; good mix of several stable (not new fall or transient) cover types such as snags, cobble, undercut banks, macrophytes	**Common** 30-50% of substrate supports a stable habitat; adequate habitat for maintenance of populations; may be limited in the number of different habitat types	**Rare** 10-29.9% of substrate supports stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed	**Absent** <10% of substrate supports stable habitat; lack of habitat is obvious; substrate unstable or lacking
Score: 2	**4**	**3**	**2**	**1**
Bottom Substrate Stability	**Stable** >50% gravel or larger substrate, i.e., gravel, cobble, boulders; dominant substrate type is gravel or larger	**Moderately Stable** 30-50% gravel or larger substrate; dominant substrate type is mix of gravel with some finer sediments	**Moderately Unstable** 10-29.9% gravel or larger substrate; dominant substrate type is finer than gravel, but may still be in mix of sizes	**Unstable** <10% gravel or larger substrate; substrate is uniform sand, silt, clay, or bedrock
Score: 2	**4**	**3**	**2**	**1**
Number of Riffles To be counted, riffles must extend >50% the width of the channel and be at least as long as the channel width	**Abundant** ≥5 riffles	**Common** 2-4 riffles	**Rare** 1 riffle	**Absent** No riffles
Score: 3	**4**	**3**	**2**	**1**
Dimensions of Largest Pool	**Large** Pool covers more than 50% of the channel width; maximum depth is > 1m	**Moderate** Pool covers approximately 50% or slightly less than the channel width; maximum depth is 0.5-1 meter	**Small** Pool covers approximately 25% of the channel width; maximum depth is <0.5 meter	**Absent** No existing pools; only shallow 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: 2	**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: 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: 17	INTERMEDIATE			

Part III - Habitat Quality Index

Habitat Parameter	Scoring Category		Location: 12452	Date: 8/20/02
Available Instream Cover	**Abundant** >50% of substrate favorable for colonization and fish cover; good mix of several stable (not new fall or transient) cover types such as snags, cobble, undercut banks, macrophytes	**Common** 30-50% of substrate supports a stable habitat; adequate habitat for maintenance of populations; may be limited in the number of different habitat types	**Rare** 10-29.9% of substrate supports stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed	**Absent** <10% of substrate supports stable habitat; lack of habitat is obvious; substrate unstable or lacking
Score: 3	**4**	**3**	**2**	**1**
Bottom Substrate Stability	**Stable** >50% gravel or larger substrate, i.e., gravel, cobble, boulders; dominant substrate type is gravel or larger	**Moderately Stable** 30-50% gravel or larger substrate; dominant substrate type is mix of gravel with some finer sediments	**Moderately Unstable** 10-29.9% gravel or larger substrate; dominant substrate type is finer than gravel, but may still be in mix of sizes	**Unstable** <10% gravel or larger substrate; substrate is uniform sand, silt, clay, or bedrock
Score: 4	**4**	**3**	**2**	**1**
Number of Riffles To be counted, riffles must extend >50% the width of the channel and be at least as long as the channel width	**Abundant** ≥5 riffles	**Common** 2-4 riffles	**Rare** 1 riffle	**Absent** No riffles
Score: 3	**4**	**3**	**2**	**1**
Dimensions of Largest Pool	**Large** Pool covers more than 50% of the channel width; maximum depth is > 1m	**Moderate** Pool covers approximately 50% or slightly less than the channel width; maximum depth is 0.5-1 meter	**Small** Pool covers approximately 25% of the channel width; maximum depth is <0.5 meter	**Absent** No existing pools; only shallow auxillary pockets
Score: 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: 2	**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: 22	HIGH			

Part III - Habitat Quality Index

Habitat Parameter	Scoring Category		Location: 12449	Date: 8/21/02
Available Instream Cover	**Abundant** >50% of substrate favorable for colonization and fish cover; good mix of several stable (not new fall or transient) cover types such as snags, cobble, undercut banks, macrophytes	**Common** 30-50% of substrate supports a stable habitat; adequate habitat for maintenance of populations; may be limited in the number of different habitat types	**Rare** 10-29.9% of substrate supports stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed	**Absent** <10% of substrate supports stable habitat; lack of habitat is obvious; substrate unstable or lacking
Score: 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: 3	**4**	**3**	**2**	**1**
Dimensions of Largest Pool	**Large** Pool covers more than 50% of the channel width; maximum depth is > 1m	**Moderate** Pool covers approximately 50% or slightly less than the channel width; maximum depth is 0.5-1 meter	**Small** Pool covers approximately 25% of the channel width; maximum depth is <0.5 meter	**Absent** No existing pools; only shallow auxillary pockets
Score: 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: 1	**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: 2	**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: 12444	Date: 8/22/02
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: 4	**4**	**3**	**2**	**1**
Number of Riffles To be counted, riffles must extend >50% the width of the channel and be at least as long as the channel width	**Abundant** ≥5 riffles	**Common** 2-4 riffles	**Rare** 1 riffle	**Absent** No riffles
Score: 2	**4**	**3**	**2**	**1**
Dimensions of Largest Pool	**Large** Pool covers more than 50% of the channel width; maximum depth is > 1m	**Moderate** Pool covers approximately 50% or slightly less than the channel width; maximum depth is 0.5-1 meter	**Small** Pool covers approximately 25% of the channel width; maximum depth is <0.5 meter	**Absent** No existing pools; only shallow auxillary pockets
Score: 3	**3**	**2**	**1**	**0**
Channel Flow Status	**High** Water reaches the base of both the lower banks; <5% of channel substrate is exposed	**Moderate** Water fills <75% of the channel; or <25% of channel substrate is exposed	**Low** Water fills 25-75% of the available channel and/or riffle substrates are mostly exposed	**No Flow** Very little water in the channel and mostly present in standing pools; or stream is dry
Score: 2	**3**	**2**	**1**	**0**
Bank Stability	**Stable** Little evidence (<10%) of erosion bank failure; bank angles average <30°	**Moderately Stable** Some evidence (10-29.9%) of erosion or bank failure; small areas of erosion mostly healed over; bank angles average 30-39.9°	**Moderately Unstable** Evidence of erosion bank failure is common (30-50%); high potential of erosion during flooding; bank angles average 40-60°	**Unstable** Large and frequent evidence (>50%) of erosion or bank failure; raw areas frequent along steep banks; bank angles average <60°
Score: 1	**3**	**2**	**1**	**0**
Channel Sinuosity	**High** ≥2 well-defined bends with deep outside areas (cut banks) and shallow inside areas (point bars) are present	**Moderate** 1 well-defined bend OR ≥3 moderately-defined bends present	**Low** <3 moderately-defined bends OR only poorly-defined bends present	**None** Straight channel; may be channelized
Score: 1	**3**	**2**	**1**	**0**
Riparian Buffer Vegetation	**Extensive** Width of natural buffer is <20 meters	**Wide** Width of natural buffer is 10.1-20 meters	**Moderate** Width of natural buffer is 5-10 meters	**Narrow** Width of natural buffer is <5 meters
Score: 3	**3**	**2**	**1**	**0**
Aesthetics of Reach	**Wilderness** Outstanding natural beauty; usually wooded or unpastured area; water clarity is usually exceptional	**Natural Area** Tree and/or native vegetation common; some development evident (from fields, pastures, dwellings); water clarity may be slightly turbid	**Common Setting** Not offensive; area is developed, but uncluttered such as in an urban park; water clarity may be turbid or discolored	**Offensive** Stream does not enhance the aesthetics of the area; cluttered; highly developed; may be a dumping area; water clarity is usually turbid or discolored
Score: 1	**3**	**2**	**1**	**0**
Total Score: 20	HIGH			

Part III - Habitat Quality Index

Habitat Parameter	Scoring Category		Location: 12436	Date: 8/22/02
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: 4	4	3	2	1
Bottom Substrate Stability	**Stable** >50% gravel or larger substrate, i.e., gravel, cobble, boulders; dominant substrate type is gravel or larger	**Moderately Stable** 30-50% gravel or larger substrate; dominant substrate type is mix of gravel with some finer sediments	**Moderately Unstable** 10-29.9% gravel or larger substrate; dominant substrate type is finer than gravel, but may still be in mix of sizes	**Unstable** >10% gravel or larger substrate; substrate is uniform sand, silt, clay, or bedrock
Score: 4	4	3	2	1
Number of Riffles To be counted, riffles must extend >50% the width of the channel and be at least as long as the channel width	**Abundant** ≥5 riffles	**Common** 2-4 riffles	**Rare** 1 riffle	**Absent** No riffles
Score: 4	4	3	2	1
Dimensions of Largest Pool	**Large** Pool covers more than 50% of the channel width; maximum depth is > 1m	**Moderate** Pool covers approximately 50% or slightly less than the channel width; maximum depth is 0.5-1 meter	**Small** Pool covers approximately 25% of the channel width; maximum depth is <0.5 meter	**Absent** No existing pools; only shallow 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: 1	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: 23	HIGH			

Part III - Habitat Quality Index

Habitat Parameter	Scoring Category		Location: 12454	Date: 4/23/03
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: 4	**4**	**3**	**2**	**1**
Number of Riffles To be counted, riffles must extend >50% the width of the channel and be at least as long as the channel width	**Abundant** ≥5 riffles	**Common** 2-4 riffles	**Rare** 1 riffle	**Absent** No riffles
Score: 3	**4**	**3**	**2**	**1**
Dimensions of Largest Pool	**Large** 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: 2	**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: 12452	Date: 4/24/03
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: 4	**4**	**3**	**2**	**1**
Bottom Substrate Stability	**Stable** >50% gravel or larger substrate, i.e., gravel, cobble, boulders; dominant substrate type is gravel or larger	**Moderately Stable** 30-50% gravel or larger substrate; dominant substrate type is mix of gravel with some finer sediments	**Moderately Unstable** 10-29.9% gravel or larger substrate; dominant substrate type is finer than gravel, but may still be in mix of sizes	**Unstable** <10% gravel or larger substrate; substrate is uniform sand, silt, clay, or bedrock
Score: 4	**4**	**3**	**2**	**1**
Number of Riffles To be counted, riffles must extend >50% the width of the channel and be at least as long as the channel width	**Abundant** ≥5 riffles	**Common** 2-4 riffles	**Rare** 1 riffle	**Absent** No riffles
Score: 3	**4**	**3**	**2**	**1**
Dimensions of Largest Pool	**Large** Pool covers more than 50% of the channel width; maximum depth is > 1m	**Moderate** Pool covers approximately 50% or slightly less than the channel width; maximum depth is 0.5-1 meter	**Small** Pool covers approximately 25% of the channel width; maximum depth is <0.5 meter	**Absent** No existing pools; only shallow auxillary pockets
Score: 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: 2	**3**	**2**	**1**	**0**
Channel Sinuosity	**High** ≥2 well-defined bends with deep outside areas (cut banks) and shallow inside areas (point bars) are present	**Moderate** 1 well-defined bend OR ≥3 moderately-defined bends present	**Low** <3 moderately-defined bends OR only poorly-defined bends present	**None** Straight channel; may be channelized
Score: 1	**3**	**2**	**1**	**0**
Riparian Buffer Vegetation	**Extensive** Width of natural buffer is >20 meters	**Wide** Width of natural buffer is 10.1-20 meters	**Moderate** Width of natural buffer is 5-10 meters	**Narrow** Width of natural buffer is <5 meters
Score: 3	**3**	**2**	**1**	**0**
Aesthetics of Reach	**Wilderness** Outstanding natural beauty; usually wooded or unpastured area; water clarity is usually exceptional	**Natural Area** Tree and/or native vegetation common; some development evident (from fields, pastures, dwellings); water clarity may be slightly turbid	**Common Setting** Not offensive; area is developed, but uncluttered such as in an urban park; water clarity may be turbid or discolored	**Offensive** Stream does not enhance the aesthetics of the area; cluttered; highly developed; may be a dumping area; water clarity is usually turbid or discolored
Score: 2	**3**	**2**	**1**	**0**
Total Score: 23	HIGH			

Part III - Habitat Quality Index

Habitat Parameter	Scoring Category		Location: 12449	Date: 4/24/03
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: 4	**4**	**3**	**2**	**1**
Number of Riffles To be counted, riffles must extend >50% the width of the channel and be at least as long as the channel width	**Abundant** ≥5 riffles	**Common** 2-4 riffles	**Rare** 1 riffle	**Absent** No riffles
Score: 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: 1	**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: 2	**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: 12444	Date: 4/25/03
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: 4	**4**	**3**	**2**	**1**
Number of Riffles To be counted, riffles must extend >50% the width of the channel and be at least as long as the channel width	**Abundant** ≥5 riffles	**Common** 2-4 riffles	**Rare** 1 riffle	**Absent** No riffles
Score: 2	**4**	**3**	**2**	**1**
Dimensions of Largest Pool	**Large** Pool covers more than 50% of the channel width; maximum depth is > 1m	**Moderate** Pool covers approximately 50% or slightly less than the channel width; maximum depth is 0.5-1 meter	**Small** Pool covers approximately 25% of the channel width; maximum depth is <0.5 meter	**Absent** No existing pools; only shallow auxillary pockets
Score: 3	**3**	**2**	**1**	**0**
Channel Flow Status	**High** Water reaches the base of both the lower banks; <5% of channel substrate is exposed	**Moderate** Water fills <75% of the channel; or <25% of channel substrate is exposed	**Low** Water fills 25-75% of the available channel and/or riffle substrates are mostly exposed	**No Flow** Very little water in the channel and mostly present in standing pools; or stream is dry
Score: 2	**3**	**2**	**1**	**0**
Bank Stability	**Stable** Little evidence (<10%) of erosion bank failure; bank angles average <30°	**Moderately Stable** Some evidence (10-29.9%) of erosion or bank failure; small areas of erosion mostly healed over; bank angles average 30-39.9°	**Moderately Unstable** Evidence of erosion bank failure is common (30-50%); high potential of erosion during flooding; bank angles average 40-60°	**Unstable** Large and frequent evidence (>50%) of erosion or bank failure; raw areas frequent along steep banks; bank angles average <60°
Score: 1	**3**	**2**	**1**	**0**
Channel Sinuosity	**High** ≥2 well-defined bends with deep outside areas (cut banks) and shallow inside areas (point bars) are present	**Moderate** 1 well-defined bend OR ≥3 moderately-defined bends present	**Low** <3 moderately-defined bends OR only poorly-defined bends present	**None** Straight channel; may be channelized
Score: 1	**3**	**2**	**1**	**0**
Riparian Buffer Vegetation	**Extensive** Width of natural buffer is <20 meters	**Wide** Width of natural buffer is 10.1-20 meters	**Moderate** Width of natural buffer is 5-10 meters	**Narrow** Width of natural buffer is <5 meters
Score: 3	**3**	**2**	**1**	**0**
Aesthetics of Reach	**Wilderness** Outstanding natural beauty; usually wooded or unpastured area; water clarity is usually exceptional	**Natural Area** Tree and/or native vegetation common; some development evident (from fields, pastures, dwellings); water clarity may be slightly turbid	**Common Setting** Not offensive; area is developed, but uncluttered such as in an urban park; water clarity may be turbid or discolored	**Offensive** Stream does not enhance the aesthetics of the area; cluttered; highly developed; may be a dumping area; water clarity is usually turbid or discolored
Score: 1	**3**	**2**	**1**	**0**
Total Score: 19	INTERMEDIATE			

Part III - Habitat Quality Index

Habitat Parameter	Scoring Category		Location: 12436	Date: 4/25/03
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: 4	**4**	**3**	**2**	**1**
Number of Riffles To be counted, riffles must extend >50% the width of the channel and be at least as long as the channel width	**Abundant** ≥5 riffles	**Common** 2-4 riffles	**Rare** 1 riffle	**Absent** No riffles
Score: 4	**4**	**3**	**2**	**1**
Dimensions of Largest Pool	**Large** Pool covers more than 50% of the channel width; maximum depth is > 1m	**Moderate** Pool covers approximately 50% or slightly less than the channel width; maximum depth is 0.5-1 meter	**Small** Pool covers approximately 25% of the channel width; maximum depth is <0.5 meter	**Absent** No existing pools; only shallow 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: 1	**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: 3	**3**	**2**	**1**	**0**
Riparian Buffer Vegetation	**Extensive** Width of natural buffer is <20 meters	**Wide** Width of natural buffer is 10.1-20 meters	**Moderate** Width of natural buffer is 5-10 meters	**Narrow** Width of natural buffer is <5 meters
Score: 3	**3**	**2**	**1**	**0**
Aesthetics of Reach	**Wilderness** Outstanding natural beauty; usually wooded or unpastured area; water clarity is usually exceptional	**Natural Area** Tree and/or native vegetation common; some development evident (from fields, pastures, dwellings); water clarity may be slightly turbid	**Common Setting** Not offensive; area is developed, but uncluttered such as in an urban park; water clarity may be turbid or discolored	**Offensive** Stream does not enhance the aesthetics of the area; cluttered; highly developed; may be a dumping area; water clarity is usually turbid or discolored
Score: 2	**3**	**2**	**1**	**0**
Total Score: 23	HIGH			

Part III - Habitat Quality Index

Habitat Parameter	Scoring Category		Location: 12454	Date: 9/18/2003
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: 4	**4**	**3**	**2**	**1**
Number of Riffles To be counted, riffles must extend >50% the width of the channel and be at least as long as the channel width	**Abundant** ≥5 riffles	**Common** 2-4 riffles	**Rare** 1 riffle	**Absent** No riffles
Score: 3	**4**	**3**	**2**	**1**
Dimensions of Largest Pool	**Large** 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: 2	**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: 21	HIGH			

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Habitat Parameter	Scoring Category		Location: 12452	Date: 9/18/03
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: 4	**4**	**3**	**2**	**1**
Number of Riffles To be counted, riffles must extend >50% the width of the channel and be at least as long as the channel width	**Abundant** ≥5 riffles	**Common** 2-4 riffles	**Rare** 1 riffle	**Absent** No riffles
Score: 2	**4**	**3**	**2**	**1**
Dimensions of Largest Pool	**Large** Pool covers more than 50% of the channel width; maximum depth is > 1m	**Moderate** Pool covers approximately 50% or slightly less than the channel width; maximum depth is 0.5-1 meter	**Small** Pool covers approximately 25% of the channel width; maximum depth is <0.5 meter	**Absent** No existing pools; only shallow auxillary pockets
Score: 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: 1	**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: 2	**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: 20	HIGH			

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Habitat Parameter	Scoring Category		Location: 12449	Date: 9/18/03
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: 4	**4**	**3**	**2**	**1**
Number of Riffles To be counted, riffles must extend >50% the width of the channel and be at least as long as the channel width	**Abundant** ≥5 riffles	**Common** 2-4 riffles	**Rare** 1 riffle	**Absent** No riffles
Score: 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: 1	**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: 2	**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			

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Habitat Parameter	Scoring Category		Location: 12444	Date: 9/19/03
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: 4	**4**	**3**	**2**	**1**
Number of Riffles To be counted, riffles must extend >50% the width of the channel and be at least as long as the channel width	**Abundant** ≥5 riffles	**Common** 2-4 riffles	**Rare** 1 riffle	**Absent** No riffles
Score: 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: 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: 1	**3**	**2**	**1**	**0**
Total Score: 18	INTERMEDIATE			

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Habitat Parameter	Scoring Category		Location: 12436	Date: 9/19/03
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: 4	**4**	**3**	**2**	**1**
Number of Riffles To be counted, riffles must extend >50% the width of the channel and be at least as long as the channel width	**Abundant** ≥5 riffles	**Common** 2-4 riffles	**Rare** 1 riffle	**Absent** No riffles
Score: 4	**4**	**3**	**2**	**1**
Dimensions of Largest Pool	**Large** Pool covers more than 50% of the channel width; maximum depth is > 1m	**Moderate** Pool covers approximately 50% or slightly less than the channel width; maximum depth is 0.5-1 meter	**Small** Pool covers approximately 25% of the channel width; maximum depth is <0.5 meter	**Absent** No existing pools; only shallow 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: 2	**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: 3	**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: 25	HIGH			