

Metropolitan Water Reclamation District of Greater Chicago

MONITORING AND RESEARCH DEPARTMENT

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IN THE CHICAGO, CALUMET, AND

DES PLAINES RIVER SYSTEMS:

A SUMMARY OF BIOLOGICAL SAMPLING, AND HABITAT

ASSESSMENTS DURING 2012

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AMBIENT WATER QUALITY MONITORING IN THE CHICAGO, CALUMET, AND DES PLAINES RIVER SYSTEMS: A SUMMARY OF BIOLOGICAL SAMPLING AND HABITAT ASSESSMENTS DURING 2012

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DISCLAIMER

Mention of proprietary equipment and chemicals in this report does not constitute endorsement by the Metropolitan Water Reclamation District of Greater Chicago.

INTRODUCTION

The Metropolitan Water Reclamation District of Greater Chicago (District) began monitoring the biological component of the Ambient Water Quality Monitoring (AWQM) Program at 59 sampling stations on 21 waterways in 2001. The biological monitoring portion of the AWQM Program operates on a four-year cycle, with a primary focus on a different river system in the entire service area each year. The four river systems of interest are the northern portion of the Chicago River System (NPCRS), the southern portion of the Chicago River System (SPCRS), the Calumet River System (CRS), and the Des Plaines River System (DPRS). Fifteen of the 59 stations located across all of the waterways are monitored annually based on their proximity to District water reclamation plants (WRPs) or municipal boundaries. Of the remaining 44 sampling stations, 12 are on the NPCRS, 8 are on the SPCRS, 10 are on the CRS, 13 are on the DPRS, and 1 station is on the Fox River System. During 2012, biological monitoring focused on the DPRS, including the Des Plaines River (DPR), Buffalo Creek, Higgins Creek, Salt Creek, and the West Branch DuPage River (WBDPR). One station was also monitored on the Fox River System in Poplar Creek. This report documents the biological and habitat quality monitored during 2012.

In addition to the AWQM Program data being used to assess the impact of the District's WRPs, our data are often shared with other governmental agencies, non-governmental organizations, and academic institutions.

DESCRIPTION OF THE STUDY AREA

Chicago, Calumet, and Des Plaines River Systems

The District service area waterways consist of man-made canals as well as natural streams which have been altered to varying degrees. Some natural waterways have been modified by being deepened, straightened, and/or widened to such an extent that reversion to their natural state would be impossible. The waterways serve the Chicago area by draining urban stormwater runoff and treated municipal wastewater effluent and allowing commercial navigation in the deep-draft portions.

The primary man-made waterways include the North Shore Channel (NSC), connecting Lake Michigan at Wilmette to the North Branch Chicago River (NBCR); the Chicago Sanitary and Ship Canal (CSSC), extending from Damen Avenue to the Lockport Powerhouse; and the CSC, connecting the LCR with the CSSC. The primary natural waterways include the wadeable branches of the NBCR, flowing south from Lake County to the confluence with the NSC and continuing as the deep-draft portion of the NBCR, which joins the Chicago River and becomes the South Branch Chicago River; the DPR, flowing south from Lake County and joining with the discharge from the CSSC downstream of the Lockport Powerhouse; and the Calumet River, which flows south into the LCR.

Sampling Stations

The sampling stations for the AWQM Program are located on natural and man-made waterways throughout the District's service area. A map of the Chicago area waterways, including the 59 sampling stations and the District's WRPs, is shown in <u>Figure 1</u>. Stations were primarily selected so that there was at least one monitoring station on the lower end of an Illinois Environmental Protection Agency 303(d)-impaired waterway segment in 1998. Secondary criteria for selecting sampling locations included: (1) above and below District WRPs, (2) below Lake Michigan diversion points, (3) above the junction of two major waterways, (4) below county municipal boundaries, and (5) in areas of environmental concern. Fifteen of the 59 stations were chosen for annual biological monitoring.

In addition to the annual stations, biological sampling was performed at 13 stations in the DPRS during 2012, including the DPR, Buffalo Creek, Salt Creek, Higgins Creek, and WBDPR. Biological sampling was also performed at one station on Poplar Creek, which is a part of the Fox River System. <u>Table 1</u> shows the 2012 field monitoring schedule for fish sampling and physical habitat assessments.

FIGURE 1: AMBIENT WATER QUALITY MONITORING PROGRAM SAMPLING STATIONS

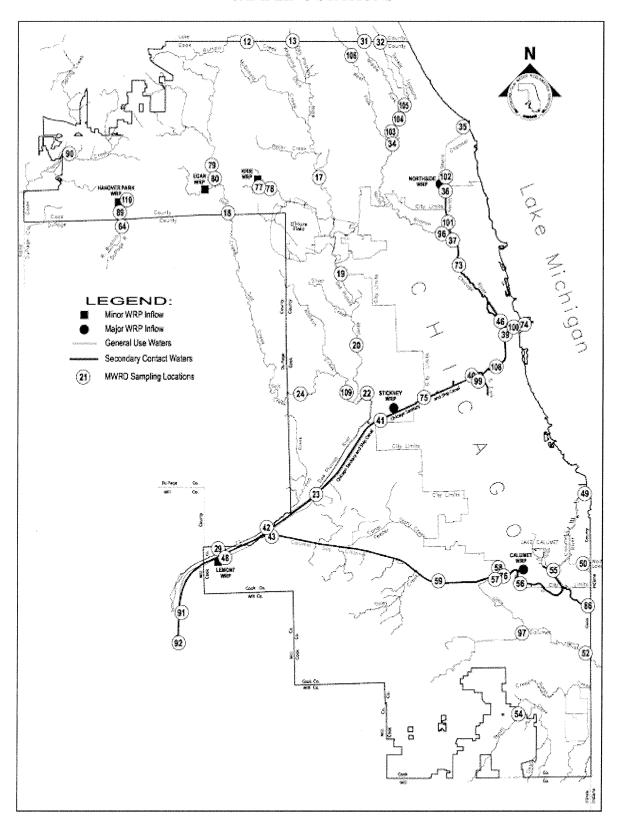


TABLE 1: SAMPLING DATES AT THE AMBIENT WATER QUALITY MONITORING PROGRAM STATIONS DURING 2012

Station No.	Sampling Station	Waterway	Date Sampled
		CHICAGO RIVER SYSTEM	
96	Albany Avenue ¹	North Branch Chicago River	06/21/12
36	Touhy Avenue ¹	North Shore Channel	09/18/12
46	Grand Avenue ¹	North Branch Chicago River	09/06/12
75	Cicero Avenue ¹	Chicago Sanitary & Ship Canal	07/20/12
41	Harlem Avenue ¹	Chicago Sanitary & Ship Canal	07/20/12
92	Lockport ¹	Chicago Sanitary & Ship Canal	08/17/12
		CALUMET RIVER SYSTEM	
49	Ewing Avenue	Calumet River	09/12/12
55	130 th Street ¹	Calumet River	09/10/12
56	Indiana Avenue	Little Calumet River	08/30/12
	<u>D</u>	ES PLAINES RIVER SYSTEM	
12	Lake-Cook Road	Buffalo Creek	06/26/12
77	Elmhurst Road	Higgins Creek	06/18/12
78	Wille Road ¹	Higgins Creek	06/18/12
79	Higgins Road	Salt Creek	07/09/12
80	Arlington Heights Rd.	Salt Creek	07/10/12
18	Devon Avenue ¹	Salt Creek	07/23/12
24	Wolf Road	Salt Creek	08/01/12
109	Brookfield Avenue	Salt Creek	07/17/12
13	Lake-Cook Road ¹	Des Plaines River	06/29/12
17	Oakton Street	Des Plaines River	07/12/12
19	Belmont Avenue	Des Plaines River	07/11/12
20	Roosevelt Road	Des Plaines River	09/25/12

TABLE 1 (Continued): DATES THAT AMBIENT WATER QUALITY MONITORING PROGRAM STATIONS WERE SAMPLED DURING 2012

Station No.	Sampling Station	Waterway	Date Sampled
	DES PL	AINES RIVER SYSTEM(Continued)	
22	Ogden Avenue ¹	Des Plaines River	07/16/12
23	Willow Springs Road	Des Plaines River	08/03/12
29	Stephen Street	Des Plaines River	08/10/12
91	Material Service Rd. ¹	Des Plaines River	06/25/12
110	Springinsguth Road	West Branch DuPage River	06/20/12
89	Walnut Lane	West Branch DuPage River	06/20/12
64	Lake Street ¹	West Branch DuPage River	06/19/12
		FOX RIVER SYSTEM	
90	Route 19	Poplar Creek	06/22/12

¹Annual sampling station.

MATERIALS AND METHODS

Habitat

Calculating Qualitative Habitat Evaluation Index Scores. The Qualitative Habitat Evaluation Index (QHEI) was created by the Ohio Environmental Protection Agency to determine the suitability of a stretch of waterway to fish and macroinvertebrates based on physical habitat characteristics (Rankin, 1989). The index was developed to assess wadeable streams, not deep-draft channels such as those prevalent in the Chicago area. Therefore, only wadeable stations were assessed using the QHEI. Appendix A shows the QHEI Field Assessment Form. Habitat scores were calculated using the Ohio QHEI procedures for assessing the quality of substrates, instream cover, channel morphology, riparian zone/erosion, pool and riffle/run development, and stream gradient. Sites were then classified as excellent, good, fair, poor, or very poor based on their ability to support aquatic life in reference to habitat (Rankin, 2004). The classification ranges were as follows:

≥75	Excellent
60-74	Good
46-59	Fair
30-45	Poor
<30	Very Poor

Fish

Boatable Stream Sampling. Fish were collected at each sampling station using a boat-mounted electrofisher powered by a direct current (DC) generator. Stunned fish were collected from the water with long-handled dip nets. For deep-draft sites, the section of canal sampled extended for 400 meters. For most shallow sites that were too deep to wade, a 100-meter section of waterway was sampled. Whenever possible, both sides of the waterways were electrofished.

Wadeable Stream Sampling. Fish were collected at each sampling station using a DC backpack electrofisher and a bag seine. Conductivity and temperature in degree of Celsius (°C) were recorded before each sample collection. In most instances, two 40-meter long backpack electrofisher collections were conducted at each station. A 40-meter reach of the creek was electrified by moving upstream parallel to the bank. Additional personnel followed the electrofisher, collecting the stunned fish with dip nets. Following the first collection, a second 40-meter electrofishing survey was conducted on the opposite bank. If the creek was less than five meters

wide, electrofishing was done only once along a 40-meter reach. The total electrofishing time during each 40-meter collection was noted.

A 15-foot bag seine with 3/16-inch mesh was also used to collect fish. Staff pulled the seine for 40 meters traveling upstream parallel to the bank. In most instances, a separate 40-meter seine collection was done along each bank.

Fish Processing. In the field, most fish were identified to species, weighed to the nearest gram or nearest 0.1 gram (depending on size), measured for standard and total length to the nearest millimeter, and examined for the incidence of disease, parasites, or other anomalies. Following processing, these fish were returned live to the river. Minnows and other small fish that were difficult to identify were preserved in a 10 percent formalin solution and returned to the laboratory for further analysis. These fish were processed in a similar manner to the field-measured fish except that they were weighed to the nearest 0.01 gram.

Index of Biotic Integrity. Biological integrity of aquatic ecosystems has been defined as the ability to support and maintain a balanced, integrated, and adaptive community having a species composition, diversity, and functional organization comparable to that of a natural habitat (Karr et al., 1986). Karr's 1986 Index of Biotic Integrity (IBI) was used to analyze fish data from 2012.

The limitations of using this tool, which was meant to apply to wadeable streams, for some of the man-made, channelized waterways in the Chicago area should be recognized.

Karr's IBI integrates information from 12 fish community metrics that fall into three major categories: (1) species richness and composition, (2) trophic composition, and (3) fish abundance and condition. Each metric is scored 1, 3, or 5 based on whether its evaluation deviates strongly, deviates somewhat, or approximates expectations, respectively, as compared to an undisturbed site located in a similar geographical region and on a stream of comparable size. Individual metrics are added to calculate a total IBI score. A high IBI indicates high biological integrity or health and low disturbance or lack of perturbations. A low IBI indicates low biological integrity and high disturbance or degradation. Separate IBI metric scores were determined based on the relative abundance of fish collected with each fishing gear. The scores were used to determine IBI categories of good (41-60), fair (21-40) or poor (<21), as derived by the IEPA (IEPA, 1996).

RESULTS

Habitat

Table 2 shows the QHEI scores and ratings for the 20 wadeable stations in the DPRS and Fox River System assessed in 2012. The completed QHEI Field Assessment Forms for each station are provided in Appendix B.

Fish

IBI scores calculated for each AWQM station and collection method are shown in <u>Table 3</u>. Springinsguth Road on the WBDPR was sampled, but did not yield any fish. Twenty-nine species of fish, including 12 game fish species, were collected from deep-draft stations, and 33 species of fish, including 13 game fish species, were collected from wadeable stations during 2012. A state threatened species, the Banded killifish (*Fundulus diaphanus*), was collected at 130^{th} Street station on the Calumet River. <u>Tables 4 – 7</u> show the number and total weight of fish collected from each station during 2012.

TABLE 2: SUMMARY OF QUALITATIVE HABITAT EVALUATION INDEX SCORES FOR WADEABLE SAMPLING STATIONS DURING 2012

Station No.	Station Name	Waterway	QHEI Score	Habitat Rating
12	Lake-Cook Road	Buffalo Creek	51	Fair
77	Elmhurst Road	Higgins Creek	47	Poor
78	Wille Road	Higgins Creek	21	Very Poor
79	Higgins Road	Salt Creek	52	Fair
80	Arlington Heights Rd.	Salt Creek	57	Fair
18	Devon Avenue	Salt Creek	58	Fair
24	Wolf Road	Salt Creek	49	Fair
109	Brookfield Avenue	Salt Creek	61	Good
13	Lake-Cook Road	Des Plaines River	47	Fair
17	Oakton Street	Des Plaines River	49	Fair
19	Belmont Avenue	Des Plaines River	62	Good
20	Roosevelt Road	Des Plaines River	51	Fair
22	Ogden Avenue	Des Plaines River	52	Fair *
23	Willow Springs Road	Des Plaines River	48	Fair
29	Stephen Street	Des Plaines River	53	Fair
91	Material Service Rd.	Des Plaines River	73	Good
110	Springinsguth Road	West Branch DuPage River	34	Poor
89	Walnut Lane	West Branch DuPage River	58	Fair
64	Lake Street	West Branch DuPage River	46	Fair
90	Route 19	Poplar Creek	63	Good

QHEI=Qualitative Habitat Evaluation Index.

TABLE 3: INDEX OF BIOTIC INTEGRITY SCORE AND CATEGORY BY STATION DURING 2012

Station No.	Location	Waterway	Sample Gear	IBI Score	IBI Category
36	Touhy Avenue	North Shore Channel	Small EF Boat	32	Fair
96	Albany Avenue	North Branch Chicago River	BP	24	Fair
96	Albany Avenue	North Branch Chicago River	Seine	26	Fair
46	Grand Avenue	North Branch Chicago River	Small EF Boat	26	Fair
75	Cicero Avenue	Chicago Sanitary and Ship Canal	Small EF Boat	28	Fair
41	Harlem Avenue	Chicago Sanitary and Ship Canal	Small EF Boat	36	Fair
92	Lockport	Chicago Sanitary and Ship Canal	Small EF Boat	26	Fair
55	130 th Street	Calumet River	Small EF Boat	42	Good
76	Halsted Street	Little Calumet River	Small EF Boat	38	Fair
59	Cicero Avenue	Calumet-Sag Channel	Small EF Boat	30	Fair
12	Lake-Cook Road	Buffalo Creek	BP	30	Fair
12	Lake-Cook Road	Buffalo Creek	Seine	34	Fair
13	Lake-Cook Road	Des Plaines River	BP	26	Fair
13	Lake-Cook Road	Des Plaines River	Seine	36	Fair
17	Oakton Street	Des Plaines River	Small EF Boat	32	Fair
19	Belmont Avenue	Des Plaines River	Small EF Boat	34	Fair
20	Roosevelt Road	Des Plaines River	Small EF Boat	22	Fair
22	Ogden Avenue	Des Plaines River	BP	34	Fair
22	Ogden Avenue	Des Plaines River	Seine	32	Fair
23	Willow Springs Road	Des Plaines River	Small EF Boat	28	Fair
29	Stephen Street	Des Plaines River	BP	32	Fair
29	Stephen Street	Des Plaines River	Seine	30	Fair
91	Material Services Road	Des Plaines River	BP	28	Fair
91	Material Services Road	Des Plaines River	Seine	34	Fair
77	Elmhurst Road	Higgins Creek	BP	28	Fair
77	Elmhurst Road	Higgins Creek	Seine	26	Fair
78	Wille Road	Higgins Creek	BP	22	Fair
78	Wille Road	Higgins Creek	Seine	24	Fair

TABLE 3 (Continued): INDEX OF BIOTIC INTEGRITY SCORE AND CATEGORY BY STATION DURING 2012

Station No.	Location	Waterway	Sample Gear	IBI Score	IBI Category
79	Higgins Road	Salt Creek	Small EF Boat	34	Fair
80	Arlington Heights Road	Salt Creek	Small EF Boat	38	Fair
18	Devon Avenue	Salt Creek	BP	32	Fair
18	Devon Avenue	Salt Creek	Seine	28	Fair
24	Wolf Road	Salt Creek	BP	26	Fair
24	Wolf Road	Salt Creek	Seine	24	Fair
109	Brookfield Avenue	Salt Creek	BP	34	Fair
109	Brookfield Avenue	Salt Creek	Seine	32	Fair
89	Walnut Lane	West Branch DuPage River	BP	24	Fair
89	Walnut Lane	West Branch DuPage River	Seine	28	Fair
64	Lake Street	West Branch DuPage River	BP	24	Fair
64	Lake Street	West Branch DuPage River	Seine	30	Fair
90	Route 19	Poplar Creek	BP	38	Fair
90	Route 19	Poplar Creek	Seine	40	Fair

IBI = Index of Biotic Integrity. EF = Electrofishing. BP = Backpack Electrofisher.

TABLE 4: NUMBER OF FISH COLLECTED FROM EACH SAMPLING STATION IN THE CHICAGO RIVER SYSTEM DURING 2012

	North Shore Channel	North Shore Channel North Branch Chicago River			Chicago Sanitary and Ship Canal		
Fish Species or Hybrid (x)	Station 36 Touhy Avenue	Station 46 Grand Avenue	Station 96 Albany Avenue	Station 75 Cicero Avenue	Station 41 Harlem Avenue	Station 92 Lockport (16 th Street)	
Gizzard shad	321	266	0	17	108	1,224	
Goldfish	0	0	0	0	1	0	
Common carp	16	4	0	5	21	2	
Golden shiner	11	1	0	0	1	10	
Emerald shiner	0	0	0	0	0	11	
Spottail shiner	1	0	0	ő	ő	0	
Spotfin shiner	36	0	0	ő	2	0	
Bluntnose minnow	22	0	0	1	4	35	
Fathead minnow	2	Ô	0	0	0	0	
White sucker	9	Ö	i	ŏ	0	ő	
Yellow bullhead ¹	0	Ö	1	1	16	2	
Channel catfish ¹	5	ő	0	Ô	1	0	
Blackstripe topminnow	5	Ö	23	0	Õ	0	
Mosquitofish	0	o O	0	255	330	0	
Green sunfish ¹	0	3	12	13	22	118	
Pumpkinseed ¹	Ö	0	0	8	14	68	
Bluegill	75	0	0	0	3	58	
Largemouth bass ¹	13	2	0	0	0	0	
Black crappie ¹	1	0	0	0	0	0	
Green sunfish x Orangespotted sunfish	0	0	0	0	0	1	
Total Number of Fish Species	13	5	4	7	12	10	
Number of Game Fish Species	4	2	2	3	5	4	
Total Number of Fish	517	279	37	300	523	1531	
Total Weight of Fish (kg)	86.2	18.0	0.2	6.9	81.8	29.1	

Game species

TABLE 5: NUMBER OF FISH COLLECTED FROM EACH SAMPLING STATION IN THE CALUMET RIVER SYSTEM DURING 2012

Fish Species or Hybrid (x)	Calumet River	Little Calumet River	Cal-Sag Channel
	Station 55 130 th Street	Station 76 Halsted Street	Station 59 Cicero Avenue
Gizzard shad	39	361	572
Goldfish	1	2	1
Common carp	9	9	28
Common carp x goldfish	1	0	0
Golden shiner	0	12	2
Emerald shiner	54	1	6
Spotfin shiner	6	3	0
Bluntnose minnow	199	5	34
White sucker	3	10	0
Black buffalo	4	0	0
Black bullhead ¹	0		0
Yellow bullhead	0	10	0
Channel catfish	0	0	1
Banded killifish	36	0	0
Brook silverside	2	0	2
Yellow bass ¹	0	1	0
Rock bass ¹	22	0	0
Green sunfish ¹	1	1	6
Pumpkinseed ¹	30	44	0
Orangespotted sunfish ¹	1	0	0
Bluegill	23	28	1
Smallmouth bass	7	0	0
Largemouth bass ¹	95	22	2
Black crappie ¹	0	1	0
Freshwater drum	0	0	2
Round goby	2	14	0
Total Number of Fish Species	18	17	12
Number of Game Fish Species	7	8	4
Total Number of Fish	535	525	657
Total Weight of Fish (kg)	51.5	30.3	94.6

¹Game Species

TABLE 6: NUMBER OF FISH COLLECTED FROM EACH SAMPLING STATION IN THE DES PLAINES RIVER SYSTEM DURING 2012

	Des Plaines River							
Fish Species	Station 13 Lake-Cook Road	Station 17 Oakton Street	Station 19 Belmont Avenue	Station 20 Roosevelt Road	Station 22 Ogden Avenue	Station 23 Willow Springs Road	Station 29 Stephen Street	Station 91 Material Service Road
Gizzard shad	0	0	0	0	2	0	0	0
Goldfish	0	0	0	6	0	0	0	7
Common carp	0	0	0	4	0	2	2	3
Hornyhead chub	0	0	4	0	0	0	0	0
Golden shiner	0	0	2	12	0	0	2	0
Emerald shiner	0	0	0	0	O	0	1	2
Spottail shiner	0	0	0	0	Queen Comment	0	0	0
Spotfin shiner	21	0	3	1	12	0	39	1
Sand shiner	7	0	0	0	1	0	0	0
Bluntnose minnow	7	1	1	3	1	0	24	9
White sucker	0	0	0	0	1	0	0	4
Spotted sucker	1	0	1	1	0	0	0	0
Oriental weatherfish	0	0	0	0	0	1	0	0
Yellow bullhead ¹	1	0	3	2	1	0	1	6
Channel catfish ¹	0	0	0	0	0	0	0	1
Tadpole madtom	1	0	0	1	0	0	0	2
Blackstripe topminnow	13	0	1	7	0	0	94	1
Mosquitofish	0	0	0	0	0	3	19	6
Rock bass ¹	3	1	1	0	0	0	. 1	0
Green sunfish ¹	27	15	43	3	1	6	47	1
Pumpkinseed ¹	0	0	0	0	person	0	0	0

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TABLE 6 (Continued): NUMBER OF FISH COLLECTED FROM EACH SAMPLING STATION IN THE DES PLAINES RIVER SYSTEM DURING 2012

	Des Plaines River							
Fish Species	Station 13 Lake-Cook Road	Station 17 Oakton Street	Station 19 Belmont Avenue	Station 20 Roosevelt Road	Station 22 Ogden Avenue	Station 23 Willow Springs Road	Station 29 Stephen Street	9 Station 91 Material Service Road
Warmouth ¹	0	1	0	0	0	0	1	0
Orangespotted sunfish ¹	0	18	6	0	0	0	5	0
Bluegill	2	8	13	13	0	2	17	0
Smallmouth bass ¹	0	0	0	0	0	0	0	6
Black crappie ¹	0	3	0	0	0	1	0	0
Johnny darter	1	2	0	0	0	0	0	12
Round goby	0	0	0	0	0	0	0	7
Total Number of Fish								
Species Number of Game Fish	11	8	11	11	9	6	13	15
Species Species	4	6	5	3	3	3	6	4
Total Number of Fish	84	49	78	53	21	15	253	68
Total Weight of Fish (g)	839	783	2,779	12,219	81	4,004	1,084	114

TABLE 6 (Continued): NUMBER OF FISH COLLECTED FROM EACH SAMPLING STATION IN THE DES PLAINES RIVER SYSTEM DURING 2012

	Buffalo Creek	Higgin	s Creek			Salt Creek		
Fish Species	Station 12 Lake- Cook Road	Station 77 Elmhurst Road	Station 78 Wille Road	Station 79 Higgins Road	Station 80 Arlington Heights Road	Station 18 Devon Avenue	Station 24 Wolf Road	Station 109 Brookfield Avenue
Goldfish	0	0	0	0	0	0	1	0
Common carp	0	0	0	0	12	0	0	0
Golden shiner	0	1	0	0	0	0	0	0
Hornyhead chub	0	0	0	0	0	0	0	2
Spotfin shiner	0	0	0	0	1	0	1	1
Sand shiner	0	0	0	0	0	0	0	18
Bluntnose minnow	0	30	3	0	0	0	22	3
Fathead minnow	0	28	3	0	0	0	0	0
Creek chub	6	0	0	0	0	0	1	8
White sucker	3	3	0	0	1	0	0	1
Yellow bullhead ¹	3	0	0	0	1	1	2	4
Tadpole madtom	0	0	0	0	0	0	0	1
Blackstripe topminnow	10	0	0	61	0	9	9	1
Green sunfish ¹	36	24	2	1	2	6	8	0
Pumpkinseed ¹	0	0	0	2	1	0	0	0
Orangespotted sunfish ¹	0	0	0	0	1	0	1	0
Bluegill ¹	7	2	0	8	115	14	0	0
Largemouth bass ¹	6	0	0	1	10	3	0	0
Black crappie ¹	general de la constant de la constan	0	0	1	2	0	0	0
Johnny darter	0	0	0	0	0	0	0	1

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TABLE 6 (Continued): NUMBER OF FISH COLLECTED FROM EACH SAMPLING STATION IN THE DES PLAINES RIVER SYSTEM DURING 2012

	Buffalo Creek	Higgir	Higgins Creek		Salt Creek					
Fish Species	Station 12 Lake- Cook Road	Station 77 Elmhurst Road	Station 78 Wille Road	Station 79 Higgins Road	Station 80 Arlington Heights Road	Station 18 Devon Avenue	Station 24 Wolf Road	Station 109 Brookfield Avenue		
Walleye ¹	0	0	0		0	4	0	0		
Total Number of Fish Species	8	6	3	6	11	5	8	10		
Number of Game Fish Species		2	1	5	8	4	3	1		
Total Number of Fish	72	88	8	74	150	33	45	40		
Total Weight of Fish (g)	1,704	476	30	267	33,395	462	293	362		

¹Game Species.

TABLE 7: NUMBER OF FISH COLLECTED FROM EACH SAMPLING STATION IN THE FOX AND DES PLAINES RIVER SYSTEMS DURING 2012

	Poplar Creek	W	est Branch DuPage River	
Fish Species	Station 90	Station 110	Station 89	Station 64
•	Lake-Cook	Springinsguth	Walnut	Lake
	Road	Road	Lane	Street
Common carp	0	0	4	0
Hornyhead chub	1	0	0	0
Spottail shiner	6	0	0	0
Spotfin shiner	0	0	0	1
Bluntnose minrow	7	0	0	1
Creek chub	100	0	0	0
Yellow bullhead ¹	0	0	2	3
Brown bullhead ¹	1	0	0	0
Blackstripe topminnow	11	0	0	0
Green sunfish ¹	4	0	10	64
Pumpkinseed ¹	0	0	0	1
Bluegill ¹	3	0	1	6
Smallmouth bass ¹	53	0	0	0
Johnny darter	1	0	0	0
Total Number of Fish Species	10	0	4	6
Number of Game Fish Species	4	0	3	4
Total Number of Fish	187	0	17	76
Total Weight of Fish (g)	207	0	121	717

¹Game Species.

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APPENDIX A

OHIO QUALITATIVE HABITAT EVALUATION INDEX FIELD ASSESSMENT FORM



Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

QHEI Score:

Scorers Full Name & Affiliation:	
1 m 1 m m 1	find
River Code: STORET #: Lat./ Long.: . /8 . Office veri	tion 🗆
1] SUBSTRATE Check ONLY Two substrate TYPE BOXES; estimate % or note every type present Check ONE (Or 2 & average)	
BEST TYPES POOL RIFFLE OTHER TYPES POOL RIFFLE ORIGIN QUALITY	
BLDR /SLABS [10] HARDPAN [4] LIMESTONE [1] HEAVY [-2]	
	strate
THAPPRAY TO THE PER 191	
Score natural substrates: ignore RIP/RAP [0] SANDSTONE [1] SANDSTONE [1] REDROCK [5] Score natural substrates: ignore RIP/RAP [0] RIP/RAP [1] RIP/RAP [1]	
NUMBER OF BEST TYPES: 4 or more [2] sludge from point-sources) LACUSTURINE [0] WORMAL [0]	ximum 20
Gammanta 3 or less [0] LI SHALE [-1] LI NONE [1]	
Comments Coal Fines [-2]	
2] INSTREAM COVER Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest	
quality: 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large ——Check ONE (Or 2 & average	•)
diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools. UNDERCUT BANKS [1] POOLS > 70cm [2] OXBOWS, BACKWATERS [1] MODERATE 25-75% [7]	
OVERHANGING VEGETATION [1] ROOTWADS [1] AQUATIC MACROPHYTES [1] SPARSE 5-<25% [3]	
SHALLOWS (IN SLOW WATER) [1] BOULDERS [1] LOGS OR WOODY DEBRIS [1] NEARLY ABSENT <5% [1]	1
Cover Comments Maximum	
20	
3] CHANNEL MORPHOLOGY Check ONE in each category (Or 2 & average)	
SINUOSITY DEVELOPMENT CHANNELIZATION STABILITY	
☐ HIGH [4] ☐ EXCELLENT [7] ☐ NONE [6] ☐ HIGH [3] ☐ MODERATE [3] ☐ GOOD [5] ☐ RECOVERED [4] ☐ MODERATE [2]	
LOW [2] FAIR [3] RECOVERING [3] LOW [1]	
□ NONE [1] □ POOR [1] □ RECENT OR NO RECOVERY [1] Channel Maximum	
Comments	
4] BANK EROSION AND RIPARIAN ZONE Check ONE in each category for EACH BANK (Or 2 per bank & average)	
River right looking downstream RIPARIAN WIDTH FLOOD PLAIN QUALITY R	
EROSION	· ***
☐ NONE / LITTLE [3] ☐ MODERATE 10-50m [3] ☐ SHRUB OR OLD FIELD [2] ☐ URBAN OR INDUSTRIAL [0] ☐ MODERATE [2] ☐ NARROW 5-10m [2] ☐ RESIDENTIAL, PARK, NEW FIELD [1] ☐ MINING / CONSTRUCTION [0]	
☐ HEAVY / SEVERE [1] ☐ VERY NARROW < 5m [1] ☐ FENCED PASTURE [1] Indicate predominant land use(s)	
□ □ NONE [0] □ □ OPEN PASTURE, ROWCROP [0] past 100m riparian. Riparian	
Comments Maximum 10	
5] POOL / GLIDE AND RIFFLE / RUN QUALITY MAXIMUM DEPTH CHANNEL WIDTH CURRENT VELOCITY Recreation Potential	1
MAXIMON DEI III CHANCE WIDII	
Check ONE (ONLY!) Check ONE (Or 2 & average) Check ALL that apply One contact Check ONE (Or 2 & average) Check ALL that apply Primary Contact	
0.7-<1m [4] POOL WIDTH = RIFFLE WIDTH [1] VERY FAST [1] INTERSTITIAL [-1] (circle one and comment on back)	
□ 0.4 × 0.7 m [2] □ POOL WIDTH < RIFFLE WIDTH [0]	
o.2m [0] Indicate for reach - pools and riffles. Current	
Comments Maximum 12	
Indicate for functional riffles; Best areas must be large enough to support a population	c=01
of riffle-obligate species: Check ONE (Or 2 & average). Check ONE (Or 2 & average). Check ONE (Or 2 & average).	
BEST AREAS > 10cm [2] MAXIMUM > 50cm [2] STABLE (e.g., Cobbie, Boulder) [2] NONE [2]	
□ BEST AREAS 5-10cm [1] □ MAXIMUM < 50cm [1] □ MOD. STABLE (e.g., Large Gravel) [1] □ LOW [1] □ LOW [1]	
BEST AREAS < 5cm UNSTABLE (e.g., Fine Gravel, Sand) [0] MODERATE [0] Rime / Run EXTENSIVE [-1] Maximum	1
Comments Maximum 8	
6] GRADIENT (ft/mi) VERY LOW LOW [2-4] %POOL: %GLIDE: Gradient	
DRAINAGE AREA MODERATE [6-10] Maximum Ma	
EPA 4520 06/16/0	6

AJ SAMPLED REACH Check ALL that apply	Comment RE: Reach consistency/	Is reach typical of steam?, Recreation	n/ Observed - Inferred, Other	/ Sampling observations, Concerns, Acc	cess directions, etc.
L LINE UP OTHER NORMAL LOW DISTANCE DRY					
0.2 Km	- 2nd	D] MAINTENANCE PUBLIC / PRIVATE / BOTH / NA ACTIVE / HISTORIC / BOTH / NA YOUNG-SUCCESSION-OLD SPRAY / SNAG / REMOVED MODIFIED / DIPPED OUT / NA LEVEED / ONE SIDED RELOCATED / CUTOFFS MOVING-BEDLOAD-STABLE ARMOURED / SLUMPS ISLANDS / SCOURED IMPOUNDED / DESICCATED FLOOD CONTROL / DRAINAGE	Circle some & COMMENT	E] ISSUES WWTP / CSO / NPDES / INDUSTRY HARDENED / URBAN / DIRT&GRIME CONTAMINATED / LANDFILL BMPs-CONSTRUCTION-SEDIMENT LOGGING / IRRIGATION / COOLING BANK / EROSION / SURFACE FALSE BANK / MANURE / LAGOON WASH H ₂ 0 / TILE / H ₂ 0 TABLE ACID / MINE / QUARRY / FLOW NATURAL / WETLAND / STAGNANT PARK / GOLF / LAWN / HOME ATMOSPHERE / DATA PAUCITY	F] MEASUREMENTS \(\times \text{ width} \) \(\times \text{ depth} \) \(\times \text{ bankfull width} \) \(\text{ bankfull } \times \text{ depth} \) \(\text{ W/D ratio} \) \(\text{ bankfull max. depth} \) \(\text{ floodprone } x^2 \) \(\text{ width} \) \(\text{ entrench. ratio} \) \(\text{ Legacy Tree:} \)

Stream Drawing:

APPENDIX B COMPLETED OHIO QUALITATIVE HABITAT EVALUATION INDEX FIELD ASSESSMENT FORMS FOR EACH 2012 WADEABLE STATION

ChioEPA

Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

		THIR
QHEI	Score:	(51)

Stream & Location:	Buttala			ساع RM:	Date:612 5 112
			rs Full Name & Affilia Lat./ Long.:		Office verified -
River Code: -		RET #:	(NAD 83 - decimal *)		location \
BEST TYPES BLDR /SLABS [10] BOULDER [9] COBBLE [8] GRAVEL [7] SAND [6]	POOL RIFFLE OF SOME STATE OF S	pe present [HER TYPES POOR] HARDPAN [4]] DETRITUS [3]] MUCK [2] [SILT [2]] ARTIFICIAL [0] (Score natural substree [2] sludge from poor	OLRIFFLE ORIGIN LIMESTONE TILLS [1] WETLANDS HARDPAN [IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	[1] [0] SILT [0] SILT [0] [E [0] [DDEO] [SILT [0] [E [0] [DDEO] [SILT [0] [DDEO] [SILT [0] [DDEO] [SILT [SILT [DDEO] [SILT [SILT [SILT [DDEO] [SILT	QUALITY HEAVY [-2] MODERATE [-1] Substra NORMAL [0] FREE [1] EXTENSIVE [-2] MODERATE [-1] NORMAL [0] NONE [1]
quality, 3-Highest quality diameter log that is stable UNDERCUT BANK OVERHANGING V	quality; 2-Moderate in moderate or greatel e, well developed rooty (S [1]	e amounts, but not of r amounts (e.g., very l yed in deep / fast wate POOLS > 70cm [ROOTWADS [1]	ry small amounts or if more c nighest quality or in small am arge boulders in deep or fast er, or deep, well-defined, fune 2] OXBOWS, BACK AQUATIC MACR LOGS OR WOOD	t water, large ctional pools. [XMATERS [1] SOPHYTES [1]	Check ONE (<i>Or 2 & average</i>)] EXTENSIVE >75% [11] [MODERATE 25-75% [7]
☐ HIGH [4] ☐ ☐ MODERATE [3] ☐ ☑ ☑ LOW [2] ※	VELOPMENT EXCELLENT[7] GOOD [5]	NE in each category (C CHANNELIZAT NONE [6] RECOVERED [4] RECOVERING [3] RECENT OR NO RE	ION STABILIT HIGH [3] MODERA LOW [1]		Channel Maximum 20
4] BANK EROSION River right looking downstr EROSION NONE / LITTLE [3] MODERATE [2] HEAVY / SEVERE [Comments	RIPARIAI	N WIDTH n [4]	each category for EACH BA FLOOD PLAIN Q FOREST, SWAMP [3] SHRUB OR OLD FIELD [2] RESIDENTIAL, PARK, NEW FENCED PASTURE [1] OPEN PASTURE, ROWCRO	UALITY C C C C C C C C C C C C C C C C C C C	& average) ONSERVATION TILLAGE [1] RBAN OR INDUSTRIAL [0] IINING / CONSTRUCTION [0] predominant land use(s) Om riparian. Maximum 10
5] POOL / GLIDE A/ MAXIMUM DEPT! Check ONE (ONLY!) □ > 1m [6] □ 0.7-<1m [4] ⋈ 0.4-<0.7m [2] □ 0.2-<0.4m [1] □ < 0.2m [0] Comments	d CHANNE	EL WIDTH Or 2 & average) RIFFLE WIDTH [2] [2] RIFFLE WIDTH [1] [2] RIFFLE WIDTH [1] [2]	FAST[1] DINTE	ply DW [1] ERSTITIAL [-1] ERMITTENT [-2] DIES [1]	Recreation Potential Primary Contact Secondary Contact (circle one and comment on back) Pool / Current Maximum 12
of riffle-obligate RIFFLE DEPTH □ BEST AREAS > 10cm □ BEST AREAS 5-10cm ⊠ BEST AREAS < 5cm [metric=	Species: RUN DEP [2] MAXIMUM > 5 [1] MAXIMUM < 5	Check ONE TH RIFFLE 50cm [2] STABLE 50cm [1] MOD. ST UNSTAB	e large enough to sup E (Or 2 & average). E / RUN SUBSTRATE (e.g., Cobble, Boulder) [2] ABLE (e.g., Large Gravel) I LE (e.g., Fine Gravel, Sand)	RIFFLE / RUN ONC (1) Milo (0) OMC DEX	I EMBEDDEDNESS ONE [2] OW [1] DDERATE [0] Riffle / Run TENSIVE [-1] Maximum 8
DRAINAGE ARE	A MODER	OW - LOW [2-4] RATE [6-10] VERY HIGH [10-6]	%POOL:(5 %RUN: (/	%GLIDE	Maximum 10
EPA 4520	The was	LAVINAM			06/16/06

A] SAMPLE Check A	ED REACH LL that apply	Comment RE: Reach consistency/	Is reach typical of steam?, Recreation	n/ Observed - Inferred, Other	√ Sampling observations, Concerns, Acc	ess directions, etc.
METHOD	STAGE					
☐ BOAT ☑ WADE ☐ L. LINE ☐ OTHER	1st-sample pass- 2nd HIGH UP NORMAL SLOW					
DISTANCE	DRY 🗆					na y maan door door hand and a charachtan da door and dad door of the control of
☑ 0.5 Km □ 0.2 Km	CLARITY	BJ AESTHETICS	D] MAINTENANCE	Circle some & COMMENT	E] ISSUES	F] MEASUREMENTS
☐ 0.15 Km ☐ 0.12 Km ☐ OTHER	1stsample pass- 2nd	☐ INVASIVE MACROPHYTES ☐ EXCESS TURBIDITY ☐ DISCOLORATION ☐ FOAM/ SCUM	PUBLIC / PRIVATE / BOTH / NA ACTIVE / HISTORIC / BOTH / NA YOUNG-SUCCESSION-OLD SPRAY / SNAG / REMOVED MODIFIED / DIPPED OUT / NA		WWTP / CSO / NPDES / INDUSTRY HARDENED / URBAN / DIRT&GRIME CONTAMINATED / LANDFILL BMPs-CONSTRUCTION-SEDIMENT LOGGING / IRRIGATION / COOLING	x width x depth max. depth x bankfull width
meters CANOP	SECCHI DEPTH	☐ TRASH/LITTER	LEVEED / ONE SIDED RELOCATED / CUTOFFS		BANK / EROSION / SURFACE FALSE BANK / MANURE / LAGOON	bankfull x depth W/D ratio bankfull max, depth
> 85%- OPE	EN & crr	☐ NUISANCE ODOR ☐ SLUDGE DEPOSITS ☐ CSOs/SSOs/OUTFALLS	MOVING-BEDLOAD-STABLE ARMOURED / SLUMPS ISLANDS / SCOURED		WASH H ₂ 0 / TILE / H ₂ 0 TABLE ACID / MINE / QUARRY / FLOW NATURAL / WETLAND / STAGNANT	floodprone x ² width entrench, ratio
☐ 10%-<30% ☐ <10%- CLO	<i>CJ RECRI</i> SED	EATION AREA DEPTH POOL: □>100ft2□>3ft	IMPOUNDED / DESICCATED FLOOD CONTROL / DRAINAGE		PARK / GOLF / LAWN / HOME ATMOSPHERE / DATA PAUCITY	Legacy Tree:

Stream Drawing:

	CA
Qualitative Habitat Evaluation Index	1911
ChicEPA Qualitative Habitat Evaluation Index and Use Assessment Field Sheet	QHEI Score: 47
Stream & Location: Flinkus St Rd flygin. Creek RM	M:Date:61/81/2
Scorers Full Name & Affiliation:	Office verified
INAD 83 - decimal 1	/8 . Office verified location
1] SUBSTRATE Check ONLY Two substrate TYPE BOXES; estimate % or note every type present BEST TYPES POOL RIFFLE OTHER TYPES POOL RIFFLE ORIGIN BLDR /SLABS [10]	QUALITY QUALITY HEAVY [-2] Substrate Substrate
2] INSTREAM COVER Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pool 2 UNDERCUT BANKS [1] POOLS > 70cm [2] OXBOWS, BACKWATERS [2] OVERHANGING VEGETATION [1] ROOTWADS [1] AQUATIC MACROPHYTES SHALLOWS (IN SLOW WATER) [1] BOULDERS [1] LOGS OR WOODY DEBRIS Comments	Check ONE (Or 2 & average)
3] CHANNEL MORPHOLOGY Check ONE in each category (Or 2 & average) SINUOSITY DEVELOPMENT CHANNELIZATION STABILITY HIGH [4]	Channel / D.
MODERATE [2] ☐ X NARROW 5-10m [2] ☐ RESIDENTIAL, PARK, NEW FIELD [1] ☐ HEAVY / SEVERE [1] ☐ VERY NARROW < 5m [1] ☐ FENCED PASTURE [1]	Der bank & average) CONSERVATION TILLAGE [1] CONSERVATION TILLAGE [1] CONSTRUCTION [0] Indicate predominant land use(s) past 100m riparian. Riparian

Comments Maximum 10 5] POOL / GLIDE AND RIFFLE / RUN QUALITY Recreation Potential **CURRENT VELOCITY** MAXIMUM DEPTH CHANNEL WIDTH Check ALL that apply Primary Contact Check ONE (Or 2 & average) Check ONE (ONLY!) POOL WIDTH > RIFFLE WIDTH [2] TORRENTIAL [-1] I SLOW [1] _ > 1m [6] Secondary Contact POOL WIDTH = RIFFLE WIDTH [1]
POOL WIDTH < RIFFLE WIDTH [0] ☐ INTERSTITIAL [-1]
☐ INTERMITTENT [-2] ☐ VERY FAST [1] ☐ FAST [1] 0.7-<1m [4] (circle one and comment on back) Ø 0.4-<0.7m [2] ☐ MODERATE [1] ☐ EDDIES [1] 0.2-<0.4m [1] Indicate for reach - pools and riffles. Current < 0.2m [0]</pre> Maximum Comments Indicate for functional riffles; Best areas must be large enough to support a population ☐NO RIFFLE [metric=0] Check ONE (Or 2 & average). of riffle-obligate species: RIFFLE / RUN SUBSTRATE RIFFLE / RUN EMBEDDEDNESS RIFFLE DEPTH **RUN DEPTH** ☐ MAXIMUM > 50cm [2] X STABLE (e.g., Cobble, Boulder) [2] ☐ NONE [2] ☐ BEST AREAS > 10cm [2] ☐ LOW [1] Riffle UNSTABLE (e.g., Fine Gravel, Sand) [0] MODERATE [0] BEST AREAS < 5cm Run [metric=0] EXTENSIVE [-1] Maximum 649 - 10:18/024 wile Comments 6] GRADIENT (4.2 ft/mi) VERY LOW - LOW [2-4] %GLIDE: %POOL Gradient ☐ MODERATE [6-10] DRAINAGE AREA Maximum mi2) HIGH - VERY HIGH [10-6] %RUN: %RIFFLE:

25' wide (7.6 m

EPA 4520

06/16/06

AJ SAMPLED REACH Check ALL that apply	Comment RE. Reach consistency/1	is reach typical of steam?, Recreation	n/ Observed - Inferred, Other	/Sampling observations, Concerns, Acc	ess directions, etc.
METHOD STAGE BOAT 1st-sample pass-2nd WADE HIGH					
DISTANCE	INVASIVE MACROPHYTES EXCESS TURBIDITY DISCOLORATION FOAM! SCUM OIL SHEEN TRASH! LITTER NUISANCE ODOR SLUDGE DEPOSITS CSOS/SSOS/OUTFALLS	DJ MAINTENANCE PUBLIC / PRIVATE / BOTH / NA ACTIVE / HISTORIC / BOTH / NA YOUNG-SUCCESSION-OLD SPRAY / SNAG / REMOVED MODIFIED / DIPPED OUT / NA LEVEED / ONE SIDED RELOCATED / CUTOFFS MOVING-BEDLOAD-STABLE ARMOURED / SLUMPS ISLANDS / SCOURED IMPOUNDED / DESICCATED FLOOD CONTROL / DRAINAGE	Circle some & COMMENT	EJISSUES WWTP / CSO / NPDES / INDUSTRY HARDENED (URBAN) DIRT&GRIME CONTAMINATED / LANDFILL BMPS-CONSTRUCTION-SEDIMENT LOGGING (IRRIGATION / COOLING BANK (EROSION / SURFACE FALSE BANK / MANURE / LAGOON WASH H ₂ 0 / TILE / H ₂ 0 TABLE ACID / MINE / QUARRY / FLOW NATURAL / WETLAND / STAGNANT PARK / GOLF / LAWN / HOME ATMOSPHERE / DATA PAUCITY	F] MEASUREMENTS \(\overline{x} \) width \(\overline{x} \) depth max. depth \(\overline{x} \) bankfull width bankfull \(\overline{x} \) depth W/D ratio bankfull max. depth floodprone \(x^2 \) width entrench. ratio Legacy Tree:

Stream Drawing:

ChicEPA

Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

QHEI Score:

	VA	20	4. Y	02
	-	Market 1	-	n
ě	L ·	21		
	1	حاصاتك	100	- /

Stream & Location:	WN- 78	Wille	Kd +	tiller ca	ERM:	Date:61	(E) 17
maning and approximation of the second and an artist and a second and			rs Full Name Lat./ Lon	e & Affiliation.		·	fice verified —
River Code: - 11 SUBSTRATE Check 0	- STORI		(NAD 83 - decim	<u> </u>	/8		location L
estimate	% or note every type OL RIFFLE OTH OTH OTH OTH OTH OTH OTH OTH	present IER TYPES POI ARDPAN [4] ETRITUS [3] IUCK [2] ILT [2] RTIFICIAL [0] Score natural substi	rates; ignore	Check ORIGIN LIMESTONE [1] TILLS [1] WETLANDS [0] HARDPAN [0] SANDSTONE [0] RIP/RAP [0] LACUSTURINE [0 SHALE [-1] COAL FINES [-2]	SILT	QUALITY HEAVY [-2] MODERATE [- NORMAL [0] FREE [1] EXTENSIVE [- MODERATE [- MODERATE [- NORMAL [0] NONE [1]	1) Substrate
2] INSTREAM COVER quality; 3-Highest quality in a diameter log that is stable, w UNDERCUT BANKS [OVERHANGING VEGI SHALLOWS (IN SLOV ROOTMATS [1] Comments	quality; 2-Moderate a noderate or greater al ell developed rootwar 1] ETATION [1]	mounts, but not of mounts (e.g., very l	highest quality of large boulders in er, or deep, well- 2] OXBo	r in small amount deep or fast wate	s of highest er, large al pools.	Check ONE (Or 2 &] EXTENSIVE >759] MODERATE 25-7] SPARSE 5-<25% [NEARLY ABSEN]	average) % [11] 5% [7] [3] [<5% [1]
	OPMENT C SELLENT[7]	in each category (c CHANNELIZAT ONE [6] ECOVERED [4] ECOVERING [3] ECENT OR NO RE	ION	STABILITY THIGH [3] MODERATE [2] LOW [1]		Cha Maxir	
☐ ☐ MODERATE [2] ☐ ☐ HEAVY / SEVERE [1] (RIPARIAN \	WIDTH 1)-50m [3]	FLOOD FOREST, SWAI SHRUB OR OL RESIDENTIAL, FENCED PAST	PLAIN QUAL MP [3] D FIELD [2] PARK, NEW FIEL	LITY COUNTY COUN	& average) ONSERVATION TIL RBAN OR INDUST IINING / CONSTRU predominant land us Om riparian. Ripa Maxir	RIAL [0] GTION [0] se(s) arian
0.7-<1m [4]	RIFFLE / RUN Q CHANNEL Check ONE (Or:] POOL WIDTH > RIF] POOL WIDTH = RIF RPOOL WIDTH < RIF	WIDTH 2 & average) FLE WIDTH [2] FLE WIDTH [1] FLE WIDTH [0]	Check TORRENTIAL VERY FAST [FAST [1] MODERATE [NT VELOCIT ALL that apply [-1] SSLOW [1 I] INTERST INTERMI 1] EDDIES each - pools and] TTAL [-1] TTENT [-2] 1]		ontact ontact it on back)
Indicate for function of riffle-obligate space RIFFLE DEPTH BESTAREAS > 10cm [2] BESTAREAS 5-10cm [1] BESTAREAS 5-0cm [metric=0] Comments	ecies: RUN DEPTH ☐ MAXIMUM > 50c ☐ MAXIMUM < 50c	Check ONE RIFFLE m [2] STABLE m [1] MOD. ST	E (Or 2 & averag F / RUN SUB (e.g., Cobble, B ABLE (e.g., Lar LE (e.g., Fine Gi	e). STRATE RIF loulder) [2] ge Gravel) [1] ravel, Sand) [0]	FFLE / RUN	<u>(Χ</u> ΙΝΟ RIFF I EMBEDDEDN DNE [2] DW [1]	LE [metric=0] ESS
DRAINAGE AREA	t/mi)			POOL:) %GLIDE)%RIFFLE		06/16/06

AJ SAMPLE Check A	ED REACH ALL that apply	Comment RE Reach consistency/1	s reach typical of steam?, <i>Recreation</i>	n/ Observed - Inferred, Other	√ Sampling observations, Concerns, Acc − − − − − − − − − − − − − − − − − −	ess directions, etc.
METHOD	STAGE					често по посто по посто от ве сторот на посто по от пороже дней ображения и посто по посто от него стоков и и общендения в
BOAT	1st -sample pass- 2nd					
☐ WADE	HIGH					
_ L. LINE			Will de Nobel and District for the section of the State o			kati dili dipubbi digunda da da da da da da da puju kuntu a jipiyad kama a jibiliya udiyada rayaan baji da dan dan pa iliyida da jijiya qa maga maga ga
☐ OTHER	NORMAL					
DISTANCE	XLOW D					
☑ 0.5 Km □ 0.2 Km	CLARITY	B] AESTHETICS	D] MAINTENANCE	Circle some & COMMENT	E] ISSUES	F] MEASUREMENTS
□ 0.2 Km	1st -sample pass- 2nd	NUISANCE ALGAE	PUBLIC / PRIVATE / BOTH / NA		WWTP / CSO / NPDES / INDUSTRY	x width
□ 0.12 Km	□ < 20 cm	☐ INVASIVE MACROPHYTES	ACTIVE / HISTORIC / BOTH / NA		HARDENED/URBAN/DIRT&GRIME	x depth
OTHER	☐ 20-<40 cm ☐	EXCESS TURBIDITY	YOUNG-SUCCESSION-OLD		CONTAMINATED / LANDFILL	max. depth
Position (C. 1977)	□ 40-70 cm □	DISCOLORATION	SPRAY / SNAG / REMOVED		BMPs-CONSTRUCTION-SEDIMENT	x bankfull width
professional and complete the state of the s	☐ > 70 cm/ CTB ☐ SECCHI DEPTH☐	FOAM/SCUM	MODIFIED / DIPPED OUT / NA		LOGGING / IRRIGATION / COOLING	bankfull x depth
meters		□ OIL SHEEM	LEVEED / ONE SIDED		BANK / EROSION / SURFACE	W/D ratio
CANOP'	Y 151cn		RELOCATED / CUTOFFS		FALSE BANK / MANURE / LAGOON	bankfull max. depth
2 > 85%- OPE	EN	☐ NUISANCE ODOR	MOVING-BEDLOAD-STABLE		WASH H ₂ 0 / TILE / H ₂ 0 TABLE ACID / MINE / QUARRY / FLOW	floodprone x ² width
☐ 55%-<8 5 %	· 2ndcn	SLUDGE DEPOSITS	ARMOURED / SLUMPS ISLANDS / SCOURED		NATURAL / WETLAND / STAGNANT	entrench, ratio
□ 30%~<55%		CSOs/SSOs/OUTFALLS	IMPOUNDED / DESICCATED		PARK / GOLF / LAWN / HOME	Legacy Tree:
□ 10%-<30%	C] RECRI	EATION AREA DEPTH	FLOOD CONTROL / DRAINAGE		ATMOSPHERE / DATA PAUCITY	Legaly Hee.
☐ <10%- CLO	SED	POOL: □ >100ft² □ >3ft	I LOUD OUTSINGLI DIMINGL		ENCOLUMN AND A CARROLL MARKET BOLD TO COLUMN TO PER	

Stream Drawing:

ChicEPA



Stream & Location:	Hissha Ro Salt	Cr. 4179	RM:	Date 2 2021 12
	<u> </u>	corers Full Name & Affiliation	* ************************************	
River Code:	STORET #:	Lat./ Long.:	/8	Office verified location
BEST TYPES BEST TYPES BLDR /SLABS [10] COBBLE [8] GRAVEL [7] SAND [6] BEDROCK [5] NUMBER OF BEST Comments	DETRITUS [3] MUCK [2] MUCK [2] SILT [2] ARTIFICIAL [1] Score natural TYPES: 4 or more [2] Sludge from \$\frac{1}{2}\$ 3 or less [0]	Check ORIGIN LIMESTONE [1] CHARDPAN [0] CHAR	SILT SILT OF THE STATE OF T	
quality; 3-Highest quality	quality; 2-Moderate amounts, but rin moderate or greater amounts (e.g., e, well developed rootwad in deep / fax (S [1] POOLS > 7 EGETATION [1] ROOTWAD	not or highest quality or in small amoun very large boulders in deep or fast wat st water, or deep, well-defined, function 0cm [2] OXBOWS, BACKWATS [1] AQUATIC MACROPH	ts of nignest checker, large Checker C	ck ONE (Or 2 & average) CTENSIVE >75% [11] CDERATE 25-75% [7] CARSE 5-<25% [3] CARLY ABSENT <5% [1] Cover Maximum 20
SINUOSITY DE HIGH [4] MODERATE [3] LOW [2]	HOLOGY Check ONE in each categ VELOPMENT CHANNEL EXCELLENT[7] NONE [6] GOOD [5] RECOVERED FAIR [3] RECOVERING POOR [1] RECENT OR 1	IZATION STABILITY ☐ HIGH [3] [4] ※ MODERATE [:	2]	Channel Maximum 20
4] BANK EROSION River right looking downstr EROSION NONE / LITTLE [3] MODERATE [2] HEAVY / SEVERE [Pam RIPARIAN WIDTH	DNE in each category for EACH BANK (FLOOD PLAIN QUAI FLOOD PLAIN QUAI FOREST, SWAMP [3] SHRUB OR OLD FIELD [2] RESIDENTIAL, PARK, NEW FIEL FENCED PASTURE [1] OPEN PASTURE, ROWCROP [6]	LITY R CONS URBA URBA D [1] MININ	SERVATION TILLAGE [1] AN OR INDUSTRIAL [0] IG / CONSTRUCTION [0] dominant land use(s)
MAXIMUM DEPTH Check ONE (ONLY!) ☐ > 1m [6]	Check ONE (Or 2 & average) POOL WIDTH > RIFFLE WIDTH { POOL WIDTH = RIFFLE WIDTH { POOL WIDTH < RIFFLE WIDTH {	☐ MODERATE [1] ☐ EDDIES Indicate for reach - pools and	FITIAL [-1] ITTENT [-2] [1] riffles.	Primary Contact (condary Contact (de one and comment on back) Proof (Current Maximum 12)
Indicate for fund of riffle-obligate RIFFLE DEPTH BEST AREAS > 10cm BEST AREAS < 5cm [metric= Comments] Gradient Gradie	Species: Check RUN DEPTH RIF RIF Call MAXIMUM > 50cm [2] STA Call MAXIMUM < 50cm [1] MO UN! Call Call	ABLE (e.g., Cobble, Boulder) [2] D. STABLE (e.g., Large Gravel) [1] STABLE (e.g., Fine Gravel, Sand) [0] 7 / /	FFLE / RUN EN	MBEDDEDNESS [2] 1] RATE [0] Riffle Run ISIVE [-1] Maximum Maximum 10
EPA 4520	1	And the second s		06/16/06

A.	ED REACH	Comment RE: Reach consistency/h	s reach typical of steam?, Recreation	n/ Observed - Inferred, Other	/Sampling observations, Concerns, Acc	ess directions, etc.
METHOD BOAT WADE L. LINE OTHER DISTANCE	STAGE 1st -sample pass- 2nd HIGH UP NORMAL LOW LOW LOW LOW STAGE PARTICLE STAGE NORMAL					
0.5 Km 0.2 Km 0.15 Km 0.12 Km	CLARITY st sample pass 2n < 20 cm C 20-<40 cm C 40-70 cm CTB C > 70 cm/ CTB C SECCHI DEPTHE Y 1st cn EN 60 2nd cn C] RECR.	INVASIVE MACROPHYTES EXCESS TURBIDITY DISCOLORATION FOAM / SCUM OIL SHEEN TRASH / LITTER NUISANCE ODOR SLUDGE DEPOSITS CSOs/SSOs/OUTFALLS	D] MAINTENANCE PUBLIC / PRIVATE / BOTH / NA ACTIVE / HISTORIC / BOTH / NA YOUNG-SUCCESSION-OLD SPRAY / SNAG / REMOVED MODIFIED / DIPPED OUT / NA LEVEED / ONE SIDED RELOCATED / CUTOFFS MOVING-BEDLOAD-STABLE ARMOURED / SLUMPS ISLANDS / SCOURED IMPOUNDED / DESICCATED FLOOD CONTROL / DRAINAGE	Circle some & COMMENT	EJISSUES WWTP / CSO / NPDES / INDUSTRY HARDENED / URBAN / DIRT&GRIME CONTAMINATED / LANDFILL BMPs-CONSTRUCTION-SEDIMENT LOGGING / IRRIGATION / COOLING BANK / EROSION / SURFACE FALSE BANK / MANURE / LAGOON WASH H ₂ 0 / TILE / H ₂ 0 TABLE ACID / MINE / QUARRY / FLOW NATURAL / WETLAND / STAGNANT PARK / GOLF / LAWN / HOME ATMOSPHERE / DATA PAUCITY	F] MEASUREMENTS \(\overline{x} \) width \(\overline{x} \) depth \(\overline{x} \) bankfull width bankfull \(\overline{x} \) depth W/D ratio bankfull max: depth floodprone \(x^2 \) width entrench. ratio Legacy Tree:

ChioEFA

		Fail
QHEI	Score:	

Stream & Location: Act	ingles Helphis Rd.	Salt Cre	ely NW39 F	RM:Date	71/21/2
River Code: -	- STORET #:	Scorers Full Name Lat./ Lor		/8 .	Office verified
1] SUBSTRATE Check ONL estimate % BEST TYPES POOL BLDR /SLABS [10] BOULDER [9] COBBLE [8] GRAVEL [7] SAND [6]	YTwo substrate TYPE BOXES or note every type present RIFFLE OTHER TYPE HARDPAN [- DETRITUS [- MUCK [2] SILT [2] ARTIFICIAL	POOL RIFFLE 4] 3] [0] al substrates; ignore crom point-sources)	Check ONE ORIGIN LIMESTONE [1] TILLS [1] WETLANDS [0]	SILT DESCRIPTION OF THE AVY OF TH	[-2] ATE [-1] Substrat
2] INSTREAM COVER Inc. quality, 3-Highest quality in mod diameter log that is stable, well UNDERCUT BANKS [1] OVERHANGING VEGET SHALLOWS (IN SLOW V ROOTMATS [1] Comments	ality; 2-Moderate amounts, but derate or greater amounts (e.g developed rootwad in deep / f. POOLS > ATION [1] ROOTWAI	inot of highest quality of a very large boulders in ast water, or deep, well 70cm [2] OXB DS.[1] LAQU	or in small amounts of n deep or fast water, la	nignest Check ONE (irge Check ONE (irge EXTENSIV [1] MODERAT [1] SPARSE 5	E 25-75% [7]
3] CHANNEL MORPHOLO SINUOSITY DEVELO HIGH [4]	OPMENT CHANNEI LLENT[7] □ NONE [6] 0 [5] □ RECOVEREI 03] □ RECOVERIN	LIZATION [D [4]	STABILITY HIGH [3] MODERATE [2] LOW [1]		Channel Maximum 20
MODERATE [2]	RIPARIAN ZONE Check RIPARIAN WIDTH WIDE > 50m [4] MODERATE 10-50m [3] NARROW 5-10m [2] VERY NARROW < 5m [1] NONE [0]	FLOOD B FOREST, SWA SHRUB OR OU RESIDENTIAL) PLAIN QUALITY MP [3] LD FIELD [2] , PARK, NEW FIELD [1 TURE [1]	CONSERVATI	NDUSTRIAL [0] ISTRUCTION [0]
0.7-<1m [4] P	FFLE / RUN QUALITY CHANNEL WIDTH Check ONE (Or 2 & average OOL WIDTH > RIFFLE WIDTH OOL WIDTH = RIFFLE WIDTH OOL WIDTH < RIFFLE WIDTH	Check [2]	☐ INTERMITTE	Primary Seconda (circle one and	Pool / Current Maximum 12
of riffle-obligate special RIFFLE DEPTH BEST AREAS > 10cm [2] BEST AREAS 5-10cm [1] BEST AREAS < 5cm [metric=0]	RUN DEPTH R]MAXIMUM > 50cm [2] S]MAXIMUM < 50cm [1] M UI	ck ONE (Or Ž & averac IFFLE / RUN SUB IABLE (e.g., Cobble, I OD. STABLE (e.g., La NSTABLE (e.g., Fine G	ge). STRATE RIFFL Boulder) [2] inge Gravel) [1] Gravel, Sand) [0]	POPULATION MODEL FOR IT NONE [2] DOMELON [1] MODERATE [0] EXTENSIVE [-1]	PRIFFLE [metric=0] DEDNESS
DRAINAGE AREA (mil	MODERATE [6-10] 2) HIGH - VERY HIGH [1	a.c		RIFFLE:	Maximum 2 10 06/16/06

-44	ED REACH ALL that apply	Comment RE: Reach consistency/1	s reach typical of steam?, Recreation	1/ Observed - Inferred, Other	√ Sampling observations, Concerns, Acc	ess directions, etc.
METHOD	STAGE					
BOAT WADE	1st -sample pass- 2nd	1964 THE PROTECTION OF A SHAPE AND A THE PROTECTION OF THE PROTECT	од во 1964 од 1964 год 1964 г	\$\$\tag{\$\}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}		$\frac{1}{2} \exp(\frac{1}{2} \log \log$
L LINE	☐ UP ☐ ☐ NORMAL ☐					
DISTANCE	DRY	ya-ran musimmanan negapa saida dikembagia pala daamo negaplamin saidany said himopuhahaji doktora o ka upasabagan payakan saida				ing ya nagawaya kwa na kanabanya ganaga sana anjayi fini ilikahanya kabamana ya jang hambaja wana ya ganaba sa
☐ 0.5 Km ☐ 0.2 Km	CLARITY	BJ AESTHETICS	D] MAINTENANCE	Circle some & COMMENT	E] ISSUES	F] MEASUREMENT:
□ 0.15 Km □ 0.12 Km	1st -sample pass- 2nd	☐ NUISANCE ALGAE ☐ INVASIVE MACROPHYTES ☐ EXCESS TURBIDITY	PUBLIC / PRIVATE / BOTH / NA ACTIVE / HISTORIC / BOTH / NA YOUNG-SUCCESSION-OLD		WWTP / CSO / NPDES / INDUSTRY HARDENED / URBAN / DIRT&GRIME CONTAMINATED / LANDFILL	x width x depth
OTHER	☐ 40-70 cm ☐ > 70 cm/ CTB ☐ SECCHI DEPTH☐	☐ DISCOLORATION ☐ FOAM/SCUM	SPRAY / SNAG / REMOVED MODIFIED / DIPPED OUT / NA LEVEED / ONE SIDED		BMPs-CONSTRUCTION-SEDIMENT LOGGING / IRRIGATION / COOLING BANK / EROSION / SURFACE	max, depth x bankfull width bankfull x depth
CANOP	Y 1stcm	☐ TRASH/LITTER	RELOCATED / CUTOFFS		FALSE BANK / MANURE / LAGOON	W/D ratio
☐ > 85% - OP ☑ 55% -< 85%	EA.		MOVING-BEDLOAD-STABLE ARMOURED / SLUMPS		WASH H ₂ 0 / TILE / H ₂ 0 TABLE ACID / MINE / QUARRY / FLOW	bankfull max, depth floodprone x ² width
☐ 30%-<55% ☐ 10%-<30% ☐ <10%- CLC	C] RECRE	☐CSOs/SSOs/OUTFALLS EATION AREA DEPTH POOL: ☐>100ft² ☐>3ft	ISLANDS / SCOURED IMPOUNDED / DESICCATED FLOOD CONTROL / DRAINAGE		NATURAL / WETLAND / STAGNANT PARK / GOLF / LAWN / HOME ATMOSPHERE / DATA PAUCITY	entrench, ratio Legacy Tree:

OhioEPA

		tair
QHEI	Score:	(FA)

Stream & Location:	Levon Soft	Charle	JUN 18)	R M : Dat	e:7123112
	Sci	orers Full Name &	Terror and a second a second and a second and a second and a second and a second an		Victoria Victoria de Santo Esperio Superio Sup
River Code: -	- STORET #:	Lat./ Long. ——— (NAD 83 - decimal °)	* : :		Office verified location
1] SUBSTRATE Check ON estimate S	ILYTwo substrate TYPE BOXES; % or note every type present		Check ON	IE (Or 2 & average)	
BEST TYPES BLDR /SLABS [10] BOULDER [9] COBBLE [8] GRAVEL [7] SAND [6]	OL RIFFLE OTHER TYPES HARDPAN [4] DETRITUS [3] MUCK [2] SILT [2] ARTIFICIAL [0]	Ubstrates; ignore RIP Point-sources) LAC	ORIGIN ESTONE [1] LS [1] TLANDS [0] RDPAN [0]	QUA HEAVY HEAVY HOODEI HOODEI HOODEI HOODEI	RATE [-1] Substrate
quality; 3-Highest quality in mo	TATION [1] ROOTWADS	of highest quality or in ery large boulders in de water, or deep, well-def cm [2] OXBOW [1] AQUATION	small amounts of ep or fast water, la	f highest arge Check ONE cools. Check ONE EXTENSIVES [1] SPARSE S	OUNT (Or 2 & average) /E >75% [11] TE 25-75% [7] 5-<25% [3] ABSENT <5% [1] Cover Maximum
					20 (5)
SINUOSITY DEVEL	[3] RECOVERING	ATION ST	TABILITY IIGH [3] IODERATE [2] OW [1]		Channel Maximum 20
River right looking downstream REROSION NONE / LITTLE [3] MODERATE [2] HEAVY / SEVERE [1]	□ NARROW 5-10m [2]	FLOOD PL DFOREST, SWAMP SHRUB OR OLD F	.AIN QUALIT) [3] IELD [2] RK, NEW FIELD [1 E [1]	Y	NSTRUCTION [0]
0.7-<1m [4]	CIFFLE / RUN QUALITY CHANNEL WIDTH Offick ONE (Or 2 & average) POOL WIDTH > RIFFLE WIDTH [2] POOL WIDTH = RIFFLE WIDTH [1] POOL WIDTH < RIFFLE WIDTH [0]	Check ALI TORRENTIAL [-1] VERY FAST [1] SAST [1] MODERATE [1]	VELOCITY Lithat apply SLOW [1] INTERSTITIA INTERMITTE EDDIES [1] h - pools and riffle	Primar Seconda (circle one and	on Potential by Contact ary Contact comment on back) Pool/ Current Maximum 12
of riffle-obligate sper RIFFLE DEPTH BESTAREAS > 10cm [2] BESTAREAS 5-10cm [1] BESTAREAS (5cm [metric=0] Comments G] GRADIENT (2.3th) DRAINAGE AREA	RUN DEPTH RIFF MAXIMUM > 50cm [2] STAB MAXIMUM < 50cm [1] MOD. UNST	DNE (Or 2 & average). LE / RUN SUBSTF LE (e.g., Cobble, Boul STABLE (e.g., Large (ABLE (e.g., Fine Grave) St Upstroum of Sa M, %PO(RATE RIFFL der) [2] Gravel) [1] I, Sand) [0] DL: 39999	POPULATION DING E / RUN EMBEDI DING [2] DING [2] DING DERATE [0] EXTENSIVE [ORIFFLE [metric=0] DEDNESS
60.	when you was	\$			

AJ SAINTLED KEAUN Y		Carried State Control of the Control	n/ Observed - Interred, Other	/ Sampling observations, Concerns, Acc	ess directions, etc.
Check ALL that apply	Ny Lyock pres		Nebbleessuurin saleini Milliolikoonna kapuussajana g ^{erja m} illiolikoonna karista karista karista jo on kalessa		aannoon sayssa ee'n Millio kan kan kan sakan sakan saka kun muun maan ee paneen puusaan maanaada Neel kiid kiid kiid kiid kiid ka
METHOD STAGE		*			
BOAT 1st -sample pass- 2nd					
□ 0.5 Km CLARITY	BJAESTHETICS	DI MAINTENANCE	Circle some & COMMENT	EJ ISSUES	F] MEASUREMENTS
0.2 Km	☐ NUISANCE ALGAE ☐ INVASIVE MACROPHYTES ☐ EXCESS TURBIDITY ☐ DISCOLORATION	PUBLIC / PRIVATE / BOTH / NA ACTIVE / HISTORIC / BOTH / NA YOUNG-SUCCESSION-OLD SPRAY / SNAG / REMOVED		WWTP CSO NPDES / INDUSTRY HARDENED (URBAN) DIRT&GRIME CONTAMINATED / LANDFILL BMPs-CONSTRUCTION-SEDIMENT	x width x depth max. depth x bankfull width
□ > 70 cm/ CTB □ meters □ SECCHI DEPTH □ CANOPY 1st ► M cm	TBASH/LITTER	MODIFIED / DIPPED OUT / NA LEVEED / ONE SIDED RELOCATED / CUTOFFS		LOGGING / IRRIGATION / COOLING BANK / EROSION / SURFACE FALSE BANK / MANURE / LAGOON	bankfull x depth W/D ratio bankfull max, depth
□ > 85%-OPEN	☐ SLUDGE DEPOSITS ☐ CSOs/SSOs/OUTFALLS	MOVING-BEDLOAD-STABLE ARMOURED / SLUMPS ISLANDS / SCOURED IMPOUNDED / DESIGNATED FLOOD CONTROL TORAINAGE	>	WASH H ₂ 0 / TILE / H ₂ 0 TABLE ACID / MINE / QUARRY / FLOW NATURAL / WETLAND / STAGNANT PARK / GOLF / LAWN / HOME ATMOSPHERE / DATA PAUCITY	floodprone x ² width entrench, ratio Legacy Tree:

ChicEPA

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QHEI	Score:	[19]

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	anu use A	356351116111	. Field Sileet		
Stream & Location:	WOLF PL SIL	Cical	(mm 54)	RM:, D	ate:8 2
			lame & Affiliation:_		
River Code:	STORET #:	Lat./	Long: 41 - 19.54	6 182.54,06	Office verified location
BEST TYPES BEST TYPES BLDR /SLABS [10] BOULDER [9] COBBLE [8] GRAVEL [7] BD SAND [6] BEDROCK [5] NUMBER OF BEST TY	YPES: ☐ 4-or more [2] ^{sludge} ☑ 3 or less [0]	PES POOL RIFFLE [4] [3] L [0] L print a substrates; ignore from point-sources	Check O ORIGIN LIMESTONE [1] TILLS [1] WETLANDS [0] ANDSTONE [0] SANDSTONE [0] LACUSTURINE [0] SHALE [-1] COAL FINES [-2]	SILT MOD SILT MOD FREI BODEO SON SON NOR	ERATE [-1] Substrate
quality; 3-Highest quality in diameter log that is stable, undercut banks over the overhanging vec		uf not of highest quiting, very large bould fast water, or deep > 70cm [2]	ality or in small amounts i lers in deep or fast water,	of highest. large Check ON pools.	MOUNT (C) (Or 2 & average) (C) (S) (A) (A) (A) (A) (A) (A) (A) (A) (A) (A
SINUOSITY DEVE	CCELLENT [7] NONE [6] DOD [5] RECOVER UR [3] RECOVER	ELIZATION ED [4]	STABILITY HIGH [3] MODERATE [2] TOW [1]		Channel Maximum 20
4] BANK EROSION A River right looking downstream R EROSION NONE / LITTLE [3] MODERATE [2] HEAVY / SEVERE [1] Comments	ND RIPARIAN ZONE Chec RIPARIAN WIDTH WIDE > 50m [4] MODERATE 10-50m [3] NARROW 5-10m [2] VERY NARROW < 5m [1]	FLO FOREST, FOREST,	DOD PLAIN QUALIT SWAMP [3] PR OLD FIELD [2] TIAL, PARK, NEW FIELD	TY CONSERV URBAN OF	ATION TILLAGE [1] R INDUSTRIAL [0] ONSTRUCTION [0] ant land use(s)
MAXIMUM DEPTH Check ONE (ONLY!) □ > 1m [6] □ 0.7-<1m [4]	O RIFFLE / RUN QUALITY CHANNEL WIDTH Check ONE (Or 2 & average) □ POOL WIDTH > RIFFLE WIDTH □ POOL WIDTH = RIFFLE WIDTH □ POOL WIDTH < RIFFLE WIDTH	CU (re) (1) (TH [2]		Prim. Secon (circle one)	ation Potential ary Contact dary Contact and comment on back) Pool / Current Maximum 12
Indicate for function of riffle-obligate sent set of the control o	RUN DEPTH MAXIMUM > 50cm [2] MAXIMUM < 50cm [1]	eck ONE (Or 2 & a RIFFLE / RUN 5 STABLE (e.g., Cob MOD. STABLE (e.g	verage). SUBSTRATE RIFF ble, Boulder) [2]	I population LE / RUN EMBE NONE [2] LOW [1] MODERATE EXTENSIVE	tot Riffle /
6] GRADIENT (),	ft/mi) UERY LOW - LOW (2-4]	%POOL:	%GLIDE:(150)	Gradiant
DRAINAGE AREA	MODERATE [6-10] mi²) HIGH - VERY HIGH			RIFFLE:) Gradient B) Maximum 10
EPA 4520			/ Wide = .	235 m	06/16/06

Comment RE: Reach consistency/ Is reach typical of steam?, Recreation/ Observed - Inferred, Other/ Sampling observations, Concerns, Assess directions, etc. A] SAMPLED REACH Check ALL that apply METHOD STAGE 21648N 1st -sample pass- 2nd □ BOAT ☐ HIGH ☐ MADE □ UP L. LINE WHORMAL W OTHER ☐ LOW DISTANCE ☐ DRY 0.5 Km CLARITY **BI AESTHETICS** D] MAINTENANCE E] ISSUES F] MEASUREMENTS Circle some & COMMENT 0.2 Km 1st --sample pass-- 2nd NUISANCE ALGAE WWTP CSO! NPDES / INDUSTRY PUBLIC / PRIVATE / BOTH / NA x width □ 0.15 Km □ < 20 cm ☐ INVASIVE MACROPHYTES ACTIVE / HISTORIC / BOTH / NA HARDENED / URBAN / DIRT&GRIME X depth ☐ Ø:12 Km ☐ 20-<40 cm ☐ EXCESS TURBIDITY YOUNG-SUCCESSION-OLD CONTAMINATED / LANDFILL OTHER max. depth ☐ 40-20 cm FI DISCOLORATION SPRAY / SNAG / REMOVED BMPs-CONSTRUCTION-SEDIMENT x bankfull width 10 70 cm/ CTB LOGGING / IRRIGATION / COOLING ☐ FOAMI/ SCUM MODIFIED / DIPPED OUT / NA bankfull x depth ☐ SECCHI DEPTH☐ BANK TEROSION / SURFACE LEVEED / ONE SIDED meters OIL SHEEN W/D ratio FALSE BANK / MANURE / LAGOON TRASH/LITTER RELOCATED / CUTOFFS CANOPY bankfull max, depth WASH H₂0 / TILE / H₂0 TABLE ☐ NUISANCE ODOR MOVING-BEDLOAD-STABLE ☐ > \$5%- OPEN floodprone x2 width ARMOURED / SLUMPS ACID / MINE / QUARRY / FLOW ☐ SLUDGE DEPOSITS 18255%-<85% entrench, ratio CSOS/SSOS/OUTFALLS ISLANDS / SCOURED NATURAL / WETLAND / STAGNANT □ 30%~<55% PARK / GOLF / LAWN / HOME IMPOUNDED / DESICCATED Legacy Tree: CIRECREATION AREA DEPTH □ 10%-<30%</p> FLOOD CONTROL / DRAINAGE ATMOSPHERE / DATA PAUCITY POOL: □>100ft2□>3ft CLOSED <10%- CLOSED Stream Drawing:

ChicEPA

		Good
QHEI	Score:	

Stream & Location:	Brook Field	5,14	Greek	Field Sneet	RM:	. Date 9 /7 /2
				Vame & Affiliation:		we will have been some some
River Code: -	- ST	ORET #:	Lat.	Long.:	/8 .	Office verified location
1] SUBSTRATE Checestim BEST TYPES BEDR /SLABS [10] BOULDER [9] GOBBLE [8] GRAVEL [7] BEDROCK [5] NUMBER OF BEST	POOL RIFFLE C	type present DTHER TYPES HARDPAN [4] DETRITUS [3] MUCK [2] SILT [2] ARTIFICIAL [0 (Score natural ore [2] sludge fro	POOL RIFFLE	Check CORIGIN CIMESTONE [1] TILLS [1] WETLANDS [0] HARDPAN [0] SANDSTONE [0]	SILT	Programme (BB) (BB) (BB) (BB) (BB) (BB) (BB) (BB
quality, 3-Highest quality diameter log that is stable UNDERCUT BANK OVERHANGING VI SHALLOWS (IN SUD ROOTMATS [1]	quality: 2-Modera in moderate or greati e, well developed roo (S [1]	te amounts, but r er amounts (e.g., twad in deep / fas	very large bould st water, or deep locm [2]	ality or in small amounts lers in deep or fast water	of highest , large pools. RS[1] S Che pools. E RS[1] S	AMOUNT sek ONE (Or 2 & average) XTENSIVE >75% [11] ODERATE 25-75% [7] PARSE 5-<25% [3] EARLY ABSENT <5% [1] Cover Maximum 20
☐ HIGH [4] ☐ II ☐ MODERATE [3] ☐ II ☐ LOW [2] ☐ II	VELOPMENT EXCELLENT[7] [GOOD [5] [FAIR [3] [NE in each categ CHANNEL! NONE [6] RECOVERED RECOVERING RECENT OR N	ZATION [4] [3]	STABILITY High [3] MODERATE [2] LOW [1]		Channel Maximum 20
4] BANK EROSION River right looking downstre EROSION	RIPARIA RIPARIA RIPARIA RIPARIA RIPARIA RIPARIA RIPARIA RIPARIA	.N WIDTH m [4]	FLO REST, FOREST, SHRUB O RESIDENT FENCED I	OOD PLAIN QUALI' SWAMP [3] R OLD FIELD [2] FIAL, PARK, NEW FIELD	TY D CON URB	SERVATION TILLAGE [1] AN OR INDUSTRIAL [0] NG / CONSTRUCTION [0] dominant land use(s)
5] POOL / GLIDE AN MAXIMUM DEPTH Check ONE (ONLY!)	CHANN	EL WIDTH Or 2 & average) RIFFLE WIDTH [2 RIFFLE WIDTH [3	Z]	RRENT VELOCITY Check ALL that apply ITIAL [-1] SLOW [1] AST [1] INTERSTIT INTERMITI ATE [1] EDDIES [1] In for reach - pools and rift	IAL [-1] Significant	ecreation Potential Primary Contact econdary Contact cte one and comment on back) Pool / Current Maximum 12
of riffle-obligate RIFFLE DEPTH □ BEST AREAS > 10cm [2 □ BEST AREAS 5-10cm [1 □ BEST AREAS < 5cm [metric=0]	species: RUN DEF 2] □ MAXIMUM > I] □ MAXIMUM <	Check PTH RIF 50cm [2] PSTA 50cm [1] MOI	ONE (Or 2 & au FLE / RUN S BLE (e.g., Cobl D. STABLE (e.g. TABLE (e.g., Fi	SUBSTRATE RIFF ble, Boulder) [2] ., Large Gravel) [1] ne Gravel, Sand) [0]	LE / RUN EI	□NO RIFFLE [metric=0] MBEDDEDNESS [2] 1]
6] GRADIENT ((12)	☐ MODE	LOW - LOW [2-4] RATE [6-10] VERY HIGH [10-	general service de la companya del companya del companya de la companya del la companya de la co	%POOL:(10)	%GLIDE:	Gradient Maximum B Gradient Maximum 10
EPA 4520				Λ		06/16/06

AJ SAMPLED REACH Check ALL that apply	Comment RE: Reach consistency/1	s reach typical of steam?, Recreation	√Observed - Inferred, Other	Sampling observations, Concerns, Acc	ess directions, etc.
METHOD STAGE BOAT Isl-sample pass-2nd WADE HIGH L. LINE UP OTHER NORMAL DISTANCE					
0.5 Km	INVASIVE MACROPHYTES EXCESS TURBIDITY DISCOLORATION FOAM / SCUM OIL SHEEN TRASH / LITTER NUISANCE ODOR SLUDGE DEPOSITS CSOS/SSOS/OUTFALLS	D] MAINTENANCE PUBLIC / PRIVATE / BOTH / NA ACTIVE / HISTORIC / BOTH / NA YOUNG-SUCCESSION-OLD SPRAY / SNAG / REMOVED MODIFIED / DIPPED OUT / NA LEVEED / ONE SIDED RELOCATED / CUTOFFS MOVING-BEDLOAD-STABLE ARMOURED / SLUMPS ISLANDS / SCOURED IMPOUNDED / DESICCATED FLOOD CONTROL / DRAINAGE	Circle some & COMMENT	EJ ISSUES WWTP (CSO) NPDES / INDUSTRY HARDENED / URBAN / DIRT&GRIME CONTAMINATED / LANDFILL BMPS-CONSTRUCTION-SEDIMENT LOGGING / IRRIGATION / COOLING BANK / EROSION / SURFACE FALSE BANK / MANURE / LAGOON WASH H ₂ 0 / TILE / H ₂ 0 TABLE ACID / MINE / QUARRY / FLOW NATURAL / WETLAND / STAGNANT PARK / GOLF / LAWN / HOME ATMOSPHERE / DATA PAUCITY	FJ MEASUREMENTS \(\times \text{ width} \) \(\times \text{ depth} \) \(\times \text{ dapth} \) \(\times \text{ bankfull width} \) \(\text{ bankfull } \times \text{ depth} \) \(\times \text{ dapth} \) \(\text{ bankfull max. depth} \) \(\text{ floodprone } x^2 \text{ width} \) \(\text{ entrench. ratio} \) \(\text{ Legacy Tree:} \)

OhioEPA TOWITS

QHEI	Score:	0



Stream & Location:	Sac Clarines Con	lakeCoon Loo-1	RM:	Date: { 19 12
	Section of the sectio	corers Full Name & Affiliation		
River Code:	STORET #:	Lat./ Long.: (NAD 83 - decimal °)		Office verified location
BEST TYPES BEST TYPES BEST TYPES BEST TYPES BEDR /SLABS [10] GRAVEL [7] GRAVEL [7] BEDROCK [5] NUMBER OF BEST TOmments 2] INSTREAM COVER quality in 3-Highest quality in 15 minus and 15 m	- STORET#: ONLYTwo substrate TYPE BOXES; ite % or note every type present OTHER TYPES OHARDPAN [4] DETRITUS [3] MUCK [2] SILT [2] ARTIFICIAL [6] (Score natural YPES: 4 or more [2] sludge fro 3 or less [0] R Indicate presence 0 to 3: 0-Absent quality; 2-Moderate amounts, but no moderate or greater amounts (e.g., well developed rootwad in deep / fas [1] EGETATION [1] CONLYTWO SUBSILITION [1] ARTIFICIAL [6] SCORE NOTE: 1	Check ORIGIN CHECK CHECK CHECK ORIGIN CHECK CHECK CHECK ORIGIN CHECK CHECK ORIGIN CHECK CHECK ORIGIN CHECK CHECK CHECK ORIGIN CHECK CHECK ORIGIN CHECK ORIGIN CHECK CHECK ORIGIN CHECK CHECK ORIGIN CHECK CHECK CHECK ORIGIN CHECK CHECK CHECK ORIGIN CHECK CHECK ORIGIN CHECK CHECK ORIGIN CHECK CHECK ORIGIN CHECK CHECK CHECK ORIGIN CHECK CHECK CHECK ORIGIN CHECK CHEC	SILT SILT	
Comments				Cover Maximum 20
SINUOSITY DEV HIGH [4]	OLOGY Check ONE in each categ ELOPMENT CHANNELI XCELLENT [7] NONE [6] OOD [5] RECOVERED AIR [3] RECOVERING OOR [1] RECENT OR N	ZATION STABILITY ☐ HIGH [3] [4]	1	Channel Maximum 20
River right looking downstrea B EROSION NONE / LITTLE [3] MODERATE [2]	RIPARIAN WIDTH RIPARIAN WIDTH MODERATE 10-50m [3] NARROW 5-10m [2] VERY NARROW < 5m [1]	RESIDENTIAL PARK, NEW FIEL	LITY COI COI CI	NSERVATION TILLAGE [1] BAN-OR INDUSTRIAL [0] IING / CONSTRUCTION [0] redominant land use(s)
MAXIMUM DEPTH Check ONE (ONLY/) □ > 1m [6] □ 0.7-<1m [4]	O RIFFLE / RUN QUALITY CHANNEL WIDTH Check ONE (Or 2 & average) ☐ POOL WIDTH > RIFFLE WIDTH [2 ☐ POOL WIDTH = RIFFLE WIDTH [4 ☑ POOL WIDTH < RIFFLE WIDTH [4	I VERY FAST [1] INTERST	I ITIAL [-1] ITENT [-2]	Recreation Potential Primary Contact Secondary Contact Sincle one and comment on back) Pool / Current Maximum 12
Indicate for funct of riffle-obligate s RIFFLE DEPTH BESTAREAS > 10cm [2] BESTAREAS 5-10cm [1] BESTAREAS < 5cm [metric=0] Comments 6] GRADIENT (52	Check RUN DEPTH RIF RI	D. STABLE (e.g., Large Gravel) [1] TABLE (e.g., Fine Gravel, Sand) [0]	FLE / RUN E NON LOW MOD EXTE	EMBEDDEDNESS E [2]
DRAINAGE AREA	ft/mi) VERY LOW - LOW [2-4] MODERATE [6-10] Mi ²) HIGH - VERY HIGH [10-	%POOL:() %GLIDE:()%RIFFLE:(Gradient Maximum 10 06/16/06

AJ SAMPLED REACH Check ALL that apply	Co	omment RE: Reach consistency/1	s reach typical of steam?, Recreation	n/ Observed - Interred, Other	/ Sampling obs	ervations, Concerns, Acc	ess directions, etc.
METHOD STAGE BOAT STAGE WADE HIGH L. LINE UP OTHER NORMA DISTANCE DRY	Ss-2nd —						
0.5 Km	2nd	BJ AESTHETICS NUISANCE ALGAE INVASIVE MACROPHYTES EXCESS TURBIDITY DISCOLORATION FOAM SCUM OIL SHEEN	DJ MAINTENANCE PUBLIC / PRIVATE / BOTH / NA ACTIVE / HISTORIC / BOTH / NA YOUNG-SUCCESSION-OLD SPRAY / SNAG / REMOVED MODIFIED / DIPPED OUT / NA LEVEED / ONE SIDED	Circle some & COMMENT	WWTP / CS HARDENED CONTAN BMPs-CONS LOGGING / I	TISSUES / NPDES / INDUSTRY / NPDES / INDUSTRY URBAN / DIRT&GRIME NATED / LANDFILL RUCTION-SEDIMENT RRIGATION / COOLING RCSION / SURFACE	FJ MEASUREMENTS x width x depth max. depth x bankfull width bankfull x depth
CANOPY 1st 2nd	cm cm	TRASH / LITTER NUISANCE ODOR SLUDGE DEPOSITS CSOs/SSOs/OUTFALLS TION AREA DEPTH POOL: >100ft2 >3ft	RELOCATED / CUTOFFS MOVING-BEDLOAD-STABLE ARMOURED / SLUMPS ISLANDS / SCOURED IMPOUNDED / DESIGCATED FLOOD CONTROL / DRAINAGE		WASH H ₂ : ACID / MIN NATURAL / V PARK / G	K/MANURE/LAGOON 0/ LE/H ₂ 0 TABLE NE/LUARRY/FLOW NETL ND/STAGNANT OLF/E AWN/HOME ERE/DATA PAUCITY	W/D ratio bankfull max. depth floodprone x ² width entrench, ratio Legacy Tree:



Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

		FAI
QHEI	Score:	(H9

Stream & Location: Ogthon	S4 DPP		RM:	Date:] 72 72
River Code:	STORET #:	corers Full Name & Affiliation: Lat./ Long.:	/8 .	Office verified _I
1) SUBSTRATE Check ONLYTWO S estimate % or note BEST TYPES POOL RIFFLI DIE GOOD BLDR /SLABS [10] COBBLE [8] GRAVEL [7] GRAVEL [7] SAND [6] 15 NUMBER OF BEST TYPES:	ubstrate TYPE BOXES; every type present OTHER TYPES HARDPAN [4] DETRITUS [3] MUCK [2] SILT [2] ARTIFICIAL [0	POOL RIFFLE ORIGIN IMESTONE [1] ILLS [1] WETLANDS [0] ARDPAN [0] SANDSTONE [0] SUBSTRIES: IGNORE RIP/RAP [0]	ONE (Or 2 8	OCATION Laverage) OUALITY HEAVY [-2] MODERATE [-1] Substrate [-1] EXTENSIVE [-2] MODERATE [-1] MODERATE [-1] NORMAL [0] NONE [1]
2] INSTREAM COVER Indicate propulative 2-1 quality; 2-1 quality; 3-Highest quality in moderate of diameter log that is stable, well developed UNDERCUT BANKS [1] OVERHANGING VEGETATION [1] SHALLOWS (IN SLOW WATER) OROOTMATS [1]	r greater amounts, but n r greater amounts (e.g., ed rootwad in deep / fas POOLS > 70	not of highest quality or in small amount very large boulders in deep or fast wate at water, or deep, welf-defined, functions or [2] OXBOWS, BACKWAT AQUATIC MACROPHY	er, large il pools. ERS [1]	AMOUNT Check ONE (Or 2 & average) EXTENSIVE >75% [11] MODERATE 25-75% [7] SPARSE 5-<25% [3] NEARLY ABSENT <5% [1] Cover Maximum 20
3] CHANNEL MORPHOLOGY CONTROL SINUOSITY DEVELOPMENT DE	OT CHANNELI OF NONE [6] OF RECOVERED OF RECOVERING	ZATION STABILITY HIGH [3] [4] MODERATE [2]	i pina	Channel Maximum 20
EROSION	PARIAN WIDTH E > 50m [4] [DERATE 10-50m [3] [ROW 5-10m [2] [Y NARROW < 5m [1] [FLOOD PLAIN QUAL FOREST, SWAMP [3] SHRUB OR OLD FIELD [2] RESIDENTIAL, PARK, NEW FIEL	LITY	CONSERVATION TILLAGE [1] URBAN OR INDUSTRIAL [0]
Check ONE (ONLY) Check ☐ 1m [6] ☐ POOL W ☐ 0.7<1m [4] ☐ POOL W ☐ 0.4<0.7m [2] ☐ POOL W	/ RUN QUALITY IANNEL WIDTH ONE (Or 2 & average) IDTH > RIFFLE WIDTH [IDTH = RIFFLE WIDTH [IDTH < RIFFLE WIDTH [1] VERY FAST [1] INTERST] TTIAL [-1] TTENT [-2] 1]	Recreation Potential Primary Contact Secondary Contact (circle one and comment on back) Pool/ Current Maximum 12
of riffle-obligate species: RIFFLE DEPTH RU □ BEST AREAS > 10cm [2] ☑ MAXIII	Check N DEPTH RIF NUM > 50cm [2] STA NUM < 50cm [1] MO UNS	st be large enough to suppor ONE (Or 2 & average). FFLE / RUN SUBSTRATE RII BLE (e.g., Cobble, Boulder) [2] D. STABLE (e.g., Large Gravel) [1] STABLE (e.g., Fine Gravel, Sand) [0]	FFLE / RU	Ation NO RIFFLE [metric=1] IN EMBEDDEDNESS NONE [2] LOW [1] MODERATE [0] Riffle EXTENSIVE [-1] Maximum
6] GRADIENT (, 44 ft/mi) DRAINAGE AREA	VERY LOW - LOW [2-4 MODERATE [6-10] HIGH - VERY HIGH [10		%GLID	Mayimum 1/2

39.6m

AJ SAMPLED REACH Check ALL that apply	Comment RE; Reach consistency/1	Is reach typical of steam?, Recreation	n/ Observed - Inferred, Other	√ Sampling observations, Concerns, Acc	ess directions, etc.
METHOD STAGE BOAT 1st sample pass-2nd WADE ☐ HIGH ☐ LINE ☐ UP ☐					
OTHER ONORMALO					
0.5 Km	INVASIVE MACROPHYTES EXCESS TURBIDITY DISCOLORATION FOAM / SCUM OIL SHEEN TRASH / LITTER NUISANCE ODOR SLUDGE DEPOSITS CSOs/SSOs/OUTFALLS	D] MAINTENANCE PUBLIC / PRIVATE / BOTH / NA ACTIVE / HISTORIC / BOTH / NA YOUNG-SUCCESSION-OLD SPRAY / SNAG / REMOVED MODIFIED / DIPPED OUT / NA LEVEED / ONE SIDED RELOCATED / CUTOFFS MOVING-BEDLOAD-STABLE ARMOURED / SLUMPS ISLANDS / SCOURED IMPOUNDED / DESICCATED FLOOD CONTROL / DRAINAGE	Circle some & COMMENT	EJISSUES WWTP CSO PPDES / INDUSTRY HARDENED / URBAN / DIRT&GRIME CONTAMINATED / LANDFILL BMPS-CONSTRUCTION-SEDIMENT LOGGING / IRRIGATION / COOLING BANK / EROSION / SURFACE FALSE BANK / MANURE / LAGOON WASH H ₂ 0 / TILE / H ₂ 0 TABLE ACID / MINE / QUARRY / FLOW NATURAL / WETLAND / STAGNANT PARK / GOLF / LAWN / HOME ATMOSPHERE / DATA PAUCITY	F] MEASUREMENTS \(\overline{x} \) width \(\overline{x} \) depth \(\overline{x} \) bankfull width bankfull \(\overline{x} \) depth W/D ratio bankfull max. depth floodprone \(x^2 \) width entrench. ratio Legacy Tree:

ChoERA WW

		01000
QHEI	Score:	(62)

Stream & Location	Property of the Control of the Contr	*******************	Dzs 1	7	2547	RM:	Date:7	1// 1/3
on carrie a account,	"	3 1-4 m. L.		Classes Euli Nar	ne & Affiliation	-	······································	12115
River Code: -	der Mittelsteil der	STORET #:		Lat./ Lo (NAD 83 - der	ong.:	/8 .	akulda silince asserbus ar dell'alkalimente unit anni lanchante della asserbiti la secondi la la secondi la se B	Office verified location
1] SUBSTRATE Ch esi BEST TYPES	timate % or note ev	ostrate TYPE BOX very type present OTHER TY	DEC	RIFFLE		ONE (Or 2 8	QUALIT	TY
BLDR /SLABS [1] BOULDER [9] COBBLE [8] GRAVEL [7] SAND [6] BEDROCK [5] NUMBER OF BES Comments	T TYPES: 4	HARDPAI HARDPAI DETRITU MUCK [2] SILT [2] ARTIFICIA (Score na or more [2] Sludg or less [0]	N [4] S [3] AL [0] tural substrai	tes; ignore [-sources]	IMESTONE [1] TILLS [1] WETLANDS [0] HARDPAN [0] SANDSTONE [0] RIP/RAP [0] LACUSTURINE [SHALE [-1] COAL FINES [-2	SILT SILT SILT SILT	HEAVY [-2] MODERAT NORMAL [FREE [1] EXTENSIV MODERAT NORMAL [NONE [1]	E [-1] Substr
quality, 3-Highest qualidiameter log that is standard with the standard of the	quality; 2-Mo ity in moderate or g ble, well developed VKS [1] VEGETATION [1]	derate amounts, preater amounts (in the control of	but not of his e.g., very lar /fast water,	ghest quality ge boulders or deep, we OX AQ	or in small amoung in deep or fast wat	its of highest ter, large nal pools. [TERS [1] [IYTES [1] [Check ONE (Or EXTENSIVE > MODERATE 2 SPARSE 5-<2 NEARLY ABS	2 & average) 75% [11] 5-75% [7] 5% [3] ENT <5% [1]
Comments							M	aximum 20
☐ HIGH [4] ☐ MODERATE [3] ☐ LOW [2]	PHOLOGY Che EVELOPMENT] EXCELLENT [7]] GOOD [5] Y FAIR [3]] POOR [1]		ELIZATIONED [4] RING [3]	N	STABILITY STABILITY HIGH [3] MODERATE [LOW [1]	2]		Channel aximum 20
4] BANK EROSIOI River right looking downs EROSION NONE / LITTLE [2] HEAVY / SEVERE Comments	Stream RIPA	RIAN WIDTH > 50m [4] RATE 10-50m [3] DW 5-10m [2] NARROW < 5m [D B FO	FLOO OREST, SW HRUB OR C ESIDENTIAL ENCED PAS	D PLAIN QUAI AMP [3] DLD FIELD [2] ., PARK, NEW FIEL		CONSERVATION URBAN OR INDE MINING / CONST e predominant lan 20m riparian.	ISTRIAL [0] RUCTION [0]
5] POOL / GLIDE A MAXIMUM DEPT Check ONE (ONLY! □ 1 1m [6] □ 0.7-<1m [4] □ 0.4-<0.7m [2] □ 0.2-<0.4m [1] □ < 0.2m [0] Comments	H CHA Check O POOL WID	RUN QUALIT NNEL WIDTH NE (Or 2 & avera TH > RIFFLE WID TH = RIFFLE WID TH < RIFFLE WID	I ge) TH[2] [] TH[1] [] TH[0] []	Chec TORRENTIA VERY FAST FAST [1] MODERATE	☐ INTERM	1] TITIAL [-1] ITTENT [-2] [1]		Contact Contact
Indicate for fur of riffle-obligat RIFFLE DEPTH BEST AREAS > 10cm BEST AREAS 5-10cm BEST AREAS < 5cm [metric	te species: RUN I [2] MAXIMUI [1] MAXIMUI	C DEPTH W > 50cm [2] □ W < 50cm [1] ☑	heck ONE (RIFFLE / STABLE (e MOD. STAB	Or 2 & avera RUN SUE .g., Cobble, 3LE (e.g., La	ige). BSTRATE RII Boulder) [2]	FFLE / RUI	tion NO RI N EMBEDDE! ONE [2] OW [1] ODERATE [0] XTENSIVE [-1]	FFLE [metric=0 ONESS
DRAINAGE ARE	EA OM	RY LOW - LOW DERATE [6-10] 3H - VERY HIGH			5POOL: 10 5RUN: (10) %GLIDE		aximum 10
EPA 4520	130/20 -C	0						06/16/06

AJ SAMPLED REACH Check ALL that apply METHOD STAGE BOAT	BJ AESTHETICS NUISANCE ALGAE INVASIVE MACROPHYTES EXCESS TURBIDITY DISCOLORATION FOAM!/ SCUM OIL SHEEN TRASH!/ LITTER NUISANCE ODOR SLUDGE DEPOSITS CSOs/SSOs/OUTFALLS	D] MAINTENANCE PUBLIC / PRIVATE / BOTH / NA ACTIVE / HISTORIC / BOTH / NA YOUNG-SUCCESSION-OLD SPRAY / SNAG / REMOVED MODIFIED / DIPPED OUT / NA LEVEED / ONE SIDED RELOCATED / CUTOFFS MOVING-BEDLOAD-STABLE ARMOURED / SLUMPS ISLANDS / SCOURED IMPOUNDED / DESICCATED FLOOD CONTROL / DRAINAGE	Observed - Inferred, Other. Circle some & COMMENT	FI ISSUES WWTP I GSO / NPDES / INDUSTRY HARDENED / URBAN DIRT&GRIME CONTAMINATED / LANDFILL BMPS-CONSTRUCTION-SEDIMENT LOGGING / IRRIGATION / COOLING BANK / EROSION / SURFACE FALSE BANK / MANURE / LAGOON WASH H ₂ 0 / TILE / H ₂ 0 TABLE ACID / MINE / QUARRY / FLOW NATURAL / WETLAND / STAGNANT PARK / GOLF / LAWN / HOME ATMOSPHERE / DATA PAUCITY	FJ MEASUREMENTS X width X depth max. depth bankfull X depth W/D ratio bankfull max. depth floodprone x² width entrench, ratio Legacy Tree:
Stream Drawing:	opprende egyptychete familia dewys of der dag twy general dag best		Postball	Eddie/allike	Grand
B-22		and develop			
				<- 3	
g food bur		At will be		South hostily and	
The second secon	100 m	Company of the Control of the Contro		1,61	ē <i>r</i> is

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Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

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QHEI	Score:	(51)

Stream & Location:	Roose Ve	It DPA	<u> </u>		RM:	Date@1251	
	and the second s	and the second s		ll Name & Affiliation at./ Long.;	y H	Office v	
River Code:	a company three many contra	STORET #:	(NA	D 83 - decimal ")	/8		ocation C
BEST TYPES BLDR /SLABS [10] BOULDER [9] COBBLE [8] GRAVEL [7] SAND [6]	POOL RIFFLE	ery type present OTHER TYP HARDPAN DETRITUS MUCK [2] ARTIFICIAL (Score natu	ES POOL RIF	FLE ORIGIN LIMESTONE [1] TILLS [1] WETLANDS [0] HARDPAN [0] SANDSTONE [0]	OF END	QUALITY HEAVY [-2]	Gubstra G Waximur 20
quality; 3-Highest quality idiameter log that is stable UNDERCUT BANK OVERHANGING VERHALLOWS (IN SEROOTMATS [1]	quality; 2-Mo in moderate or g s, well developed S [1] EGETATION [1]	derate amounts, bureater amounts (e. rootwad in deep /	ut not of highes g., very large bi fast water, or d 70cm [2]	ill amounts or if more commit quality or in small amount outders in deep or fast wateep, well-defined, functional OXBOWS, BACKWAT AQUATIC MACROPH' LOGS OR WOODY DE	ts of highest er, large al pools. 'ERS [1] YTES [1]	AMOUNT Check ONE (Or 2 & avera EXTENSIVE >75% [11] MODERATE 25-75% [7] SPARSE 5-<25% [3] NEARLY ABSENT <5% Cover Maximum 20	1
☐ HIGH [4] ☐ E ☐ MODERATE [3] ☐ C ☑ F ☐ LOW [2] ☑ F	HOLOGY Che /ELOPMENT EXCELLENT [7] GOOD [5] FAIR [3] POOR [1]	CHANNE NONE [6] RECOVERE RECOVERE	LIZATION D [4]	STABILITY HIGH [3] MODERATE [2] LOW [1]	2]	Channel Maximum 20	10.
4] BANK EROSION / River right looking downstre BEROSION NONE / LITTLE [3] MODERATE [2] HEAVY / SEVERE [1]	AM RIPA	RIAN WIDTH 50m [4] RATE 10-50m [3] DW 5-10m [2] VARROW < 5m [1]	FORES	FLOOD PLAIN QUAL ST, SWAMP [3] B OR OLD FIELD [2] ENTIAL, PARK, NEW FIEL	D [1] O Indicate past 10	CONSERVATION TILLAGE URBAN OR INDUSTRIAL MINING I CONSTRUCTION of predominant land use(s) Of riparian Riparian	101
5] POOL / GLIDE AN MAXIMUM DEPTH Check ONE (ONLY!) > 1m [6] 0.7-<1m [4] 0.4-<0.7m [2] 0.2-<0.4m [1] <0.2m [0] Comments	CHA Check O SPOOL WIDT	RUN QUALITY NNEL WIDTH NE (Or 2 & average H > RIFFLE WIDTH H = RIFFLE WIDTH H < RIFFLE WIDTH	9) H[2]	CURRENT VELOCITY Check ALL that apply RENTIAL [-1] A SLOW [1] (FAST [1]	Y TIAL [-1] TENT [-2] 1]	Recreation Potentia Primary Contact Secondary Contact (circle one and comment on back Pool / Current Maximum 12	t
Indicate for func of riffle-obligate RIFFLE DEPTH BEST AREAS > 10cm [2 BEST AREAS 5-10cm [1 BEST AREAS < 5cm [metric=0	species: RUN [□ MAXIMUI □ MAXIMUI	Che DEPTH R M > 50cm [2] □ S M < 50cm [1] M M	eck ONE (Or 2 IFFLE / RUI TABLE (e.g., C OD. STABLE (FLE / RUI	tion NO RIFFLE [me N EMBEDDEDNESS ONE [2] DW [1] CODERATE [0] Riffle / Run (Maximum 8)	tric=0]
6] GRADIENT (, 4) DRAINAGE AREA (EPA 4520	☐ MC	RY LOW - LOW [2 DERATE [6-10] GH - VERY HIGH [%POOL: %RUN:) %GLIDE)%RIFFLE	7	6)

(15.1m)

AJ SAMPLED REACH Check ALL that apply	Comment RE: Reach consistency/1	s reach typical of steam?, Recreation	n/Observed - Inferred, Other	✓ Sampling observations, Concerns, Acc	ess directions, etc.
METHOD STAGE BOAT Isl -sample pass-2nd HIGH DISTANCE DDPY D					
DRY	INVASIVE MACROPHYTES INVASIVE MACROPHYTES EXCESS TURBIDITY DISCOLORATION FOAM/ SCUM OIL SHEEN TRASH / LITTER NUISANCE ODOR SLUDGE DEPOSITS CSOS/SSOS/OUTFALLS	D] MAINTENANCE PUBLIC / PRIVATE / BOTH / NA ACTIVE / HISTORIC / BOTH / NA YOUNG-SUCCESSION-OLD SPRAY / SNAG / REMOVED MODIFIED / DIPPED OUT / NA LEVEED / ONE SIDED RELOCATED / CUTOFFS MOVING-BEDLOAD-STABLE ARMOURED / SLUMPS ISLANDS / SCOURED IMPOUNDED / DESICCATED FLOOD CONTROL / DRAINAGE	Circle some & COMMENT	E] ISSUES WWTP / CSO / NPDES / INDUSTRY HARDENED / URBAN / DIRT&GRIME CONTAMINATED / LANDFILL BMPs-CONSTRUCTION-SEDIMENT LOGGING / IRRIGATION / COOLING BANK / EROSION / SURFACE FALSE BANK / MANURE / LAGOON WASH H ₂ 0 / TILE / H ₂ 0 TABLE ACID / MINE / QUARRY / FLOW NATURAL / WETLAND / STAGNANT PARK / GOLF / LAWN / HOME ATMOSPHERE / DATA PAUCITY	F] MEASUREMENTS X.width X.depth maxdepth X bankfull width bankfull X depth W/D ratio bankfull max. depth floodprone X² width entrench. ratio Legacy Tree:



		Jail
QHEI	Score:	(5Z)

Stream & Location:	Daven Des	Maries 21. 1		R M : Dat	e:71 /61 12
		to the transport of the second	lame & Affiliation:		
River Code:	STORET #	t: Lat./ (NAD 83	Long.:		Office verified location
BEST TYPES BLDR /SLABS [10] BOULDER [9] COBBLE [8] GRAVEL [7] SAND [6]	☐ ☐ HARD ☐ DETR ☐ DETR ☐ SILT [rent TYPES POOL RIFFLE PAN [4] ITUS [3] [5 [2] 2] FICIAL [0]	ORIGIN LIMESTONE [1] TILLS [1] WETLANDS [0] HARDPAN [0] SANDSTONE [0]	SILT HEAV SILT NORM FREE DEO EXTEN	RATE [-1] Substrate AL [0] [1] ISIVE [-2] RATE [-1] AL [0] Maximum 20
quality; 3-Highest quality in diameter fog that is stable UNDERCUT BANK: OVERHANGING VE	n moderate or greater amour , well developed rootwad in c S [1] POO	nts, but not of highest quits (e.g., very large bould leep / fast water, or deep DLS > 70cm [2]	ality or in small amounts of lers in deep or fast water, k	Trignest Check ONE arge Check ONE OOIS. CALLED EXTENSIONS [1] CALLED EXTENSION OF THE CONTROL OF THE CHECK ONE OF THE CHECK O	OUNT (Or 2 & average) VE >75% [11] TE 25-75% [7] 5-<25% [3] ABSENT <5% [1] Cover Maximum 20
SINUOSITY DEV HIGH [4]	XCELLENT[7] NONE SOOD [5] RECO AIR [3] RECO	NNELIZATION	STABILITY HIGH [3] MODERATE [2] LOW [1]		Channel Maximum 20
4] BANK EROSION ARIVER right looking downstre EROSION DENON / LITTLE [3] DENON / SEVERE [1] Comments	WIDE > 50m [4] MODERATE 10-50i NARROW 5-10m [2]	TH FL(DFOREST, m [3]	DOD PLAIN QUALIT' SWAMP [3] OR OLD FIELD [2] TIAL, PARK, NEW FIELD [1	Y R CONSERVA	NSTRUCTION [0] Int land use(s)
5] POOL / GLIDE AN MAXIMUM DEPTH Check ONE (ONLY!)	D RIFFLE / RUN QUA: CHANNEL WII Check ONE (Or 2 & a ☐ POOL WIDTH > RIFFLE ☐ POOL WIDTH < RIFFLE ☐ POOL WIDTH < RIFFLE	OTH CU Iverage) (WIDTH [2]	AST [1] INTERSTITION	AL [-1] ENT [-2] Prima Second (circle one an	ion Potential ry Contact lary Contact d comment on back) Pool / Current Maximum 12
Indicate for function of riffle-obligate RIFFLE DEPTH BEST AREAS - 10cm [1] BEST AREAS - 10cm [1] BEST AREAS - 5em Innetrice [Comments G] GRADIENT DRAINAGE AREA	RUN DEPTH MAXIMUM > 50cm [2] MAXIMUM < 50cm [1] MAXIMUM < 50cm [1]	Check ONE (Or 2 & a RIFFLE / RUN S STABLE (e.g., Cob MOD. STABLE (e.g., F) UNSTABLE (e.g., F) OW [2-4]	verage). SUBSTRATE RIFFL ble, Boulder) [2] s., Large Gravel) [1] ine Gravel, Sand) [0]	population E / RUN EMBED NONE [2] LOW [1] MODERATE [EXTENSIVE [0] Riffle / Run Annum 8
EPA 4520	mi²) HIGH · VERY I	-	%RUN: (100)%	RIFFLE:	06/16/06

AJ SAMPLE Check AL	D REACH LL that apply	Comment RE: Reach consistency/	is reach typical of steam?, Recreation	n/ Observed - Inferred, <i>Other</i>	√ Sampling observations, Concerns, Acc	ess directions, etc.
METHOD	STAGE					and a contract of the response and a contract of the response
☐ BOAT ☐ WADE ☐ L. LINE ☐ OTHER	1st -sample pass- 2nd HIGH UP NORMAL DELOW					
DISTANCE	ÖDRY 🗇					
□ 0.15 Km □ 0.12 Km □ OTHER □	CLARITY 1stsample pass 2nd < 20 cm	☐ INVASIVE MACROPHYTES ☐ EXCESS TURBIDITY ☐ DISCOLORATION ☐ FOAM/ SCUM	DJ MAINTENANCE PUBLIC / PRIVATE / BOTH / NA ACTIVE / HISTORIC / BOTH / NA YOUNG-SUCCESSION-OLD SPRAY / SNAG / REMOVED MODIFIED / DIPPED OUT / NA LEVEED / ONE SIDED	Circle some & COMMENT	EJ ISSUES WWTP / CSO / NPDES / INDUSTRY HARDENED / URBAN / DIRT&GRIME CONTAMINATED / LANDFILL BMPs-CONSTRUCTION-SEDIMENT LOGGING / IRRIGATION / COOLING BANK / EROSION / SURFACE	F] MEASUREMENTS \(\tilde{x} \) width \(\tilde{x} \) depth max. depth \(\tilde{x} \) bankfull width bankfull \(\tilde{x} \) depth
CANOPY > 85%- OPEI 55%-<85% 30%-<55% 10%-<30% <10%- CLOS	N g cm	☐ NUISANCE ODOR ☐ SLUDGE DEPOSITS ☐ CSOs/SSOs/OUTFALLS	RELOCATED / CUTOFFS MOVING-BEDLOAD-STABLE ARMOURED / SLUMPS ISLANDS / SCOURED IMPOUNDED / DESICCATED FLOOD CONTROL / DRAINAGE		FALSE BANK / MANURE / LAGOON WASH H ₂ 0 / TILE / H ₂ 0 TABLE ACID / MINE / QUARRY / FLOW NATURAL / WETLAND / STAGNANT PARK / GOLF / LAWN / HOME ATMOSPHERE / DATA PAUCITY	W/D ratio bankfull max, depth floodprone x ² width entrench, ratio Legacy Tree:



		fair
QHEI	Score:	48

Stream & Location:	Willow	<u> Sarrya</u>	My 71	2 25	Quer_	RM:	Date:	813112
		OTODET #.	_Scorer		me & Affiliati			Office verified —
River Code: -	OMIVTWO	STORET #:		Lat./L (NAD 83 - d	ecimal "1 ·			location
estima	ate % or note e	OTHER TY HARDPA DETRITU MUCK [2] ARTIFICI	PES POO N [4] S [3] AL [0]		ORIGIN LIMESTONE [TILLS [1] WETLANDS [HARDPAN [0] SANDSTONE RIP/RAP [0]	O] SILT	QUALI DHEAVY [-2 DHEAV	2] TE [-1] Substrate [0] VE [-2] TE [-1]
2] INSTREAM COVE quality; 3-Highest quality i diameter log that is stable UNDERCUT BANK OVERHANGING VE SHALLOWS (IN SL ROOTMATS [1] Comments	quality; 2-Mi n moderate or , well develope S [1] EGETATION [1]	greater amounts, greater amounts (direction for the proof of the proof	e.g., verv la	rignest quali rige boulder r, or deep, v	ty or in smail amα s in deep or fast ι	water, large lional pools. [VATERS [1] [VPHYTES [1] [Check ONE (O) EXTENSIVE MODERATE SPARSE 5-< NEARLY AB:	r 2 & average) >75% [11] 25-75% [7]
☐ HIGH [4] ☐ E ☐ MODERATE [3] ☐ C ☐ LOW [2] ☐ F	HOLOGY Chi VELOPMEN EXCELLENT [7 GOOD [5] FAIR [3] FOOR [1]	T CHANN	NELIZATI RED [4] RING [3]	ON	STABILITY HIGH [3] MODERATE LOW [1]			Channel Maximum 20
4] BANK EROSION ARIVER right looking downstree EROSION NONE / LITTLE [3] HEAVY / SEVERE [1]	RIPA	RIAN WIDTH > 50m [4] ERATE 10-50m [3 IOW 5-10m [2] NARROW < 5m		FLOG FOREST, SI SHRUB OR RESIDENTIA FENCED PA	OD PLAIN QU	JALITY	CONSERVATIO URBAN OR INE MINING / CONS e predominant le 00m riparian.	DUSTRIAL [0] TRUCTION [0]
OOMMents								10 🖳
5] POOL / GLIDE AN MAXIMUM DEPTH Check ONE (ONLY!) ☐ 1m [6] ☐ 0.7-<1m [4] ☐ 0.4-<0.7m [2] ☐ 0.2-<0.4m [1] ☐ < 0.2m [0] Comments	CHA Check (POOL WID POOL WID	RUN QUALIT ANNEL WIDTI DNE (Or 2 & aver ITH > RIFFLE WIG ITH = RIFFLE WIG ITH < RIFFLE WIG	H age) OTH[2] [] OTH[1] [] OTH[0] []	Ch TORRENT VERY FAS FAST [1] MODERAT	T [1] INTE	ly W [1] RSTITIAL [-1] RMITTENT [-2] ES [1]	Secondar (circle one and co	Contact y Contact
Indicate for function of riffle-obligate RIFFLE DEPTH BEST AREAS > 10cm [3] BEST AREAS 5-10cm [4] BEST AREAS < 5cm [4] [metric=0]	species: RUN 2] □ MAXIMI 1] □ MAXIMI	DEPTH JM > 50cm [2] [JM < 50cm [1] [Check ONE RIFFLE STABLE (MOD. STA	(Or 2 & ave / RUN St e.g., Cobbl ABLE (e.g.,	JBSTRATE e, Boulder) [2]	RIFFLE / RU	TAMO	Riffle /
6] GRADIENT (1). DRAINAGE AREA	A 🗆 N	ERY LOW - LOW IODERATE [6-10 IGH - VERY HIG]		%POOL: %RUN:	%GLID %RIFFLI		Gradient 6
EPA 4520	20	will 6	4.0m	\bigcirc				06/16/06
507 - 5) OVER TH	B-2	270, 3				

AJ SAMPLED REACH Check ALL that apply	Comment RE: Reach consistency/	Is reach typical of steam?, Recreation	n/ Observed - Inferred, <i>Other</i>	r/ Sampling observations, Concerns, Acc	ess directions, etc.
METHOD STAGE BOAT st-sample pass-2nd HIGH					
□ 0.5 Km □ 0.2 Km □ 0.15 Km □ 0.15 Km □ < 20 cm □ 0.12 Km □ 20~40 cm □ 0THER □ 40-70 cm □ > 70 cm/ CTB □ SECCHI DEPTHI CANOPY □ 55%~85% □ 30%~55% □ 10%~30% □ <10%-CLOSED	INVASIVE MACROPHYTES INVASIVE MACROPHYTES EXCESS TURBIDITY DISCOLORATION FOAM! SCUM OIL SHEEN TRASH / LITTER NUISANCE ODOR SLUDGE DEPOSITS CSOs/SSOs/OUTFALLS	D] MAINTENANCE PUBLIC / PRIVATE / BOTH / NA ACTIVE / HISTORIC / BOTH / NA YOUNG-SUCCESSION-OLD SPRAY / SNAG / REMOVED MODIFIED / DIPPED OUT / NA LEVEED / ONE SIDED RELOCATED / CUTOFFS MOVING-BEDLOAD-STABLE ARMOURED / SLUMPS ISLANDS / SCOURED IMPOUNDED / DESICCATED FLOOD CONTROL / DRAINAGE	Circle some & COMMENT	EJ ISSUES WWTP / CSO / NPDES / INDUSTRY HARDENED / URBAN / DIRT&GRIME CONTAMINATED / LANDFILL BMPs-CONSTRUCTION-SEDIMENT LOGGING / IRRIGATION / COOLING BANK / EROSION / SURFACE FALSE BANK / MANURE / LAGOON WASH H ₂ 0 / TILE / H ₂ 0 TABLE ACID / MINE / QUARRY / FLOW NATURAL / WETLAND / STAGNANT PARK / GOLF / LAWN / HOME ATMOSPHERE / DATA PAUCITY	F] MEASUREMENTS X width X depth max. depth X bankfull width bankfull X depth W/D ratio bankfull max. depth floodprone x² width entrench. ratio Legacy Tree:

S PORTER

Stream Drawing:

B-28

Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

		-4	æ	ě :	-
QHEI	Score:		5	3	

	100	C. A		7			******************************	
Stream & Location:	DPK	Steps	en s	refere. Anna Caracteria de Caracteria		RM:	Date:8174	7773
			_Scorers		Affiliation:			
River Code:	gar dan lagram stander bilagels manual supergrammer	STORET #:	indi laccade accept movem magnin	Lat./Long. (NAD 83 - decimal*		/8	Om(ie verified location
1] SUBSTRATE Chec	k ONLY Two sub	ostrate <i>TYPE BOX</i> very type present	ES;	r	Check C	NE (Or 2 &	average)	
BEST TYPES	POOL RIFFLE	OTHER TY	PES	سنير او ننان سواي پوس	ORIGIN	,,,ee (0) e a	QUALITY	
☐ ☐ BLDR /SLABS [10]		☐ ☐ HARDPAN	PUUL	KIFFLE	ESTONE [1]		☐ HEAVY [-2]	
BOULDER [9]		DETRITUS			LS [1]	SILT	☐ MODERATE [-1]	Substrate
☐ ☐ COBBLE [8]		☐ ☐ MUCK [2]	sinning mental and a second	- The second sec	TLANDS [0]	3121	⊠NORMAL [0]	
GRAVEL [7]				national desiration of the second	RDPAN [0]		OFREE (1)	1151
☐ ☐ SAND [6] ☐ ② BEDROCK [5]		ARTIFICIA		s; ignore 🔲 RIP	NDSTONE [0]	SEDDEON	EXTENSIVE [-2] MODERATE [-1]	
NUMBER OF BEST	TVDES - 874	or more [2] Sludge	arar substrate a from point-s	sources) [] LA	CUSTURINE [0]	EM.	S SNORMAL [0]	Maximum 20
Comments		or less [0]		LJ SH.	ALE [-1]		☐ NONE [1]	
1.200	Sect .	P. 11		Псо	AL FINES [-2]			
2) INSTREAM COVE		V6U(401 >	<u> 492</u>					erijenilikudinikulunyelde epipe
*	quality; 2-Mc	iderate amounts, b	rut not of high	nest quality or in	i small amounts	of highest	,	
quality, 3-Highest quality	in moderate or o	reater amounts (e	g., very large	e boulders in de	ep or fast water	large	Check ONE (Or 2 & av	
diameter log that is stable UNDERCUT BANK					IS, BACKWATE	PS [41]] EXTENSIVE >75% [☑ MODERATE 25-75%	
OVERHANGING VI	EGETATION [1]	Ø ROOTW		Part .	C MACROPHY		SPARSE 5-<25% [3	
SHALLOWS (IN SL	OW WATER) [1	」	ERS [1]	LOGS O	R WOODY DEE	BRIS [1]	NEARLY ABSENT	5% [1]
ROOTMATS [1]							Cove	7
Comments							Maximu	m
3] CHANNEL MORPH								
	VELOPMENT		ELIZATIO		TABILITY			
	EXCELLENT [7]	□ NONE [6] ☑ RECOVER	C P FAI	Married Poly	HIGH [3]			
. ,	GOOD [5] FAIR [3]	Ø RECOVER	n =		NODERATE [2] LOW [1]			
	POOR [1]	*7	R NO RECO				Chann	iel 💮
Comments				-			Maximu	m 0
4] BANK EROSION.		AN ZONE Chec	k ONE in ear				& average)	
River right looking downstre	L R	RIAN WIDTH	L R	FLOOD PI	LAIN QUALI	TYLR		
EROSION NONE / LITTLE [3]		> 50m [4]		REST, SWAMP			CONSERVATION TILL	
MODERATE [2]		RATE 10-50m [3] OW 5-10m [2]		RUB OR OLD F	FIELD [2] RK, NEW FIELD		JRBAN OR INDUSTRI MINING / CONSTRUCT	
☐ ☐ HEAVY / SEVERE [1] O VERY	NARROW < 5m [1	1 D D FEN	NCED PASTUR	E III		predominant land uset	
	□ □ NONE		□ □ OP	EN PASTURE,	ROWCROP [0]		e predominam land uset 10m riparian - Ripari a	January Committee Committe
Comments							Maximu	= 2 / <i>2 - 1</i> 2 2 1
							;	
5] POOL / GLIDE AN			/					45-17
MAXIMUM DEPTH		NNEL WIDTH			VELOCITY		Recreation Poter	
Check ON E (<i>ONLY!</i>) ☐ > 1m [6]		NE (Or 2 & averag TH > RIFFLE WIDT	granag	Check AL CRRENTIAL [-1	L that apply		Primary Conta	11
0.7-<1m [4]	hand to	TH = RIFFLE WIDT		ERY FAST [1]	☐ INTERSTIT	TIAL I-11	Secondary Con	
☑ 0.4-<0.7m [2]	PLOOF MID.	TH < RIFFLE WIDT	H[0] F	\ST [1]	☐ INTERMIT		Teace one and connects of	- Dack)
0.2-<0.4m [1]	₹			ODERATE [1]	☐ EDDIES [1		Poo	
□ < 0.2m [0]				indicate for read	ch - pools and rif	tles.	Curre . Maximu	B: 6 B:
Comments							re-cayanna	2
Indicate for fund		; Best areas n	nust be la	rge enough	to support	a popula	lion	e 1 * . m*
of riffle-obligate	*			r 2 & average).			□NO RIFFLE	
RIFFLE DEPTH				RUN SUBST			N EMBEDDEDNE	SS
☐ BEST AREAS > 10cm [2]	Z] [MAXIMU	M > 50cm [2] ☐ 5 M < 50cm [1] ☐ N	STABLE (e.g	., Cobble, Bou	Ider) [2]		ONE [2]	
BEST AREAS < 5cm	13 MINIMANINO			.E (e.g., Large e.g., Fine Grave			OW [1] ODERATE [0] Riff[
[metric=()] (, ,	- marketing	The state of the	~. 2011	i maximitel	□ E)	CTENSIVE [-1] Maximu	
Comments	120w.	64.(m	_)				* * Maximu	8
6] GRADIENT (A.S	ft/mi) [] VE	RY LOW - LOW [2-41	0/ BA	01:0	% GLIDE		
DRAINAGE AREA	,	DDERATE [6-10]	·- ' g	%PO		%GLIDE	- Administration of the second	量 // 重
(GH - VERY HIGH	[10-6]	%RU	N: (100)	%RIFFLE	: Maximu	
FPA 4520			THE RESERVE THE PROPERTY OF THE PARTY OF THE					6/16/06

5/1 - 535/ (m. 1) B-29

	ED REACH ALL that apply	Comment RE: Reach consistency/ (is reach typical of steam?, Recreation		√ Sampling observations, Concerns, Acc	ess directions, etc.
METHOD	STAGE					
BOAT WADE LLINE OTHER	1st -sample pass- 2nd HIGH UP NORMAL LOW					
DISTANCE	DRY .					
☐ 0.5 Km ☐ 0.2 Km ☐ 0.15 Km ☐ 0.12 Km ☐ 0THER	CLARITY 1stsample pass 2no < 20 cm 20-<40 cm 40-70 cm > 70 cm/ CTB SECCHI DEPTH	BJ AESTHETICS □ NUISANCE ALGAE □ INVASIVE MACROPHYTES □ EXCESS TURBIDITY □ DISCOLORATION □ FOAM / SCUM □ OIL SHEEN	D] MAINTENANCE PUBLIC / PRIVATE / BOTH / NA ACTIVE / HISTORIC / BOTH / NA YOUNG-SUCCESSION-OLD SPRAY / SNAG / REMOVED MODIFIED / DIPPED OUT / NA LEVEED / ONE SIDED	Circle some & COMMENT	E] ISSUES WWTP / CSO / NPDES / INDUSTRY HARDENED / URBAN / DIRT&GRIME CONTAMINATED / LANDFILL BMPs-CONSTRUCTION-SEDIMENT LOGGING / IRRIGATION / COOLING BANK / EROSION / SURFACE	F] MEASUREMENTS \overline{\tilde{X}} width \overline{\tilde{X}} depth max. depth \overline{\tilde{X}} bankfull width bankfull \overline{X} depth
CANOP > 85%- OP 55%-<85% 30%-<55% 10%-<30% <10%- CLO	EN $\frac{8}{2}$ cm C	☐ NUISANCE ODOR ☐ SLUDGE DEPOSITS ☐ CSOs/SSOs/OUTFALLS	RELOCATED / CUTOFFS MOVING-BEDLOAD-STABLE ARMOURED / SLUMPS ISLANDS / SCOURED IMPOUNDED / DESICCATED FLOOD CONTROL / DRAINAGE		FALSE BANK / MANURE / LAGOON WASH H20 / TILE / H20 TABLE ACID / MINE / QUARRY / FLOW NATURAL / WETLAND / STAGNANT PARK / GOLF / LAWN / HOME ATMOSPHERE / DATA PAUCITY	W/D ratio bankfull max. depth floodprone x ² width entrench. ratio Legacy Tree:

ChicEPA (1991

		C.(000)
		-
QHEI	Score:	173

Stream & Location:	MANAGE ON THE PARTY OF THE PART	(100	icia Oricot	RM:	. Date:6 2	T1 /2
Stream & Location.	103,664		Scorari	EUII Na	me & Affiliation:			2/25
River Code: -	188°	STORET #:	OGUIETS	Lat./ L 	ong.:	/8 .	Offic	e verified location
DEST TYPES	ONLY Two su te % or note e OOL RIFFLE	bstrate TYPE Bevery type prese OTHER T	nt YPES _{POO!} AN [4] 'US [3]	L RIFFLE		ONE (Or 2 8	QUALITY QUALITY HEAVY [-2] MODERATE [-1]	Substra
GRAVEL [7] SAND [6] SEDROCK [5] NUMBER OF BEST T	—————————————————————————————————————	SILT [2]	CIAL [0]	ites; ignore t-sources)	HARDPAN [0] SANDSTONE [0]	ADDEON!	☐ FREE [1] ☐ EXTENSIVE [-2] ☐ MODERATE [-1] S ☐ NORMAL [0] ☐ NONE [1]	Maximur 20
2] INSTREAM COVER quality; 3-Highest quality in diameter log that is stable, UNDERCUT BANKS OVERHANGING VEC SHALLOWS (IN SEC ROOTMATS [1] Comments	quality: 2-Mi moderate or well develope [1] GETATION [1]	oderate amount greater amounts d rootwad in de POOI	s, but not of hi s (e.g., very la: ep / fast water	rgnest quair rge boulder r, or deep, w I <u>2</u> 01	ry or in smail amounts s in deep or fast wate	s of highest r, large il pools. [ERS [1] [TES [1] [AMOUNT Check ONE (Or 2 & av EXTENSIVE >75% [MODERATE 25-75% SPARSE 5-<25% [3 NEARLY ABSENT < Cove Maximus 2	11] [7] 5% [1]
☐ HiGH [4] ☐ EX ☐ MODERATE [3] ☐ G ☐ F/	OLOGY Ch ELOPMEN XCELLENT [7 ODD [5] AIR [3] OOR [1]	T CHAN I NONE [RECOV	INELIZATIO 6] ERED [4]	ON	STABILITY HIGH [3] MODERATE [2] LOW [1]		Chann Maximui 2	1
4] BANK EROSION A River right looking downstreal EROSION NONE / LITTLE [3] MODERATE [2] HEAVY / SEVERE [1] Comments	" RIPA □ □ Wide □ □ Modi	ARIAN WIDT 1 > 50m [4] ERATE 10-50m ROW 5-10m [2] ' NARROW < 51		FLOC OREST, SV SHRUB OR RESIDENTIA ENCED PA	DD PLAIN QUAL VAMP [3] OLD FIELD [2] KL, PARK, NEW FIELI	1TY	k & average) CONSERVATION TILLA URBAN OR INDUSTRI, MINING / CONSTRUCT. Te predominant land use(: 00m riparian. Riparia Maximur 1	AL'[0] ION [0]
5] POOL / GLIDE AND MAXIMUM DEPTH Check ONE (ONLY!) > 1m [6] 0.7.<1m [4] 0.4.<0.7m [2] 0.2.<0.4m [1] < 0.2m [0] Comments	CH. Check (POOL WIE	RUN QUAL ANNEL WID ONE (Or 2 & av OTH > RIFFLE W OTH = RIFFLE W OTH < RIFFLE W	TH erage) MDTH [2] MDTH [1] MDTH [0]	Ch TORRENT VERY FAS FAST [1] MODERAT	☐ INTERMIT	ITIAL [-1] FTENT [-2]	Recreation Poter Primary Conta Secondary Conta Circle one and comment on Currer Maximum	ct tact back)
Indicate for funct of riffle-obligate s RIFFLE DEPTH BEST AREAS > 10cm [2] BEST AREAS 5-10cm [1] BEST AREAS < 5cm [metric=0] Comments	species: RUN □MAXIMI □MAXIMI	DEPTH UM > 50cm [2]	Check ONE RIFFLE STABLE (MOD. STA	(Or 2 & ave / RUN SU e.g., Cobbl .BLE (e.g.,	rege). JBSTRATE RIF e, Boulder) [2] (1) Large Gravel) [1] e Gravel, Sand) [0]	FLE / RU	NO RIFFLE N EMBEDDEDNES ONE [2] OW [1] IODERATE [0] XTENSIVE [-1] Maximul	is
6] GRADIENT (2 DRAINAGE AREA (EPA 4520	_ N	ERY LOW - LO MODERATE (6- HIGH - VERY HI	10]		%POOL:(10) %RUN:) %GLIDE)%RIFFLE	E:(≀() Maximur	$_{n}[IO]$

AJ SAMPLED REACH Check ALL that apply METHOD STAGE BOAT 1st-sample pass-2nd WADE HIGH D L. LINE UP NORMAL OTHER NORMAL DISTANCE DRY 0,5 Km					
0.2 Km	INVASIVE MACROPHYTES EXCESS TURBIDITY DISCOLORATION FOAM / SCUM OIL SHEEN TRASH / LITTER NUISANCE ODOR SLUDGE DEPOSITS CSOs/SSOs/OUTFALLS	D] MAINTENANCE PUBLIC / PRIVATE / BOTH / NA ACTIVE / HISTORIC / BOTH / NA YOUNG-SUCCESSION-OLD SPRAY / SNAG / REMOVED MODIFIED / DIPPED OUT / NA LEVEED / ONE SIDED RELOCATED / CUTOFFS MOVING-BEDLOAD-STABLE ARMOURED / SLUMPS ISLANDS / SCOURED IMPOUNDED / DESICCATED FLOOD CONTROL / DRAINAGE	Circle some & COMMENT	E] ISSUES WWTP / CSO / NPDES / INDUSTRY HARDENED / URBAN / DIRT&GRIME CONTAMINATED / LANDFILL BMPs-CONSTRUCTION-SEDIMENT LOGGING / IRRIGATION / COOLING BANK / EROSION / SURFACE FALSE BANK / MANURE / LAGOON WASH H ₂ 0 / TILE / H ₂ 0 TABLE ACID / MINE / QUARRY / FLOW NATURAL / WETLAND / STAGNANT PARK / GOLF / LAWN / HOME ATMOSPHERE / DATA PAUCITY	F] MEASUREMENTS \(\times \text{ width} \) \(\times \text{ depth} \) \(\times \text{ bankfull width} \) \(\text{ bankfull } \times \text{ depth} \) \(\text{ W/D ratio} \) \(\text{ bankfull max. depth} \) \(\text{ floodprone } x^2 \text{ width} \) \(\text{ entrench. ratio} \) \(\text{ Legacy Tree:} \)

The other 3 types of Guelia Ung Late of Clamentous algae

Grafish + Bullings gresout

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		Po	3		enter-
QHEI	Score:		31	1	and di
				Ž.,	escale .

	and OSC	Assessment	i ieiu olieet			
Stream & Location:	Springinggs	the Knowl	UBDR	_RM:	Date:/	
		Scorers Full N	lame & Affiliation.			
River Code:	STORET #:		Long.:	/8	01	fice verified L
BEST TYPES BLDR /SLABS [10] BUDLDER [9] GRAVEL [7] SAND [6] BEDROCK [5]	ONLY Two substrate TYPE BC te % or note every type preser COOL RIFFLE	OXES; Int YPES POOL RIFFLE AN [4] US [3] [2] [2] [3] [4] CIAL [0] Inatural substrates; ignore	Check ORIGIN LIMESTONE [1] TILLS [1] WETLANDS [0] HARDPAN [0] SANDSTONE [0]	SILT SILT SIDDEONES	average) QUALITY HEAVY [-2] MODERATE [- NORMAL [0] FREE [1] MODERATE [- MODERATE [- NORMAL [0] NONE [1]	ij Substrat
quality, 3-Highest quality in	GETATION [1] 2 ROOT	s, but not of highest qualifies, very large bould ep / fast water, or deep .S > 70cm [2]	ality or in small amounts ers in deep or fast wate	s of highest r, large Il pools. ERS [1]	Check ONE (Or 2 & EXTENSIVE >75% MODERATE 25-75	[11] % [7] [3] <5% [1]
SINUOSITY DEV HIGH [4]	XCELLENT[7] NONE [6 00D [5] RECOVI MR [3] RECOVI	NELIZATION 6] ERED [4]	STABILITY HIGH [3] MODERATE [2] LOW [1]		Char Maxim	# / W
River right looking downstream EROSION NONE / LITTLE [3] MODERATE [2]	ND RIPARIAN ZONE C RIPARIAN WIDT WIDE > 50m [4] MODERATE 10-50m [2] MARROW 5-10m [2] VERY NARROW < 5m	H FLC FOREST, (S) SHRUB OF COMMERCE COMME	OOD PLAIN QUAL SWAMP [3] R OLD FIELD [2]		ONSERVATION TILI	RIAL'[0] TION [0] P(S)
5] POOL / GLIDE AND MAXIMUM DEPTH Check ONE (ONLY/)	O RIFFLE / RUN QUALI CHANNEL WIDT Check ONE (Or 2 & ave □ POOL WIDTH > RIFFLE WI □ POOL WIDTH = RIFFLE WI □ POOL WIDTH < RIFFLE WI	H CUI rage) ○ IDTH [2] □ TORREN IDTH [1] □ VERY FA IDTH [0] □ FAST [1] □ MODERA		TIAL [-1] TENT [-2]	Recreation Pote Primary Cont Secondary Cont (circle one and comments Po Curn Maxim	ential pact probable
of riffle-obligate s RIFFLE DEPTH BEST AREAS > 10cm [2] BEST AREAS 5-10cm [1] BEST AREAS < 5cm [metric=0] Comments	RUN DEPTH MAXIMUM > 50cm [2] [MAXIMUM < 50cm [1] [Check ONE (Or 2 & av RIFFLE / RUN S STABLE (e.g., Cobb MOD. STABLE (e.g., UNSTABLE (e.g., Fin	rerage). SUBSTRATE RIF. Sile, Boulder) [2] , Large Gravel) [1] ne Gravel, Sand) [0]	FLE / RUN	EMBEDDEDNE NE [2]	SS
DRAINAGE AREA	ft/mi)	D] H [10-6]	%POOL: %RUN:	%GLIDE: %RIFFLE:	Maximi	5 / B
	* 1 mg/massacra en en elsenten	B-33				

A] SAMPLE Check Al	TD REACH LL that apply	Comment RE: Reach consistency/	s reach typical of steam?, Recreation	n/ Observed - Inferred, Other	/ Sampling observations, Concerns, Acc	ess directions, etc.
METHOD BOAT	STAGE 1st -sample pass- 2nd					enurin-hydro-dd eighelol digliddin aceithau rodan hell ach rigidael rejddin blancaen araigear mean canacada a
□ WADE □ L. LINE □ OTHER	UP D'NORMAL D					
DISTANCE	□LOW □ □DRY □	uruggan di Kishir arah grupia kungkalag kesi gelipi gagi gajak di arah kishir un Malaru di Abril di Ab				Spannish MANAGANAAN SISS Finned you hill colory in the SAN ANAGAN SIGNATURE AND ANAGAN SIGNATURE AND ANAGAN SI
□ 0.15 Km □ 0.12 Km □ OTHER □ ✓	CLARITY 1stsample pass 2nd 20 cm □ 20-<40 cm □ 40-70 cm □ > 70 cm/ CTB □ SECCHI DEPTH□	BJ AESTHETICS NUISANCE ALGAE INVASIVE MACROPHYTES EXCESS TURBIDITY DISCOLORATION FOAM!/ SCUM OIL SHEEN	D] MAINTENANCE PUBLIC / PRIVATE / BOTH / NA ACTIVE / HISTORIC / BOTH / NA YOUNG-SUCCESSION-OLD SPRAY / SNAG / REMOVED MODIFIED / DIPPED OUT / NA LEVEED / ONE SIDED	Circle some & COMMENT	EJ ISSUES WWTP(CSO/NPDES / INDUSTRY HARDENED / URBAN) DIRT&GRIME CONTAMINATED DLANDFILL BMPS-CONSTRUCTION-SEDIMENT LOGGING / IRRIGATION / COOLING BANK / EROSION) SURFACE	F] MEASUREMENTS \overline{\textbf{X}} width \overline{\textbf{X}} depth max. depth \overline{\textbf{X}} bankfull width bankfull \overline{\textbf{X}} depth W/D ratio
CANOPY □ > 85%-OPE □ 55%-<85% □ 30%-<55% □ 10%-<30% □ <10%- CLOS	N g cm	TRASH / LITTER MUISANCE ODOR SLUDGE DEPOSITS CSOS/SSOS/OUTFALLS ATION AREA DEPTH POOL: ->100ft2 ->3ft	RELOCATED / CUTOFFS MOVING-BEDLOAD-STABLE ARMOURED / SLUMPS ISLANDS / SCOURED IMPOUNDED / DESICCATED FLOOD CONTROL / DRAINAGE		FALSE BANK / MANURE / LAGOON WASH H ₂ 0 / TILE / H ₂ 0 TABLE ACID / MINE / QUARRY / FLOW NATURAL / WETLAND / STAGNANT PARK / GOLF / LAWN / HOME ATMOSPHERE / DATA PAUCITY	bankfull max, depth floodprone x ² width entrench, ratio Legacy Tree:

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Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

QHEI Score:

Stream & Location:		SSMent Fleid Sneet	RM:	. Date:(, ?0 /7
	Scol	rers Full Name & Affiliation.		and
River Code:	STORET #:	Lat./ Long.;	/8	Office verified location
BEST TYPES BLDR /SLABS [10] BOULDER [9] COBBLE [8] GRAVEL [7] SAND [6]	☐ ☐ HARDPAN [4] ☐ ☐ DETRITUS [3] ☐ ☐ MUCK [2] ☐ ☐ SILT [2] ☐ ☐ ARTIFICIAL [0]	Check OOL RIFFLE OOL RIFFLE OOL RIFFLE UIMESTONE [1] UIMESTONE [1] UIMESTONE [0] UIMESTONE [0] UIMESTONE [0] UIMESTONE [0] UIMESTONE [0]	SILT	
quality; 3-Highest quality in	GETATION [1] ROOTWADS [1	of highest quality or in small amounts y large boulders in deep or fast wate ater, or deep, well-defined, functions in [2] OXBOWS, BACKWAT AQUATIC MACROPHY	s of highest er, large al pools. [ERS [1] [(TES [1] [AMOUNT Check ONE (Or 2 & average) EXTENSIVE >75% [11] MODERATE 25-75% [7] SPARSE 5-<25% [3] NEARLY ABSENT <5% [1] Cover Maximum 20
SINUOSITY DEVE HIGH [4]	CLOGY Check ONE in each category ELOPMENT CHANNELIZA (CELLENT [7] NONE [6] OOD [5] RECOVERED [4] AIR [3] RECENT OR NO I	TION STABILITY HIGH [3] MODERATE [2] Ow [1]	produced	Channel Maximum 20
4] BANK EROSION A. River right looking downstream BEROSION NONE / LITTLE [3] MODERATE [2] HEAVY / SEVERE [1] Comments		FLOOD PLAIN QUAL FOREST, SWAMP [3] SHRUB OR OLD FIELD [2] RESIDENTIAL, PARK, NEW FIELD		CONSERVATION TILLAGE [1] JRBAN OR INDUSTRIAL [0]
MAXIMUM DEPTH Check ONE (ONLY!) ☐ > 1m [6] ☐ 0.7-<1m [4]	CHANNEL WIDTH Check ONE (Or 2 & average) POOL WIDTH > RIFFLE WIDTH [2] POOL WIDTH = RIFFLE WIDTH [1] POOL WIDTH < RIFFLE WIDTH [0]	CURRENT VELOCITY Check ALL that apply TORRENTIAL [-1] SLOW [1] VERY FAST [1] INTERST FAST [1] INTERMITED MODERATE [1] EDDIES [Indicate for reach - pools and its	ITIAL [-1] FTENT [-2] 1]	Recreation Potential Primary Contact Secondary Contact (circle one and comment on back) Pool/ Current Maximum 12
Indicate for function of riffle-obligate services RIFFLE DEPTH BEST AREAS > 10cm [2] BEST AREAS 5-10cm [1] BEST AREAS < 5cm [metric=0] Comments	RUN DEPTH RIFFL MAXIMUM > 50cm [2] STABL MAXIMUM < 50cm [1] MOD. S	NE (Or 2 & average). LE / RUN SUBSTRATE RIF E (e.g., Cobble, Boulder) [2] STABLE (e.g., Large Gravel) [1] BLE (e.g., Fine Gravel, Sand) [0]	FLE / RUI	NO RIFFLE [metric=0] NEMBEDDEDNESS DNE [2] DW [1] ODERATE [0] RIFFLE [1] Advances
DRAINAGE AREA (ft/mi) VERY LOW - LOW [2-4] MODERATE [6-10] MIGH - VERY HIGH [10-6]	%POOL: S %RUN: 75) %GLIDE)%RIFFLE	Gradient

METHOD BOAT WADE LINE OTHER	STAGE STAGE 1st-sample pass- 2nd HIGH UP UP UP UP UP UP UP U	Bulling a	Residence			
OTHER	□ DRY □ □ CLARITY 1stsample pass 2nd □ < 20 cm □ □ 20-<40 cm □ □ 40-70 cm □ □ > 70 cm/ CTB □ □ SECCHI DEPTH□ Y 1st cm EN 2 2nd cm C] RECRE	☐ INVASIVE MACROPHYTES ☐ EXCESS TURBIDITY ☐ DISCOLORATION ☐ FOAM / SCUM ☐ OIL SHEEN ☐ TRASH / LITTER ☐ NUISANCE ODOR ☐ SLUDGE DEPOSITS ☐ CSOs/SSOs/OUTFALLS	DJ MAINTENANCE PUBLIC / PRIVATE / BOTH / NA ACTIVE / HISTORIC / BOTH / NA YOUNG-SUCCESSION-OLD SPRAY / SNAG / REMOVED MODIFIED / DIPPED OUT / NA LEVEED / ONE SIDED RELOCATED / CUTOFFS MOVING-BEDLOAD-STABLE ARMOURED / SLUMPS ISLANDS / SCOURED IMPOUNDED / DESICCATED FLOOD CONTROL / DRAINAGE	*Circle some & COMMENT	EJ ISSUES WWTP/ CSO / NPDES / INDUSTRY HARDENED / URBAN / DIRT&GRIME CONTAMINATED / LANDFILL BMPs-CONSTRUCTION-SEDIMENT LOGGING / IRRIGATION / COOLING BANK / EROSION / SURFACE FALSE BANK / MANURE / LAGOON WASH H ₂ 0 / TILE / H ₂ 0 TABLE ACID / MINE / QUARRY / FLOW NATURAL / WETLAND / STAGNANT PARK / GOLF / LAWN / HOME ATMOSPHERE / DATA PAUCITY	F] MEASUREMENTS \(\overline{x} \) width \(\overline{x} \) depth max. depth \(\overline{x} \) bankfull width bankfull \(\overline{x} \) depth W/D ratio bankfull max. depth floodprone \(x^2 \) width entrench. ratio Legacy Tree:
Stream L	Drawing:	az jaroka filosak en ulugu konsi estationzak pronononononon on on on on on en		unnedelausendukouseliken saadisis halphore eleksiön kilökkein värjelisistansi koreliksioidelisistelisis koksi	and the second section of the second	жеруунд (Д. Ангійнама маков, по жетом «по мето» (дено посыто выпосня болого вісто посыто выпосня в
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Stream & Location:	Call St.	w 64	MBDR	RM:	. Date: 6 / 9 1 Z
manusko alda ender silanda kalanna in indonen kannalarin kannalarin besata eta kalandarin almanden dalah bilak ender			s Full Name & Affiliation	***************************************	
River Code: -		RET#:	Lat./ Long.: (NAD 83 - decimal *) *	/8	Office verified location
BEST TYPES BLDR /SLABS [10] BOULDER [9] COBBLE [8] GRAVEL [7] SAND [6] BEDROCK [5]	ate % or note every type POOL RIFFLE OT COUNTY COUNT	HER TYPES HARDAN [4] DETRITUS [3] MUCK [2] SILT [2] ARTIFICIAL [0] (Score natural substrate [2] sludge from point	L RIFFLE ORIGIN LIMESTONE [1] TILLS [1] WETLANDS [0] HARDPAN [0] SANDSTONE [0]	SILT SUPEONE	average) QUALITY HEAVY [-2] NORMAL [0] FREE [1] EXTENSIVE [-2] MODERATE [-1] MODERATE [-1] NORMAL [0] NONE [1]
quality; 3-Highest quality i	quality; 2-Moderate n moderate or greater , well developed rooty 5 [1] GETATION [1]	amounts, but not of hi amounts (e.g., very la ad in deep / fast water	y small amounts or if more commighest quality or in small amount rige boulders in deep or fast wath or deep, well-defined, function of deep deep deep deep deep deep deep dee	is of highest er, large al pools. [ERS [1] [YTES [1] [AMOUNT Check ONE (Or 2 & average) EXTENSIVE >75% [11] MODERATE 25-75% [7] SPARSE 5-<25% [3] NEARLY ABSENT <5% [1] Cover Maximum 20
☐ HIGH [4] ☐ E ☐ MODERATE [3] ☐ G ☐ LOW [2] ☐ E	ELOPMENT XCELLENT [7] GOOD [5] AIR [3]	E in each category (Or CHANNELIZATION NONE [6] BECOVERED [4] RECOVERING [3] RECENT OR NO REC	ON STABILITY ☐ HIGH [3] ☐ MODERATE [3] ☐ LOW [1]	2]	Channel Maximum 20
4] BANK EROSION A River right looking downstrea EROSION NONE / LITTLE [3] MODERATE [2] HEAVY / SEVERE [1] Comments	RIPARIAN RIPARIAN RIPARIAN RIPARIAN RIPARIAN RIPARIAN RIPARIAN	WIDTH [4]	Pach category for EACH BANK (FLOOD PLAIN QUAL OREST, SWAMP [3] HRUB OR OLD FIELD [2] ESIDENTIAL, PARK, NEW FIEL ENCED PASTURE [1] PEN PASTURE, ROWCROP [0]		ONSERVATION TILLAGE [1]
5] POOL / GLIDE AN MAXIMUM DEPTH Check ONE (ONLY!) [1m [6] [0.7-<1m [4] [0.4-<0.7m [2] [0.2-<0.4m [1] [< 0.2m [0] Comments	D RIFFLE / RUN (CHANNEI Check ONE (Or □ POOL WIDTH > RI □ POOL WIDTH < RI □ POOL WIDTH < RI	WIDTH 2 & average) FFLE WIDTH [2] FFLE WIDTH [1] FFLE WIDTH [0]	CURRENT VELOCIT Check ALL that apply TORRENTIAL [-1] ☐ SLOW [1 VERY FAST [1] ☐ INTERMI MODERATE [1] ☐ EDDIES Indicate for reach - pools and] TTIAL [-1] TTENT [-2] 1]	Recreation Potential Primary Contact Secondary Contact (circle one and comment on back) Pool/ Current Maximum 12
Indicate for function of riffle-obligate RIFFLE DEPTH BEST AREAS > 10cm [2] BEST AREAS < 5cm [metric=0] Comments 6] GRADIENT DRAINAGE AREA	Species: RUN DEPT MAXIMUM > 50 MAXIMUM < 50 ft/mi) VERY LO	Check ONE (H RIFFLE / cm [2] STABLE (e cm [1] MOD. STAI UNSTABLE	large enough to support Or 2 & average). RUN SUBSTRATE RIFg., Cobble, Boulder) [2] BLE (e.g., Large Gravel) [1] E (e.g., Fine Gravel, Sand) [0] %POOL: %RUN:	FLE / RUN	
EPA 4520	+ pole	7 2m B-3			06/16/06

Check ALL that apply METHOD STAGE BOAT si -sample pass - 2nd WADE HIGH	B] AESTHETICS JISANCE ALGAE VASIVE MACROPHYTES ICCESS TURBIDITY SCOLORATION DAM!/ SCUM L SHEEN LASH / LITTER JISANCE ODOR LUDGE DEPOSITS SOS/SSOS/OUTFALLS	DJ MAINTENANCE PUBLIC / PRIVATE / BOTH / NA ACTIVE / HISTORIC / BOTH / NA YOUNG-SUCCESSION-OLD SPRAY / SNAG / REMOVED MODIFIED / DIPPED OUT / NA LEVEED / ONE SIDED RELOCATED / CUTOFFS MOVING-BEDLOAD-STABLE ARMOURED / SLUMPS ISLANDS / SCOURED IMPOUNDED / DESICCATED FLOOD CONTROL / DRAINAGE	Observed - Inferred, Other Circle some & COMMENT	ETISSUES WWTP/CSO / NPDES / INDUSTRY HARDENED / URBAN / DIRT&GRIME CONTAMINATED / LANDFILL BMPs-CONSTRUCTION-SEDIMENT LOGGING / IRRIGATION / COOLING BANK / EROSION / SURFACE FALSE BANK / MANURE / LAGOON WASH H ₂ 0 / TILE / H ₂ 0 TABLE ACID / MINE / QUARRY / FLOW NATURAL / WETLAND / STAGNANT PARK / GOLF / LAWN / HOME ATMOSPHERE / DATA PAUCITY	FJ MEASUREMENTS \(\overline{x}\) width \(\overline{x}\) depth \(\overline{x}\) bankfull width \(\overline{bankfull}\) \(\overline{x}\) depth \(\warmanumu\) Dratio \(\overline{bankfull}\) max. depth \(\overline{floodprone}\) x ² width \(\overline{entrench}\). ratio \(\overline{Legacy}\) Tree:
Stream Drawing:	on Long en pi (poppi scheme) spisovens Loven and Novi pelo delplace and susses and Novi Allandi and service and novi and			OR COLOTO COST CAN COM ACCUSATO COM COLOTO COM COLOTO COM COLOTO COM COLOTO CO	on deutschopping und 2000 von de manut verzeit und von de die deutschen deutschop und deutsche Geschopping und von der deutsche Verzeit und deutsche Verzeit
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Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

QHEI Score:

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The same	2000000	TOTAL	-
1	6	3	
	CONCLUS	SECTION STATES	

Stream & Location:	Roste 19 P	spar L	wek was	RM:	. Date: 6/22/12
			lame & Affiliation:		
River Code: -	- STORET #:		Long.:		Office verified location
BEST TYPES BLDR /SLABS [10] BOULDER [9] COBBLE [8] GRAVEL [7] SAND [6]		PES POOL RIFFLE [4] [3] [3] [4]	ORIGIN LIMESTONE [1] TILLS [1] WETLANDS [0] HARDPAN [0] SANDSTONE [0] RIPIRAP [0]	SILT SILT SUPPEONESS	Verage) QUALITY HEAVY [-2] MODERATE [-1] Substrate Substrate Companies [-1] MODERATE [-1]
quality: 3-Highest quality i diameter log that is stable UNDERCUT BANK OVERHANGING VE		but not of highest que e.g., very large bould / fast water, or deep. > 70cm [2]	ality or in small amounts ers in deen or fast water.	of fighest Ciarge Cipools, Cipools, Cipools, Cipools C	AMOUNT heck ONE (Or 2 & average) EXTENSIVE >75% [11] MODERATE 25-75% [7] SPARSE 5-<25% [3] NEARLY ABSENT <5% [1] Cover Maximum 20
SINUOSITY DEV HIGH [4]	EXCELLENT [7] NONE [6] GOOD [5] RECOVER AIR [3] RECOVER	ELIZATION RED [4]	STABILITY HIGH(3) MODERATE [2] LOW [1]		Channel Maximum 20
4] BANK EROSION A River right looking downstre EROSION COMMENTALE [3] COMMENTS A BANK EROSION A RIVER IS SEVERE [4] Comments	☐ WIDE > 50m [4] ☐ MODERATE 10-50m [3] ☐ MARROW 5-10m [2]	FLO FOREST, FLO FO	OOD PLAIN QUALI' SWAMP [3] R OLD FIELD [2] NAL, PARK, NEW FIELD	TY D CC D D UR [1] D MII Indicate p	DNSERVATION TILLAGE [1] RBAN OR INDUSTRIAL [0] NING / CONSTRUCTION [0] predominant land use(s) m riparian. Riparian Maximum 10
5] POOL / GLIDE AN MAXIMUM DEPTH Check ONE (ONLY!) > 1m [6] 0.7,<1m [4] 0.4<0.7m [2] 0.2<0.4m [1] < 0.2m [0] Comments	CHANNEL WIDTH CHANNEL WIDTH Check ONE (Or 2 & avera POOL WIDTH > RIFFLE WID POOL WIDTH < RIFFLE WID	H CUI	☐ INTERMIT	TAL [-1] FENT [-2]	Recreation Potential Primary Contact Secondary Contact (circle one and comment on back) Pool/ Current Maximum 12
Indicate for fund of riffle-obligate RIFFLE DEPTH BEST AREAS > 10cm [2] BEST AREAS < 5cm [metric=0]	RUN DEPTH 2	Check ONE (Or 2 & ar RIFFLE / RUN S STABLE (e.g., Cobi	verage). BUBSTRATE RIFF ble, Boulder) [2] ., Large Gravel) [1]	FLE / RUN	EMBEDDEDNESS NE [2]
6] GRADIENT (9) (DRAINAGE AREA (ft/mi) (3 VERY LOW - LOW MODERATE [6-10] mi ²) HIGH - VERY HIGH		%POOL: %RUN:	%GLIDE:(%RIFFLE:(Gradient 10
EPA 4520					06/16/06

AJ SAMPLED REACH Check ALL that apply		s reach typical of steam?, Recreation	n/ Observed - Inferred, Other	/Sampling observations, Concerns, Acc	ess directions, etc.
METHOD STAGE BOAT 1st sample pass 2nd WADE HIGH			\$1		
□ 85%-OPEN	INVASIVE MACROPHYTES INVASIVE MACROPHYTES EXCESS TURBIDITY DISCOLORATION FOAM! SCUM OIL SHEEN TRASH / LITTER NUISANCE ODOR SLUDGE DEPOSITS CSOS/SSOS/OUTFALLS	PUBLIC / PRIVATE / BOTH / NA ACTIVE / HISTORIC / BOTH / NA YOUNG-SUCCESSION-OLD SPRAY / SNAG / REMOVED MODIFIED / DIPPED OUT / NA LEVEED / ONE SIDED RELOCATED / CUTOFFS MOVING-BEDLOAD-STABLE ARMOURED / SLUMPS ISLANDS / SCOURED IMPOUNDED / DESICCATED FLOOD CONTROL / DRAINAGE	Circle some & COMMENT	EJ ISSUES WWTP / CSO / NPDES / INDUSTRY HARDENED / URBAN / DIRT&GRIME CONTAMINATED / LANDFILL BMPS-CONSTRUCTION-SEDIMENT LOGGING / IRRIGATION / COOLING BANK / EROSION / SURFACE FALSE BANK / MANURE / LAGOON WASH H ₂ 0 / TILE / H ₂ 0 TABLE ACID / MINE / QUARRY / FLOW NATURAL / WETLAND / STAGNANT PARK / GOLF / LAWN / HOME ATMOSPHERE / DATA PAUCITY	FJ MEASUREMENTS x width x depth max. depth x bankfull width bankfull x depth W/D ratio bankfull max. depth floodprone x² width entrench. ratio Legacy Tree:

