

Appendix 5

Invertebrate Survey

Invertebrate Survey Sampling Methods

Invertebrate surveys were conducted in September of 2006 and November of 2007 within the Lamprey Designated River. The surveys were conducted using 1x1 meter quadrates placed at seven random locations within specific HMU types. Their placement was determined by visually dividing the HMU into square units and using previously generated random numbers to locate the seven positions within each HMU where quadrates were to be placed. Upon placement of each quadrate, an invertebrate sample was collected from within each quadrate using a “clean and sweep” method of a 1-meter wide swath down the center of each quadrate. Invertebrate samples were collected using a submerged drift net. A sweep of the center of each quadrate (1-meter wide) was conducted by disturbing, or cleaning the sediments located between the top (upstream) and bottom (downstream) end of each quadrate. Samples were collected within the drift net, which was placed at the downstream center of the quadrate. Samples were labeled for site location, HMU type, and quadrate number, and stored in ethanol for later identification in the laboratory.

Invertebrate Survey Sample Results

Using the methods described above, 38 of 42 identified quadrates were sampled from multiple HMU types within Site 2, just downstream of Wadley (aka Wadleigh) Falls, in 2006. Due to hazardous weather conditions, four of the identified quadrates (31 and 40 to 42) were not sampled during this field survey. During the 2007 field survey, 14 additional quadrates were sampled from multiple HMU types within Site 4, just downstream of Lee Hook Road. The results of these two sampling events are summarized below.

EPT

During the 2006 survey event; 239 Ephemeroptera, 41 Plecoptera, 465 Trichoptera, and 9 Odonates were identified in the samples collected from 38 quadrates placed within multiple hydromorphologic unit types throughout the upper portion of Site 2 (Table 1). The average number of individuals from each family caught per quadrate within Representative Site 2 was 6.3, 1.1, 12.2, and 0.2, respectively (Figure 1).

During the 2007 survey event; 35 Ephemeroptera, 41 Plecoptera, 245 Trichoptera, and 24 Odonates were identified in the samples collected from the 14 quadrates placed within multiple hydromorphologic unit types throughout the upper portion of Site 4 (Table 3). The average number of individuals from each family caught per quadrate within Site 4 was 2.5, 2.9, 17.5, and 1.7, respectively (Figure 1).

Odonates

Of the 33 individual odonates collected from the 52 quadrates within the Lamprey Designated River during 2006 (Table 2) and 2007 (Table 4), there were seven different species observed: spine-crowned clubtail (21), shadow darter (4), Illinois River cruiser

(3), common spreadwing (2), blue-fronted dancer (1), black-tipped darner (1), and lancet clubtail (1). All nine odonates collected from the 38 quadrates sampled within Site 2 were collected from different quadrates. In other words, only nine quadrates within Site 2 contained an odonate and none contained more than one individual. Within Site 4, the 24 individual odonates collected were sampled from seven different quadrates. Among the quadrates containing odonates, Site 4 had a higher density of odonates per quadrate (3.4) than Site 2 (1).

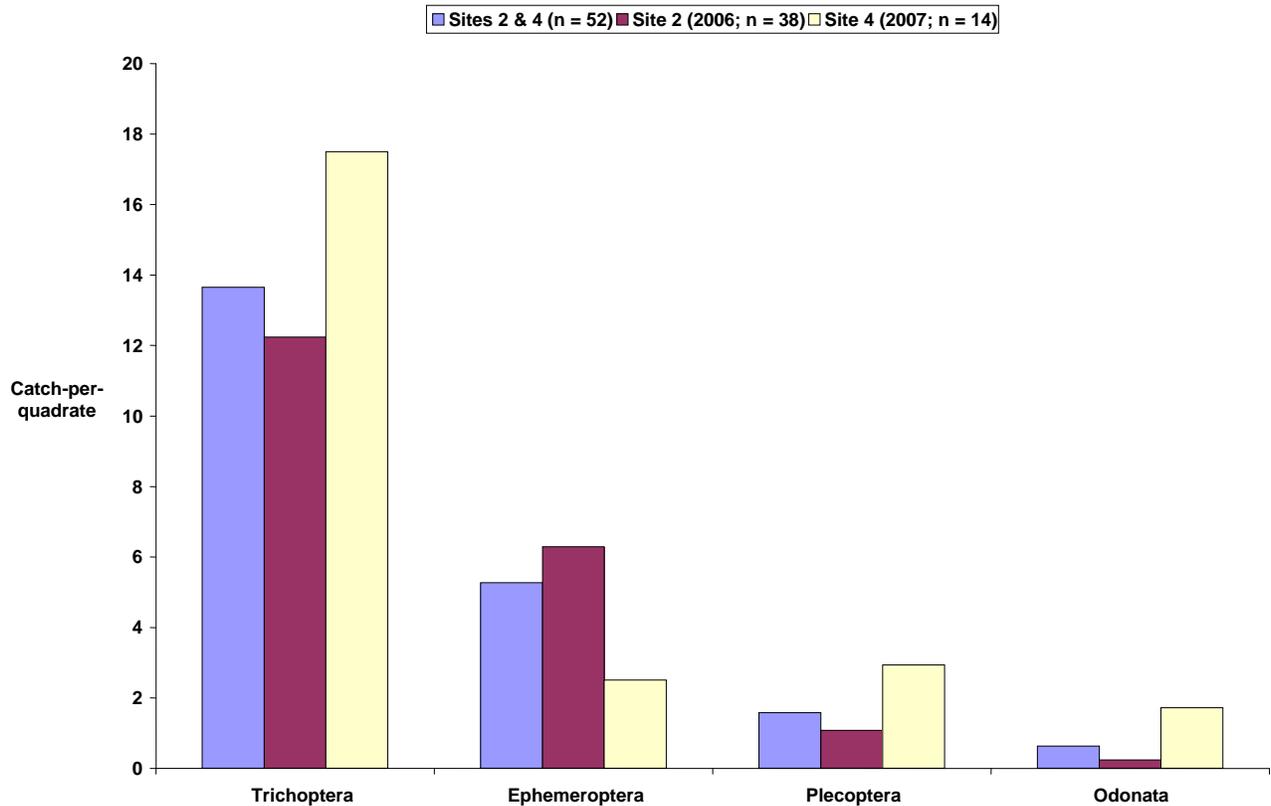


Figure 1. Lamprey Designated River benthic macro-invertebrate catch-per-quadrate.

TABLES

**Invertebrate Survey
Data**

Table 1 – EPT survey data for Site 2 collected September 28-29, 2006.

River	Date	Site #	HMU #	HMU Type	Quadrat #	E	P	T	Totals:
Lamprey River	9/28/2006	2	20201	Pool	1	2	0	0	2
Lamprey River	9/28/2006	2	20201	Pool	2	0	0	3	3
Lamprey River	9/28/2006	2	20201	Pool	3	0	1	0	1
Lamprey River	9/28/2006	2	20201	Pool	4	0	0	0	0
Lamprey River	9/28/2006	2	20201	Pool	5	1	0	0	1
Lamprey River	9/28/2006	2	20201	Pool	6	4	0	1	5
Lamprey River	9/28/2006	2	20201	Pool	7	3	0	3	6
Lamprey River	9/28/2006	2	20202	Ruffle	8	33	6	81	120
Lamprey River	9/28/2006	2	20202	Ruffle	9	10	6	47	63
Lamprey River	9/28/2006	2	20202	Ruffle	10	9	3	6	18
Lamprey River	9/28/2006	2	20202	Ruffle	11	72	6	87	165
Lamprey River	9/28/2006	2	20202	Ruffle	12	5	0	20	25
Lamprey River	9/28/2006	2	20202	Ruffle	13	7	0	23	30
Lamprey River	9/28/2006	2	20202	Ruffle	14	12	5	7	24
Lamprey River	9/28/2006	2	20203	Riffle	15	6	3	13	22
Lamprey River	9/28/2006	2	20203	Riffle	16	5	2	25	32
Lamprey River	9/28/2006	2	20203	Riffle	17	1	2	10	13
Lamprey River	9/28/2006	2	20203	Riffle	18	4	2	18	24
Lamprey River	9/28/2006	2	20203	Riffle	19	21	1	24	46
Lamprey River	9/28/2006	2	20203	Riffle	20	6	1	21	28
Lamprey River	9/29/2006	2	20203	Riffle	21	4	0	15	19
Lamprey River	9/29/2006	2	20214	Pool	22	0	1	2	3
Lamprey River	9/29/2006	2	20214	Pool	23	3	0	1	4
Lamprey River	9/29/2006	2	20214	Pool	24	0	0	0	0

Table 1 (Continued)

River	Date	Site #	HMU #	HMU Type	Quadrat #	E	P	T	Totals:
Lamprey River	9/29/2006	2	20214	Pool	25	2	0	0	2
Lamprey River	9/29/2006	2	20214	Pool	26	0	0	0	0
Lamprey River	9/29/2006	2	20214	Pool	27	2	0	0	2
Lamprey River	9/29/2006	2	20214	Pool	28	0	1	2	3
Lamprey River	9/29/2006	2	20210	Sidearm	29	1	0	0	1
Lamprey River	9/29/2006	2	20210	Sidearm	30	3	0	4	7
Lamprey River	9/29/2006	2	20210	Sidearm	31	–	–	–	Not Sampled
Lamprey River	9/29/2006	2	20210	Sidearm	32	0	0	0	0
Lamprey River	9/29/2006	2	20210	Sidearm	33	1	0	1	2
Lamprey River	9/29/2006	2	20210	Sidearm	34	2	0	0	2
Lamprey River	9/29/2006	2	20210	Sidearm	35	1	0	2	3
Lamprey River	9/29/2006	2	20216	Run	36	8	0	25	33
Lamprey River	9/29/2006	2	20216	Run	37	0	0	0	0
Lamprey River	9/29/2006	2	20216	Run	38	9	1	9	19
Lamprey River	9/29/2006	2	20216	Run	39	2	0	15	17
Lamprey River	9/29/2006	2	20216	Run	40	–	–	–	Not Sampled
Lamprey River	9/29/2006	2	20216	Run	41	–	–	–	Not Sampled
Lamprey River	9/29/2006	2	20216	Run	42	–	–	–	Not Sampled
Totals:						239	41	465	745

Table 2 – Odonate survey data for Site 2 collected September 28-29, 2006.

River	Date	Site #	HMU #	HMU Type	Qua- drate #	Presence	Common Name	Scientific Name
Lamprey River	9/28/2006	2	20201	Pool	1	Odonate	Spine-crowned Clubtail	<i>(Hylo) Gomphus abbreviatus</i>
Lamprey River	9/28/2006	2	20201	Pool	2	No Odonates		
Lamprey River	9/28/2006	2	20201	Pool	3	No Odonates		
Lamprey River	9/28/2006	2	20201	Pool	4	Odonate	Illinois River Cruiser	<i>Macromia illinoiensis</i>
Lamprey River	9/28/2006	2	20201	Pool	5	No Odonates		
Lamprey River	9/28/2006	2	20201	Pool	6	No Odonates		
Lamprey River	9/28/2006	2	20201	Pool	7	No Odonates		
Lamprey River	9/28/2006	2	20202	Ruffle	8	No Odonates		
Lamprey River	9/28/2006	2	20202	Ruffle	9	No Odonates		
Lamprey River	9/28/2006	2	20202	Ruffle	10	Odonate	Shadow Darner	<i>Aeschna umbrosa</i>
Lamprey River	9/28/2006	2	20202	Ruffle	11	Odonate	Illinois River Cruiser	<i>Macromia illinoiensis</i>
Lamprey River	9/28/2006	2	20202	Ruffle	12	No Odonates		
Lamprey River	9/28/2006	2	20202	Ruffle	13	No Odonates		
Lamprey River	9/28/2006	2	20202	Ruffle	14	No Odonates		
Lamprey River	9/28/2006	2	20203	Riffle	15	Odonate	Blue-Fronted Dancer	<i>Argia apicales</i>
Lamprey River	9/28/2006	2	20203	Riffle	16	No Odonates		
Lamprey River	9/28/2006	2	20203	Riffle	17	No Odonates		
Lamprey River	9/28/2006	2	20203	Riffle	18	No Odonates		
Lamprey River	9/28/2006	2	20203	Riffle	19	No Odonates		
Lamprey River	9/28/2006	2	20203	Riffle	20	No Odonates		
Lamprey River	9/29/2006	2	20203	Riffle	21	Odonate	Shadow Darner	<i>Aeschna umbrosa</i>
Lamprey River	9/29/2006	2	20214	Pool	22	No Odonates		
Lamprey River	9/29/2006	2	20214	Pool	23	No Odonates		

Table 2 (Continued)

River	Date	Site #	HMU #	HMU Type	Qua- drate #	Presence	Common Name	Scientific Name
Lamprey River	9/29/2006	2	20214	Pool	24	No Odonates		
Lamprey River	9/29/2006	2	20214	Pool	25	No Odonates		
Lamprey River	9/29/2006	2	20214	Pool	26	No Odonates		
Lamprey River	9/29/2006	2	20214	Pool	27	No Odonates		
Lamprey River	9/29/2006	2	20214	Pool	28	No Odonates		
Lamprey River	9/29/2006	2	20210	Sidearm	29	No Odonates		
Lamprey River	9/29/2006	2	20210	Sidearm	30	Odonate	Shadow Darner	<i>Aeschna umbrosa</i>
Lamprey River	9/29/2006	2	20210	Sidearm	31	N/A	No sample collected	
Lamprey River	9/29/2006	2	20210	Sidearm	32	No Odonates		
Lamprey River	9/29/2006	2	20210	Sidearm	33	No Odonates		
Lamprey River	9/29/2006	2	20210	Sidearm	34	No Odonates		
Lamprey River	9/29/2006	2	20210	Sidearm	35	Odonate	Illinois River Cruiser	<i>Macromia illinoensis</i>
Lamprey River	9/29/2006	2	20216	Run	36	No Odonates		
Lamprey River	9/29/2006	2	20216	Run	37	Odonate	Shadow Darner	<i>Aeschna umbrosa</i>
Lamprey River	9/29/2006	2	20216	Run	38	No Odonates		
Lamprey River	9/29/2006	2	20216	Run	39	No Odonates		
Lamprey River	9/29/2006	2	20216	Run	40	N/A	No sample collected	
Lamprey River	9/29/2006	2	20216	Run	41	N/A	No sample collected	
Lamprey River	9/29/2006	2	20216	Run	42	N/A	No sample collected	

Table 3 – EPT survey data for Site 4 collected November 1, 2007.

River	Date	Site #	HMU #	HMU Type	Qua drate #	E	P	T	Totals:
Lamprey River	11/1/2007	4	40501	Rapids	43	4	1	1	6
Lamprey River	11/1/2007	4	40501	Rapids	44	3	1	26	30
Lamprey River	11/1/2007	4	40501	Rapids	45	3	4	7	14
Lamprey River	11/1/2007	4	40501	Rapids	46	5	10	16	31
Lamprey River	11/1/2007	4	40501	Rapids	47	5	6	42	53
Lamprey River	11/1/2007	4	40501	Rapids	48	3	1	23	27
Lamprey River	11/1/2007	4	40501	Rapids	49	2	4	18	24
Lamprey River	11/1/2007	4	40503	Glide	50	1	4	27	32
Lamprey River	11/1/2007	4	40503	Glide	51	1	0	31	32
Lamprey River	11/1/2007	4	40503	Glide	52	2	0	7	9
Lamprey River	11/1/2007	4	40503	Glide	53	1	2	5	8
Lamprey River	11/1/2007	4	40503	Glide	54	1	1	12	14
Lamprey River	11/1/2007	4	40503	Glide	55	2	7	25	34
Lamprey River	11/1/2007	4	40503	Glide	56	2	0	5	7
Totals:						35	41	245	321

Table 4 – Odonate survey data for Site 4 collected November 1, 2007.

River	Date	Site #	HMU #	HMU Type	Qua drate #	Presence	Common Name	Scientific Name
Lamprey River	11/1/2007	4	40501	Rapids	43	No Odonates		
Lamprey River	11/1/2007	4	40501	Rapids	44	No Odonates		
Lamprey River	11/1/2007	4	40501	Rapids	45	Odonate	Black-tipped Darner	<i>Aeschna tuberculifera</i>
Lamprey River	11/1/2007	4	40501	Rapids	46	No Odonates		
Lamprey River	11/1/2007	4	40501	Rapids	47	No Odonates		
Lamprey River	11/1/2007	4	40501	Rapids	48	No Odonates		
Lamprey River	11/1/2007	4	40501	Rapids	49	No Odonates		
Lamprey River	11/1/2007	4	40503	Glide	50	Odonate	Lancet Clubtail	<i>Gomphus exilis</i>
Lamprey River	11/1/2007	4	40503	Glide	50	Odonate	Common Spreadwing	<i>Lestes disjunctis</i>
Lamprey River	11/1/2007	4	40503	Glide	50	Odonate	Spine-crowned Clubtail	(Hylo) <i>Gomphus abbreviatus</i>
Lamprey River	11/1/2007	4	40503	Glide	50	Odonate	Spine-crowned Clubtail	(Hylo) <i>Gomphus abbreviatus</i>
Lamprey River	11/1/2007	4	40503	Glide	50	Odonate	Spine-crowned Clubtail	(Hylo) <i>Gomphus abbreviatus</i>
Lamprey River	11/1/2007	4	40503	Glide	50	Odonate	Spine-crowned Clubtail	(Hylo) <i>Gomphus abbreviatus</i>
Lamprey River	11/1/2007	4	40503	Glide	50	Odonate	Spine-crowned Clubtail	(Hylo) <i>Gomphus abbreviatus</i>
Lamprey River	11/1/2007	4	40503	Glide	51	Odonate	Spine-crowned Clubtail	(Hylo) <i>Gomphus abbreviatus</i>
Lamprey River	11/1/2007	4	40503	Glide	51	Odonate	Spine-crowned Clubtail	(Hylo) <i>Gomphus abbreviatus</i>
Lamprey River	11/1/2007	4	40503	Glide	51	Odonate	Spine-crowned Clubtail	(Hylo) <i>Gomphus abbreviatus</i>

Table 4 (Continued)

River	Date	Site #	HMU #	HMU Type	Qua- drate #	Presence	Common Name	Scientific Name
Lamprey River	11/1/2007	4	40503	Glide	51	Odonate	Spine-crowned Clubtail	<i>(Hylo) Gomphus abbreviatus</i>
Lamprey River	11/1/2007	4	40503	Glide	52	Odonate	Spine-crowned Clubtail	<i>(Hylo) Gomphus abbreviatus</i>
Lamprey River	11/1/2007	4	40503	Glide	52	Odonate	Spine-crowned Clubtail	<i>(Hylo) Gomphus abbreviatus</i>
Lamprey River	11/1/2007	4	40503	Glide	52	Odonate	Spine-crowned Clubtail	<i>(Hylo) Gomphus abbreviatus</i>
Lamprey River	11/1/2007	4	40503	Glide	52	Odonate	Spine-crowned Clubtail	<i>(Hylo) Gomphus abbreviatus</i>
Lamprey River	11/1/2007	4	40503	Glide	53	Odonate	Common Spreadwing	<i>Lestes disjunctis</i>
Lamprey River	11/1/2007	4	40503	Glide	54	Odonate	Spine-crowned Clubtail	<i>(Hylo) Gomphus abbreviatus</i>
Lamprey River	11/1/2007	4	40503	Glide	54	Odonate	Spine-crowned Clubtail	<i>(Hylo) Gomphus abbreviatus</i>
Lamprey River	11/1/2007	4	40503	Glide	54	Odonate	Spine-crowned Clubtail	<i>(Hylo) Gomphus abbreviatus</i>
Lamprey River	11/1/2007	4	40503	Glide	54	Odonate	Spine-crowned Clubtail	<i>(Hylo) Gomphus abbreviatus</i>
Lamprey River	11/1/2007	4	40503	Glide	55	Odonate	Spine-crowned Clubtail	<i>(Hylo) Gomphus abbreviatus</i>
Lamprey River	11/1/2007	4	40503	Glide	55	Odonate	Spine-crowned Clubtail	<i>(Hylo) Gomphus abbreviatus</i>
Lamprey River	11/1/2007	4	40503	Glide	56	No Odonates		