Table 1.

Site	Date	Zone	Inverts	Fish	Latitude	Longitude
Northern Lake Michigan						
Big Fishdam	8/2/02	Inner Scirpus	x	x	N45.89271	W86.58555
Big Fishdam	8/2/02	Juncus	x		N45.89271	W86.58555
Big Fishdam	8/2/02	Outer Scirpus	x	x	N45.89271	W86.58555
Epoufette Bay	7/18/02	Juncus	x		N46.05265	W85.19958
Epoufette Bay	7/18/02	Nuphar	x		N46.05265	W85.19958
Escanaba	7/31/02	Inner Scirpus	x	x	N45.81790	W87.05235
Escanaba	7/31/02	Outer Scirpus	x	x	N45.81790	W87.05235
Garden Bay	8/2/02	Inner Scirpus	x	x	N45.99678	W86.57316
Garden Bay	8/2/02	Outer Scirpus	x	x	N45.99678	W86.57316
Ludington Park	7/31/02	Scirpus	x	x	N45.73874	W87.05646
Ludington Park	7/31/02	Scirpus Island	x	x	N45.73874	W87.05646
Nahma	8/1/02	Inner Scirpus	x		N45.85228	W86.63153
Nahma	8/1/02	Outer Scirpus	x		N45.85024	W86.63129
Ogontz Bay	7/31/02	Inner Scirpus	x	x	N45.83229	W86.78177
Ogontz Bay	7/31/02	Outer Scirpus	x	x	N45.83229	W86.78177
Pt.St. Ignace	7/18/02	Inner Scirpus	x	x	N45.84523	W84.73923
Pt.St. Ignace	7/18/02	Juncus	x		N45.84523	W84.73923
Pt.St. Ignace	7/18/02	Outer Scirpus	x	x	N45.84523	W84.73923
Rapid River	7/31/02	Inner Scirpus	x	x	N45.9137	W86.96622
Rapid River	7/31/02	Outer Scirpus	x	x	N45.9137	W86.96622
Rapid River	7/31/02	Typha	x	x	N45.9137	W86.96622
Rapid River	7/31/02	Wet Meadow	x		N45.9173	W86.96436
Eastern Lake Michigan Drowned River Mouths						
Arcadia River	6/27/02	Nuphar	x	x	N44.48858	W86.23041
Arcadia River	6/27/02	Sparganium	x	x	N44.48531	W86.22944
Arcadia River	6/27/02	Typha	x		N44.48597	W86.23124
Grand-Bruces Bayou	6/24/02	Nuphar	x	x	N43.04746	W86.10401
Grand-Bruces Bayou	6/24/02	Nymphaea	x	x	N43.04590	W86.11614
Grand-Bruces Bayou	6/24/02	Peltandra	x	x	N43.04765	W86.11283
Grand-Bruces Bayou	6/24/02	Typha	x	x	N43.04410	W86.12411
Lincoln River	7/1/02	Nuphar	x	x	N43.98149	W86.43466
Lincoln River	7/1/02	Scirpus	x	x	N43.98137	W86.43391
Lincoln River	7/1/02	Sparganium	x	x	N43.98125	W86.43105
Lincoln River	7/1/02	Typha	x	x	N43.98152	W86.44007
Little Black Creek	6/26/02	Typha	x	x	N43.18610	W86.24681
Little Pigeon River	6/17/02	Nuphar	x	x	N42.96297	W86.21807
Little Pigeon River	6/17/02	Pontederia/Peltandra	x	x	N42.96297	W86.21807
Muskegon River	6/13/02	Nuphar	x	x	N42.96297	W86.21807
Muskegon River	6/13/02	Pontedaria	x	x	N43.26642	W86.20118
Muskegon River	6/13/02	Typha	x	x	N43.27114	W86.22441
Norris Creek	6/24/02	Nuphar	x	x	N43.12100	W86.15175
Pentwater River	6/28/02	Nuphar	x	x	N43.76023	W86.40048
Pentwater River	6/28/02	Scirpus	x	x	N43.76239	W86.40674
Pentwater River	6/28/02	Sparganium	x	x	N43.76224	W86.40725
Pentwater River	6/28/02	Typha	x	x	N43.76023	W86.40048
Pere Marquette River	7/2/02	Nymphaea	x	x	N43.92949	W86.40756

Table 1. (Cont.)

Site	Date	Zone	Inverts	Fish	Latitude	Longitude
Eastern Lake Michigan Drowned River Mouths (Cont.)						
Pere Marquette River	7/2/02	Pontederia	x		N43.92930	W86.40735
Pere Marquette River	7/2/02	Sparganium	x		N43.92919	W86.40757
Pere Marquette River	7/2/02	Typha	x	x	N43.93364	W86.42019
Pigeon River	6/17/02	Nuphar	x	x	N42.90284	W86.18258
Pigeon River	6/17/02	Sparganium	x	x	N42.90406	W86.18199
Pigeon River	6/17/02	Typha	x	x	N42.90603	W86.17923
White River	7/9/02	Nuphar	x	x	N43.41472	W86.34184
White River	7/8/02	Nymphaea	x	x	N43.41315	W86.34661
White River	7/8/02	Sparganium	x	x	N43.41380	W86.34261
White River	7/9/02	Typha	x		N43.41410	W86.34220
Northern Lake Huron						
Cedarville	7/17/02	Inner Scirpus	x	x	N45.99678	W84.36251
Hessel Bay	7/15/02	Inner Scirpus	x	x	N46.00548	W84.43411
Hessel Bay	7/15/02	Outer Scirpus	x	x	N46.00548	W84.43411
Hill Island	7/16/02	Inner Scirpus	x	x	N45.98199	W84.31723
Hill Island	7/16/02	Outer Scirpus	x	x	N45.98199	W84.31723
Mackinaw Bay	7/15/02	Inner Scirpus	x	x	N46.00174	W84.40915
Mackinaw Bay	7/15/02	Outer Scirpus	x	x	N46.00174	W84.40915
Mackinaw Bay	7/15/02	Wet Meadow	x		N46.00367	W84.41145
Mismer Bay	7/15/02	Inner Scirpus	x		N46.00719	W84.46217
Mismer Bay	7/15/02	Outer Scirpus	x		N46.00719	W84.46217
Moscoe Channel	7/16/02	Inner Scirpus	x	x	N45.99175	W84.31438
Moscoe Channel	7/16/02	Outer Scirpus	x	x	N45.99175	W84.31438
Pine River	7/17/02	Scirpus	x		N46.03827	W84.62284
Prentiss Bay	7/17/02	Inner Scirpus	x		N45.98865	W84.22683
Prentiss Bay	7/17/02	Outer Scirpus	x		N45.98843	W84.22750
Prentiss Bay	7/17/02	Wet Meadow	x		N45.98867	W84.22700
Search Bay	7/17/02	Inner Scirpus	x		N45.99679	W84.50903
Shepard Island	7/17/02	Inner Scirpus	x	x	N45.98346	W84.36425
Shepard Island	7/17/02	Outer Scirpus	x	x	N45.98346	W84.36425
Shepard Island	7/17/02	Wet Meadow	x		N45.98059	W84.36428
Thunder Bay						
Squaw Bay	6/25/02	Juncus/Eleocharis	x		N44.99122	W83.457577
Whitefish Bay (N. of Rd.)	6/25/02	Scirpus	x		N45.07687	W83.377910
Whitefish Bay (N. of Rd.)	6/25/02	Typha	x		N45.07687	W83.377910
Whitefish Bay (S. of Rd.)	6/25/02	Juncus/Scirpus	x		N45.07687	W83.377910
Saginaw Bay						
Allen Rd	8/22/02	Typha/Scirpus	x	x	N43.64172	W83.60922
Almeda Beach	7/25/02	Inner Scirpus	x		N43.80138	W83.92374
Almeda Beach	7/25/02	Typha	x		N43.80112	W83.92311
Almeda Beach	7/25/02	Wet Meadow	x		N43.80168	W83.92549
Bradleyville Rd	8/29/02	Inner Scirpus	x		N43.62120	W83.63474
Bradleyville Rd	8/29/02	Outer Scirpus	x	x	N43.62155	W83.63510
Jones Rd	8/22/02	Typha	x	x	N43.64235	W83.81427
Nayanquing	7/25/02	Inner Scirpus	x		N43.77107	W83.93546

Table 1. (Cont.)

Site	Date	Zone	Inverts	Fish	Latitude	Longitude
Saginaw Bay (Cont.)						
Nayanquing	7/25/02	Outer Scirpus	x		N43.77085	W83.93528
Nayanquing	7/25/02	Typha	x		N43.77250	W83.93440
Pinnconning	8/21/02	Inner Scirpus	x	x	N43.85401	W83.91534
Pinnconning	8/21/02	Outer Scirpus	x	x	N43.85936	W83.91246
Thomas Rd. Coastal	7/11/02	Juncus	x		N43.70631	W83.54331
Thomas Rd. Coastal	7/11/02	Outer Scirpus	x		N43.70645	W83.54409
Thomas Rd. Coastal	7/11/02	Scirpus	x		N43.70645	W83.54409
Tobico Marsh	7/25/02	Nymphaea	x		N43.67838	W83.91845
Tobico Marsh	7/25/02	Typha	x		N43.67838	W83.91845
Vanderbilt Park	8/22/02	Inner Scirpus	x	x	N43.60082	W83.66103
Vanderbilt Park	8/22/02	Outer Scirpus	x	x	N43.60101	W83.66135
Wigwam Bay	8/20/02	Inner Scirpus	x	x	N43.96345	W83.85697
Wigwam Bay	8/20/02	Juncus	x		N43.96553	W83.86082
Wigwam Bay	8/20/02	Outer Scirpus	x	x	N43.96093	W83.85936
Wildfowl Bay	8/22/02	Inner Scirpus	x	x	N43.80198	W83.46281
Southern Lake Superior						
Baraga	7/30/02	Nuphar	x	x	N46.75373	W88.49267
Lightfoot Bay	7/30/02	Eleocharis/Juncus	x	x	N46.89640	W88.20306
Ojibwa Bay	7/30/02	Eleocharis	x		N46.78597	W88.46542
Ojibwa Bay	7/30/02	Wet Meadow	x		N46.78597	W88.46542
Ojibwa Bay	7/30/02	Wild Rice	x	x	N46.78597	W88.46542
Pequaming Fen	7/30/02	Channel	x		N46.85126	W88.38845
Portage River	7/29/02	Juncus	x	x	N46.98710	W88.43303
Portage River	7/29/02	Pontederia	x	x	N46.99501	W88.42750
Portage River	7/29/02	Sparganium	x		N46.99501	W88.42750
Portage River	7/29/02	Wet Meadow	x		N46.99501	W88.42750
Tahquamenon	7/17/02	Nuphar	x	x	N46.56088	W85.03021
Tahquamenon	7/17/02	Scirpus	x	x	N46.56088	W85.03021
Tahquamenon	7/17/02	Typha	x		N46.56088	W85.03021
Lake Ontario Fringing						
Bayfield Bay	7/16/02	Typha	x	x	N44.19716	W76.36786
Button Bay	7/16/02	Phalaris	x		N44.14018	W76.38305
Button Bay	7/16/02	Sagittaria/Typha/grass		x	N44.14018	W76.38305
Button Bay	7/16/02	Typha		x	N44.14018	W76.38305
Button Bay	7/16/02	Sparganium	x		N44.14018	W76.38305
Frenchman's Bay	7/31/02	Typha	x	x	N43.81168	W79.09469
Hay Bay	7/22/02	Typha	x	x	N44.15642	W76.88536
Hill Island	7/29/02	Typha	x	x	N44.36565	W75.95476
Huyck's Bay	7/10/02	Sparganium	x		N43.93642	W77.48359
Huyck's Bay	7/10/02	Scirpus/Typha		x	N43.93642	W77.48359
Huyck's Bay	7/10/02	Typha	x	x	N43.93642	W77.48359
Lynde Creek	8/6/02	Typha	x	x	N43.85377	W78.96149
Parrott Bay	7/18/02	Typha	x	x	N44.22089	W76.69455
Port Britain	7/4/02	Typha	x	x	N43.93119	W78.37122
Presqu'ile	7/24/02	Scirpus		x	N43.99810	W77.72475
Presqu'ile	7/24/02	Carex	x		N43.99810	W77.72475
Presqu'ile	7/24/02	Typha	x	x	N43.99810	W77.72475

Table 1. (Cont.)

Site	Date	Zone	Inverts	Fish	Latitude	Longitude
Lake Ontario Fringing (Cont.)						
Presqu'ile	7/24/02	Zizinia	x	x	N43.99810	W77.72475
Robinson Cove	7/11/02	Scirpus	x		N44.11319	W77.28001
Robinson Cove	7/11/02	Typha	x	x	N44.11319	W77.28001
South Bay	7/8/02	Scirpus		x	N43.92087	W77.04864
South Bay	7/8/02	Typha	x	x	N43.92087	W77.04864
Lake Erie						
Bluff Marsh	9/4/02	floating/submer.	x		N42.55661	W80.14004
Bluff Marsh	8/4/02	floating/submer.	x		N42.55661	W80.14004
Bluff Marsh	7/31/02	floating/submer.	x		N42.55661	W80.14004
Bluff Marsh	7/21/02	Typha	x	x	N42.55661	W80.14004
Booth's Harbor	8/6/02	Typha	x	x	N42.65236	W80.41051
Booth's Harbor	7/18/02	Typha	x		N42.65236	W80.41051
Booth's Harbour	8/6/02	Scirpus	x	x	N42.65236	W80.41051
Causeway	7/25/02	floating/submer.	x	x	N42.59435	W80.44807
Coletta Bay	7/24/02	Typha		x	N42.58605	W80.42632
Crown Marsh	7/24/02	floating/submer.	x		N42.56529	W80.25767
Crown Marsh	7/24/02	Typha	x	x	N42.56529	W80.25767
Crown Marsh	9/4/02	Typha	x		N42.56529	W80.25767
Crown Marsh	7/20/02	Typha	x		N42.56529	W80.25767
Hahn Marsh	8/14/02	wet meadow	x			
Helmer's Pond	7/31/02	Scirpus		x	N42.56569	W80.23876
Helmer's Pond	7/31/02	floating/submer.	x	x	N42.56569	W80.23876
Lee Brown Marsh	7/16/02	floating/submer.	x		N42.58203	W80.50379
Lee Brown Marsh	8/15/02	floating/submer.	x		N42.58203	W80.50379
Lee Brown Marsh	7/16/02	Typha	x	x	N42.58203	W80.50379
Lee Brown Marsh	8/15/02	wet meadow	x		N42.58203	W80.50379
Little Rice Bay	8/13/02	floating/submer.	x		N42.58708	W80.35988
Little Rice Bay	7/27/02	submer./Typha	x		N42.58708	W80.35988
Little Rice Bay	8/13/02	submer./Typha	x		N42.58708	W80.35988
Little Rice Bay	8/13/02	Typha	x	x	N42.58708	W80.35988
Little Rice Bay	7/22/02	Typha	x		N42.58708	W80.35988
Long Point PP	7/23/02	floating/submer.	x		N42.58573	W80.39108
Long Point PP	7/23/02	Typha	x	x	N42.58573	W80.39108
Port Rowan	8/13/02	submer./Typha	x		N42.62245	W80.44791
Port Rowan	7/19/02	submer./Typha	x		N42.62245	W80.44791
Port Rowan	7/26/02	Typha	x	x	N42.62245	W80.44791
Port Rowan	7/26/02	Scirpus	x		N42.62245	W80.44791
Port Rowan	8/6/02	Typha	x		N42.62245	W80.44791
Smith Marsh	7/26/02	floating/submer.	x	x	N42.61169	W80.45365
Thoroghfare	7/21/02	Typha		x	N42.59680	W80.34455
Thoroghfare	7/21/02	Scirpus		x	N42.59680	W80.34455

Table 2

Site	Zone	Date	Site - Zone Abbr.	Water Temp (°C)	DO (mg/L)	DO (% Sat)	Spec. Cond (uS/cm)	pH	Turb (NTU)	Chl a (mg/L)	TDS (mg/L)	ORP (mV)	Cl^- (mg/L)	SO_4 (mg/L)	NO_3-N (mg/L)	NH_4-N (mg/L)	SRP-P* (mg/L)	Alk (mg $CaCO_3$/L)
Northern Lake Michigan																		
Big Fishdam	Inner Scirpus	8/2/02	Big Fish - IS	20.39	7.66	86.9	237.0	8.19	6.2	6.4	0.1513	437	8.9	16.0	0.030	0.033	<0.01	96.0
Big Fishdam	Juncus	8/2/02	Big Fish - JU	18.88	7.94	88.7	462.8	8.32	3.4	9.0	0.2956	424	25.9	8.2	<0.01	0.026	<0.01	190.5
Big Fishdam	Outer Scirpus	8/2/02	Big Fish - OS	20.75	7.73	88.4	222.0	8.09	11.4	6.1	0.1424	455	6.4	13.3	0.039	0.074	<0.01	84.0
Epoufette Bay	Juncus	7/18/02	Epouf - JU	21.55	5.02	57.9	307.6	7.60	1.5	5.6	0.1966	349	13.3	16.6	<0.01	0.024	<0.01	124.0
Epoufette Bay	Nuphar	7/18/02	Epouf - NU	23.09	6.36	75.8	298.5	7.94	3.3	5.7	0.1910	341	11.7	13.5	<0.01	0.061	<0.01	115.0
Escanaba	Inner Scirpus	7/31/02	Escan - IS	25.42	6.70	83.1	311.0	7.65	1.9	1.8			17.9	<1.0	0.011	0.031	<0.01	112.0
Escanaba	Outer Scirpus	7/31/02	Escan - OS	25.15	9.46	116.8	285.0	8.57	2.3	0.9			10.1	15.3	<0.01	0.023	<0.01	103.0
Garden Bay	Inner Scirpus	8/2/02	Gard Bay - IS	22.37	7.45	87.2	265.0	8.29	5.2	2.4			7.8	17.2	0.056	0.072	<0.01	99.0
Garden Bay	Outer Scirpus	8/2/02	Gard Bay - OS	22.80	7.84	92.6	264.0	8.52	3.7	2.6			8.4	19.3	0.068	0.072	<0.01	97.0
Ludington Park	Scirpus	7/31/02	Lud Park - SC	30.98	16.59	227.2	569.0	8.77	3.3				79.3	35.4	<0.01	0.067	<0.01	124.0
Ludington Park	Scirpus Island	7/31/02	Lud Park - SI	29.38	7.16	95.3	287.0	8.16	2.8	3.3			15.0	14.0	<0.01	0.047	<0.01	98.0
Nahma	Inner Scirpus	8/1/02	Nahma - IS	20.98	5.36	61.1	241.0	7.63	5.8	4.5			5.9	10.8	0.073	0.108	<0.01	103.0
Nahma	Outer Scirpus	8/1/02	Nahma - OS	22.34	7.77	91.0	253.0	8.36	21.2	5.1			7.6	18.6	0.054	0.116	<0.01	89.0
Ogontz Bay	Inner Scirpus	7/31/02	Ogtz Bay - IS	28.83	8.33	109.8	288.0	8.07	3.8				8.9	16.5	<0.01	0.038	<0.01	96.0
Ogontz Bay	Outer Scirpus	7/31/02	Ogtz Bay - OS	26.20	8.26	104.5	259.9	8.92	4.3	0.4	0.1658	420	9.6	18.9	0.032	0.017	<0.01	104.0
Pt.St. Ignace	Inner Scirpus	7/18/02	Pt St Ign -IS	24.13	7.05	85.2	248.9	8.19	2.8	8.3	0.1597	454	4.8	2.5	<0.01	0.031	<0.01	112.0
Pt.St. Ignace	Juncus	7/18/02	Pt St Ign - JU	24.09	6.36	78.8	352.5	7.97	5.0	8.3	0.1616	469	5.5	2.7	<0.01	0.027	<0.01	124.0
Pt.St. Ignace	Outer Scirpus	7/18/02	Pt St Ign - JU	24.43	5.95	72.9	261.2	7.97	2.7	8.0	0.1678	443	5.2	2.8	<0.01	0.040	<0.01	132.0
Rapid River	Inner Scirpus	7/31/02	Rapid R - IS	22.89	3.38	40.1	330.0	7.24	1.9	7.6			5.7	3.8	<0.01	0.017	<0.01	153.0
Rapid River	Outer Scirpus	7/31/02	Rapid R - OS	22.16	9.17	108.9	262.5	8.78	14.0	2.4	0.1680	367	9.8	22.3	0.100	0.018	<0.01	93.0
Rapid River	Typha	7/31/02	Rapid R - TY	21.52	10.45	120.4	712.0	7.90	5.6				58.5	3.1	<0.01	0.036	<0.01	310.0
Rapid River	Wet Meadow	7/31/02	Rapid R - WM	22.05	8.54	99.7	265.9	8.69	25.3	2.7	0.1702	314	8.6	20.8	0.065	0.032	<0.01	95.0
Eastern Lake Michigan Drowned River Mouths																		
Arcadia River	Nuphar	6/27/02	Arcad R - NU	15.99	10.97	112.0	343.2	7.74	14.2	2.0	0.2201	407	1.8	6.1	0.370	0.035	0.009	175.0
Arcadia River	Sparganium	6/27/02	Arcad R - SP	19.36	6.72	73.5	355.9	7.37	117.7	8.3	0.2281	401	1.8	6.5	0.300	0.080	0.009	183.0
Arcadia River	Typha	6/27/02	Arcad R - TY	18.36	4.74	51.3	359.3	7.15	10.2	5.2	0.2311	383	2.1	6.2	0.130	0.054	0.017	186.0
Grand-Bruces Bayou	Nuphar	6/24/02	Gr Bruce - NU	24.06	6.44	80.6	364.8	8.00	11.9	9.5	0.2387	390	23.5	17.7	0.060	0.053	0.005	133.0
Grand-Bruces Bayou	Nymphaea	6/24/02	Gr Bruce - NY	27.70	9.19	117.1	483.3	8.51	38.8	31.0	0.3097	363	24.5	22.3	0.160	0.086	0.004	163.0
Grand-Bruces Bayou	Peltandra	6/24/02	Gr Bruce - PT	27.49	9.37	121.7	477.4	8.69	12.9	18.2	0.3055	365	18.9	18.6	0.130	0.073	0.003	162.0
Grand-Bruces Bayou	Typha	6/24/02	Gr Bruce - TY	28.18	10.37	129.6	499.3	8.72	34.5	25.8	0.3101	365	18.6	18.6	0.170	0.054	0.002	171.0
Lincoln River	Nuphar	7/1/02	Lincoln R - NU	22.80	11.30	131.9	327.8	8.31	9.6	14.0	0.2098	362	7.7	6.2	0.190	0.025	0.008	143.0
Lincoln River	Scirpus	7/1/02	Lincoln R - SC	21.16	7.99	87.8	327.0	7.73	12.9	3.9	0.2095	392	8.4	6.5	0.270	0.018	0.011	143.0
Lincoln River	Sparganium	7/1/02	Lincoln R - SP	21.79	7.72	89.7	354.1	7.83	15.3	3.9	0.2267	377	5.1	5.9	0.370	0.043	0.015	167.0
Lincoln River	Typha	7/1/02	Lincoln R - TY	24.15	8.93	105.0	346.4	8.06	12.1	7.5	0.2219	362	4.3	4.6	0.170	0.017	0.008	162.0
Little Black Creek	Typha	6/26/02	L Black - TY	27.46	3.31	43.0	957.5	7.52	171.1	5.4	0.6136	179	97.8	3.9	<0.01	0.266	0.014	281.0
Little Pigeon River	Nuphar	6/17/02	L Pigeon - NU	23.65	7.99	95.0	221.9	7.48	35.5	3.3	0.2060	272	9.9	11.0	0.110	0.042	0.009	106.0
Little Pigeon River	Pontederia/Peltandra	6/17/02	L Pigeon - PP	25.28	10.62	129.6	323.0	8.41	13.7	3.0	0.2068	367	14.5	16.2	0.110	0.032	0.007	114.0
Muskegon River	Nuphar	6/13/02	Musk R - NU	18.63	5.50	59.9	447.7	7.23	6.2	6.0	0.2845	440	15.3	27.3	0.060	0.040	0.014	167.0

Table 2, Continued

Site - Zone Abbr.	1-KM LAND USE %Developed	%Agriculture	%Forest	% Meadow + %Idle lands	Total %Upland	20-KM LAND USE %Urban	%Agricultural	%Forest	%Rangeland	%Wetlands	%Barren	%Range+ %Wetland+ %Barren
Northern Lake Michigan												
Big Fish - IS	0.00	2.14	81.90	2.81	86.84	0.58	7.18	77.58	3.44	11.11	0.11	14.66
Big Fish - JU	0.00	2.14	81.90	2.81	86.84	0.58	7.18	77.58	3.44	11.11	0.11	14.66
Big Fish - OS	0.00	2.14	81.90	2.81	86.84	0.58	7.18	77.58	3.44	11.11	0.11	14.66
Epouf - JU	2.60	0.00	74.60	22.80	100.00	0.82	0.35	85.91	5.54	7.25	0.13	12.91
Epouf - NU	2.60	0.00	74.60	22.80	100.00	0.82	0.35	85.91	5.54	7.25	0.13	12.91
Escan - IS	66.60	0.00	31.60	1.79	100.00	5.40	12.28	69.83	5.56	6.93	0.00	12.48
Escan - OS	66.60	0.00	31.60	1.79	100.00	5.40	12.28	69.83	5.56	6.93	0.00	12.48
Gard Bay - IS	2.15	42.67	37.88	17.30	100.00	0.81	12.35	71.89	3.75	11.04	0.17	14.95
Gard Bay - OS	2.15	42.67	37.88	17.30	100.00	0.81	12.35	71.89	3.75	11.04	0.17	14.95
Lud Park - SC	9.37	12.16	63.08	15.08	99.69	6.76	14.49	65.84	5.90	7.01	0.00	12.91
Lud Park - SI	9.37	12.16	63.08	15.08	99.69	6.76	14.49	65.84	5.90	7.01	0.00	12.91
Nahma - IS	14.70	17.00	51.00	17.20	99.90	0.54	9.20	75.64	3.17	11.37	0.07	14.61
Nahma - OS	16.50	16.40	50.80	16.20	99.90	0.54	9.20	75.64	3.17	11.37	0.07	14.61
Ogtz Bay - IS	1.46	2.32	77.29	0.00	81.06	1.86	10.03	75.87	3.49	8.73	0.02	12.24
Ogtz Bay - OS	1.46	2.32	77.29	0.00	81.06	1.86	10.03	75.87	3.49	8.73	0.02	12.24
Pt St Ign -IS	33.52	0.00	44.63	21.84	99.99	5.32	2.66	75.90	5.84	9.53	0.74	16.12
Pt St Ign - JU	33.52	0.00	44.63	21.84	99.99	5.32	2.66	75.90	5.84	9.53	0.74	16.12
Pt St Ign - JU	33.52	0.00	44.63	21.84	99.99	5.32	2.66	75.90	5.84	9.53	0.74	16.12
Rapid R - IS	20.49	3.15	14.08	25.29	63.01	3.41	7.55	76.92	4.55	7.56	0.00	12.12
Rapid R - OS	20.49	3.15	14.08	25.29	63.01	3.41	7.55	76.92	4.55	7.56	0.00	12.12
Rapid R - TY	20.49	3.15	14.08	25.29	63.01	3.41	7.55	76.92	4.55	7.56	0.00	12.12
Rapid R - WM	20.49	3.15	14.08	25.29	63.01	3.41	7.55	76.92	4.55	7.56	0.00	12.12

Site - Zone Abbr.	WATERSHED LAND USE %Developed	%Agriculture	%Forest	% Meadow + %Idle lands	Total %Upland
Eastern Lake Michigan Drowned River Mouths					
Arcad R - NU	1.34	24.42	37.08	28.89	91.73
Arcad R - SP	1.34	24.42	37.08	28.89	91.73
Arcad R - TY	1.34	24.42	37.08	28.89	91.73
Gr Bruce - NU	9.13	35.86	36.54	11.65	93.19
Gr Bruce - NY	9.13	35.86	36.54	11.65	93.19
Gr Bruce - PT	9.13	35.86	36.54	11.65	93.19
Gr Bruce - TY	9.13	35.86	36.54	11.65	93.19
Lincoln R - NU	3.67	31.91	38.85	18.10	92.53
Lincoln R - SC	3.67	31.91	38.85	18.10	92.53
Lincoln R - SP	3.67	31.91	38.85	18.10	92.53
Lincoln R - TY	3.67	31.91	38.85	18.10	92.53
L Black - TY	56.84	1.11	31.30	10.10	99.34
L Pigeon - NU	9.37	12.16	63.08	15.08	99.69
L Pigeon - PP	9.37	12.16	63.08	15.08	99.69
Musk R - NU	4.23	23.01	53.16	9.92	90.34

Table 2., Continuted

Site	Zone	Date	Site - Zone Abbr.	Water Temp (°C)	DO (mg/L)	DO (% Sat)	Spec. Cond (uS/cm)	pH	Turb (NTU)	Chl a (mg/L)	TDS (mg/L)	ORP (mV)	Cl^- (mg/L)	SO_4 (mg/L)	NO_3-N (mg/L)	NH_4-N (mg/L)	SRP-P* (mg/L)	Alk (mg $CaCO_3$/L)
Eastern Lake Michigan Drowned River Mouths																		
Arcadia River	Nuphar	6/27/02	Arcad R - NU	15.99	10.97	112.0	343.2	7.74	14.2	2.0	0.2201	407	1.8	6.1	0.370	0.035	0.009	175.0
Norris Creek	Nuphar	6/24/02	Norris Cr - NU	25.17	5.82	71.8	363.7	7.75	17.4	4.1	0.2326	388	18.1	15.5	0.570	0.217	0.014	115.0
Pentwater River	Nuphar	6/28/02	Pent R - NU	24.20	12.26	146.3	425.1	7.75	8.6	3.4	0.2718	379	8.7	6.0	0.090	0.079	0.010	185.0
Pentwater River	Scirpus	6/28/02	Pent R - SC	23.39	11.97	141.4	392.1	8.31	10.6	4.8	0.2516	376	13.1	8.8	0.600	0.035	0.012	167.0
Pentwater River	Sparganium	6/28/02	Pent R -SP	20.73	10.29	115.3	394.7	7.93	16.1	2.7	0.2579	372	7.7	6.0	0.490	0.069	0.008	176.0
Pentwater River	Typha	6/28/02	Pent R - TY	24.55	13.50	159.9	415.3	8.09	18.5	4.2	0.2652	384	11.3	7.3	0.080	0.043	0.013	170.0
Pere Marquette River	Nymphaea	7/2/02	P Marq - NY	27.84	9.20	117.1	368.0	8.22	13.3	4.2	0.2354	375	8.2	11.2	0.060	0.021	0.010	156.0
Pere Marquette River	Pontederia	7/2/02	P Marq - PO	29.90	13.50	179.0	338.0	8.66	38.7	16.7	0.2162	361	10.8	14.1	<0.01	0.031	0.007	141.0
Pere Marquette River	Sparganium	7/2/02	P Marq - SP	29.85	10.59	141.7	362.7	8.44	25.6	8.2	0.2323	340	7.8	10.6	0.050	0.003	0.009	154.0
Pere Marquette River	Typha	7/2/02	P Marq - TY	28.18	9.60	123.6	429.6	7.99	21.5	3.6	0.2748	360	28.8	15.4	0.270	0.050	0.011	152.0
Pigeon River	Nuphar	6/17/02	Pigeon R - NU	19.80	8.66	95.4	553.9	8.08	7.1	4.2	0.3545	385	47.1	31.9	1.480	0.038	0.017	134.0
Pigeon River	Sparganium	6/17/02	Pigeon R - SP	19.32	8.45	91.9	572.5	8.10	13.5	4.4	0.3663	376	46.7	29.9	1.360	0.074	0.016	135.0
Pigeon River	Typha	6/17/02	Pigeon R - TY	18.64	8.08	87.0	570.7	7.96	10.6	4.1	0.3655	385	46.5	31.7	1.630	0.071	0.015	135.0
White River	Nuphar	7/9/02	White R - NU	23.66	7.51	90.2	393.7	7.95	6.3	4.5	0.2523	379	10.7	10.6	0.120	0.081	0.010	151.0
White River	Nymphaea	7/8/02	White R - NY	24.04	10.30	123.3	407.1	8.29	23.1	3.6	0.2610	355	13.3	11.6	0.090	0.086	0.006	155.0
White River	Sparganium	7/8/02	White R - SP	22.72	5.91	71.6	392.8	7.66	0.5	5.6	0.2509	398	10.1	9.2	0.020	0.034	0.010	145.0
White River	Typha	7/9/02	White R - TY	24.64	7.45	92.1	398.6	7.85	4.9	4.0	0.2553	398	10.0	9.6	0.120	0.134	0.010	148.0
Northern Lake Huron																		
Cedarville	Inner Scirpus	7/17/02	Cedar - IS	26.08	5.77	72.5	285.0	7.01	1.8	4.2			6.7	5.5	<0.01	0.026	<0.01	141.5
Hessel Bay	Inner Scirpus	7/15/02	Hessel - IS	22.80	6.53	77.9	199.6	7.57	63.7	1.7	0.1278	388	4.6	10.0	0.042	0.041	<0.01	84.0
Hessel Bay	Outer Scirpus	7/15/02	Hessel - OS	21.94	8.18	97.4	197.8	8.08	5.1	4.1	0.1266	377	4.1	9.3	0.066	0.048	<0.01	82.5
Hill Island	Inner Scirpus	7/16/02	Hill Is - IS	22.66	10.53	118.5	175.6	8.50	3.0	2.1	0.1135	362	5.2	12.0	0.100	0.017	<0.01	73.0
Hill Island	Outer Scirpus	7/16/02	Hill Is - OS	16.18	12.23	124.1	176.6	8.37	2.4	1.1	0.1133	352	4.9	11.8	0.110	0.015	<0.01	74.0
Mackinaw Bay	Inner Scirpus	7/15/02	Mac Bay - IS	25.47	11.56	143.5	414.8	8.13	2.8	8.5	0.2658	393	4.1	3.7	<0.01	0.046	<0.01	217.0
Mackinaw Bay	Outer Scirpus	7/15/02	Mac Bay - OS	26.95	6.94	89.5	281.9	8.24	22.2	3.0	0.1805	367	5.3	8.1	<0.01	0.058	<0.01	135.2
Mackinaw Bay	Wet Meadow	7/15/02	Mac Bay - WM	29.46	10.43	139.3	445.8	8.20	8.5	142.2	0.2853	348	4.1	2.2	<0.01	0.035	<0.01	237.0
Mismer Bay	Inner Scirpus	7/15/02	Mismer - IS	23.51	8.91	107.7	277.2	8.14	1.5	1.4	0.1785	376	3.7	8.8	0.074	0.058	<0.01	127.5
Mismer Bay	Outer Scirpus	7/15/02	Mismer - OS	20.30	10.43	118.5	186.8	8.52	1.3	0.8	0.1217	370	4.7	11.5	0.134	0.015	<0.01	97.5
Moscoe Channel	Inner Scirpus	7/16/02	Moscoe - IS	21.14	6.98	85.8	192.2	7.58	4.9	4.9	0.1232	375	4.5	10.8	0.027	0.036	<0.01	80.0
Moscoe Channel	Outer Scirpus	7/16/02	Moscoe - OS	21.21	10.19	117.7	182.1	8.50	6.2	1.4	0.1166	344	4.5	11.1	0.120	0.068	<0.01	75.0
Pine River	Scirpus	7/17/02	Pine R - SC	27.68	9.24	119.8	221.9	8.91	71.2	4.9	0.1420	300	7.0	15.4	0.060	0.060	<0.01	87.0
Prentiss Bay	Inner Scirpus	7/17/02	Prent - IS	23.73	3.91	47.7	228.7	7.32	3.3	4.6	0.1450	224	6.9	12.1	0.025	0.054	<0.01	84.0
Prentiss Bay	Outer Scirpus	7/17/02	Prent - OS	19.78	8.30	92.2	190.6	7.97	4.4	2.3	0.1220	303	5.4	13.5	0.177	0.033	<0.01	73.0
Prentiss Bay	Wet Meadow	7/17/02	Prent- WM	23.48	4.67	56.2	232.1	7.31	4.5	4.0	0.1480	346	6.6	12.2	<0.01	0.057	<0.01	84.0
Search Bay	Inner Scirpus	7/17/02	Search - IS	22.57	9.92	116.5	188.6	8.05	6.2	1.2	0.1207	299	5.0	12.6	0.142	0.047	<0.01	70.0
Shepard Island	Inner Scirpus	7/17/02	Shep Is - IS	28.58	5.93	77.8	271.0	7.41	2.5	5.7			7.0	8.0	<0.01	0.024	<0.01	127.0
Shepard Island	Outer Scirpus	7/17/02	Shep Is - OS	26.85	9.28	118.0	192.0	8.65	7.1	2.0			4.7	10.7	0.018	0.044	<0.01	84.0
Shepard Island	Wet Meadow	7/17/02	Shep Is - WM	27.10	3.88	49.8	615.0	7.21	4.1				15.2	<1.0	<0.01	0.068	<0.01	309.0

Table 2., Continuted

Site - Zone Abbr.	WATERSHED LAND USE %Developed	%Agriculture	%Forest	% Meadow + %Idle lands	Total %Upland
Eastern Lake Michigan Drowned River Mouths					
Arcad R - NU	1.34	24.42	37.08	28.89	91.73
Norris Cr - NU	6.29	32.07	48.00	13.16	99.53
Pent R - NU	2.24	39.83	40.49	13.26	95.83
Pent R - SC	2.24	39.83	40.49	13.26	95.83
Pent R -SP	2.24	39.83	40.49	13.26	95.83
Pent R - TY	2.24	39.83	40.49	13.26	95.83
P Marq - NY	2.65	15.12	70.17	7.29	95.23
P Marq - PO	2.65	15.12	70.17	7.29	95.23
P Marq - SP	2.65	15.12	70.17	7.29	95.23
P Marq - TY	2.65	15.12	70.17	7.29	95.23
Pigeon R - NU	5.12	50.09	34.81	8.66	98.68
Pigeon R - SP	5.12	50.09	34.81	8.66	98.68
Pigeon R - TY	5.12	50.09	34.81	8.66	98.68
White R - NU	3.20	23.60	58.82	9.65	95.28
White R - NY	3.20	23.60	58.82	9.65	95.28
White R - SP	3.20	23.60	58.82	9.65	95.28
White R - TY	3.20	23.60	58.82	9.65	95.28

Site - Zone Abbr.	1-KM LAND USE %Developed	%Agriculture	%Forest	% Meadow + %Idle lands	Total %Upland	20-KM LAND USE %Urban	%Agricultural	%Forest	%Rangeland	%Wetlands	%Barren	%Range+ %Wetland+ %Barren
Northern Lake Huron												
Cedar - IS	31.59	6.32	44.63	12.01	94.54	2.09	13.52	75.87	4.39	4.04	0.08	8.52
Hessel - IS	27.21	4.44	41.48	22.72	95.85	2.46	14.42	76.01	3.04	3.95	0.10	7.10
Hessel - OS	27.21	4.44	41.48	22.72	95.85	2.46	14.42	76.01	3.04	3.95	0.10	7.10
Hill Is - IS	30.49	0.00	62.51	2.15	95.14	2.34	11.69	76.77	4.96	4.15	0.09	9.20
Hill Is - OS	30.49	0.00	62.51	2.15	95.14	2.34	11.69	76.77	4.96	4.15	0.09	9.20
Mac Bay - IS	10.58	0.00	59.49	9.34	79.42	2.20	14.37	75.92	3.58	3.83	0.09	7.50
Mac Bay - OS	10.58	0.00	59.49	9.34	79.42	2.20	14.37	75.92	3.58	3.83	0.09	7.50
Mac Bay - WM	10.58	0.00	59.49	9.34	79.42	2.20	14.37	75.92	3.58	3.83	0.09	7.50
Mismer - IS						2.62	13.14	77.35	2.82	3.96	0.11	6.89
Mismer - OS						2.62	13.14	77.35	2.82	3.96	0.11	6.89
Moscoe - IS	12.40	0.00	76.39	1.10	89.88	2.28	12.38	76.45	4.87	3.94	0.08	8.89
Moscoe - OS	12.40	0.00	76.39	1.10	89.88	2.28	12.38	76.45	4.87	3.94	0.08	8.89
Pine R - SC	2.70	0.00	94.40	2.90	100.00	1.73	9.32	80.25	3.43	5.18	0.08	8.70
Prent - IS	2.70	0.00	67.60	18.90	89.20	2.50	9.50	79.12	4.85	3.94	0.09	8.89
Prent - OS	2.70	0.00	67.60	18.90	89.20	2.50	9.50	79.12	4.85	3.94	0.09	8.89
Prent- WM	2.70	0.00	67.60	18.90	89.20	2.50	9.50	79.12	4.85	3.94	0.09	8.89
Search - IS					0.00	3.14	7.27	86.23	3.08	0.12	0.16	3.36
Shep Is - IS	25.58	0.00	64.71	7.12	97.41	2.22	11.81	77.25	4.34	4.28	0.10	8.72
Shep Is - OS	25.58	0.00	64.71	7.12	97.41	2.22	11.81	77.25	4.34	4.28	0.10	8.72
Shep Is - WM	25.58	0.00	64.71	7.12	97.41	2.22	11.81	77.25	4.34	4.28	0.10	8.72

Table 2., Continuted

Site	Zone	Date	Site - Zone Abbr.	Water Temp (°C)	DO (mg/L)	DO (% Sat)	Spec. Cond (uS/cm)	pH	Turb (NTU)	Chl a (mg/L)	TDS (mg/L)	ORP (mV)	Cl^- (mg/L)	SO_4 (mg/L)	NO_3-N (mg/L)	NH_4-N (mg/L)	SRP-P* (mg/L)	Alk (mg $CaCO_3$/L)
Thunder Bay																		
Squaw Bay	Juncus/Eleocharis	6/25/02	Squaw - JE	35.65	8.56	126.8	627.0	8.57	2.4				42.0	12.0	<0.01	0.036	<0.01	125.0
Whitefish Bay (N. of Rd.)	Scirpus	6/25/02	Whitefish - SC	27.43	12.88	165.5	308.0	8.12	2.4				5.3	17.3	<0.01	0.034	<0.01	123.0
Whitefish Bay (N. of Rd.)	Typha	6/25/02	Whitefish - TY	26.44	12.21	154.3	304.0	8.12	3.6				4.9	16.9	<0.01	0.034	<0.01	127.0
Whitefish Bay (S. of Rd.)	Juncus/Scirpus	6/25/02	Whitefish - JS	22.99	9.92	117.7	442.0	8.02	8.6				3.1	22.4	0.035	0.019	<0.01	206.0
Saginaw Bay																		
Allen Rd	Typha/Scirpus	8/22/02	Allen Rd - TS	23.17	9.41	112.0	369.0	8.43	8.0				28.9	19.6	<0.01	0.032	<0.01	118.0
Almeda Beach	Inner Scirpus	7/25/02	Almeda - IS	27.49	10.41	134.2	475.0	8.22	2.7				38.0	15.5	<0.01	0.039	<0.01	148.0
Almeda Beach	Typha	7/25/02	Almeda - TY	24.99	9.32	114.7	396.0	8.22	3.5				32.6	21.7	<0.01	0.054	<0.01	135.0
Almeda Beach	Wet Meadow	7/25/02	Almeda - WM	24.47	12.40	151.1	340.0	8.83	2.9				29.0	25.8	<0.01	0.058	<0.01	106.0
Bradleyville Rd	Inner Scirpus	8/29/02	Bradley - IS	26.52	9.82	125.4	358.6	9.14	10.5	6.5	0.2295	435	33.0	26.1	<0.01	<0.016	<0.01	113.0
Bradleyville Rd	Outer Scirpus	8/29/02	Bradley- OS	21.83	8.68	100.6	343.0	8.71	16.1				32.3	25.7	<0.01	<0.016	<0.01	106.5
Jones Rd	Typha	8/22/02	Jones - TY	22.14	2.94	34.4	672.0	7.57	18.5				89.7	39.5	0.300	0.105	<0.01	147.0
Nayanquing	Inner Scirpus	7/25/02	Nayanq - IS	22.85	6.47	76.5	342.0	7.49	1.9				29.5	25.3	<0.01	0.046	<0.01	104.0
Nayanquing	Outer Scirpus	7/25/02	Nayanq - OS	23.77	9.15	110.1	330.0	8.17	1.7				28.9	24.9	<0.01	0.029	<0.01	102.0
Nayanquing	Typha	7/25/02	Nayanq - TY	23.50	10.59	126.8	331.0	8.60	2.5				28.7	24.5	<0.01	0.047	<0.01	104.0
Pinnconning	Inner Scirpus	8/21/02	Pinn - IS	20.99	4.96	56.6	338.0	7.33	2.5	1.5			30.5	20.3	<0.01	0.048	<0.01	98.0
Pinnconning	Outer Scirpus	8/21/02	Pinn - OS	23.04	10.17	120.7	296.0	9.22	11.4	1.5			35.1	25.2	<0.01	0.045	<0.01	67.4
Thomas Rd. Coastal	Juncus	7/11/02	Thomas - JU	26.66	9.30	118.1	481.0	8.49	3.9				52.5	52.9	<0.01	0.044	<0.01	130.0
Thomas Rd. Coastal	Outer Scirpus	7/11/02	Thomas - OS	25.63	12.68	158.0	460.0	8.89	3.1				48.5	48.8	<0.01	0.020	<0.01	128.0
Thomas Rd. Coastal	Scirpus	7/11/02	Thomas - SC	24.70	11.49	140.7	391.0	9.31	77.1				38.1	38.0	2.083	0.016	<0.01	14.0
Tobico Marsh	Nymphaea	7/25/02	Tob Mar - NY	21.99	3.65	42.5	635.0	7.46	2.3				83.5	32.4	<0.01	0.043	<0.01	123.0
Tobico Marsh	Typha	7/25/02	Tob Mar - TY	22.25	4.00	46.8	635.0	7.46	2.5				91.5	35.7	<0.01	0.050	<0.01	154.0
Vanderbilt Park	Inner Scirpus	8/22/02	Vand Park - IS	26.02	9.61	120.5	409.0	8.07	3.5	2.2			26.7	14.2	<0.01	0.228	<0.01	158.0
Vanderbilt Park	Outer Scirpus	8/22/02	Vand Park - OS	25.56	9.66	121.3	366.0	8.45	7.2	2.7			29.9	16.0	<0.01	0.115	<0.01	174.0
Wigwam Bay	Inner Scirpus	8/20/02	Wigwam - IS	24.66	10.57	119.9	289.7	9.62	12.5	2.3	0.1855	389	25.4	20.7	<0.01	0.057	<0.01	81.0
Wigwam Bay	Juncus	8/20/02	Wigwam - JU	24.24	9.92	120.8	289.3	9.47	9.1	1.3	0.1842	389	27.0	25.5	<0.01	0.027	<0.01	75.1
Wigwam Bay	Outer Scirpus	8/20/02	Wigwam - OS	28.20	11.80	155.2	366.1	9.26	4.7	3.7	0.2345	372	34.3	12.9	0.015	0.040	<0.01	138.0
Wildfowl Bay	Inner Scirpus	8/22/02	Wildfowl - IS	23.02	9.19	108.9	278.0	8.92	15.2				24.8	22.8	<0.01	0.044	<0.01	66.1
Southern Lake Superior																		
Baraga	Nuphar	7/30/02	Baraga - NU	22.47	5.83	70.7	195.0	7.55	3.0	2.9	0.1242	472	0.7	0.1	<0.01	0.039	<0.01	98.0
Lightfoot Bay	Eleocharis/Juncus	7/30/02	Lightfoot - EJ	31.11	9.13	126.4	48.6	9.19	6.9	0.8	0.0306	393	0.8	2.3	<0.01	0.075	<0.01	21.5
Ojibwa Bay	Eleocharis	7/30/02	Ojibwa - EL	23.28	9.11	112.6	90.6	8.32	0.6	0.7	0.0581	463	1.4	3.2	0.156	0.031	<0.01	46.5
Ojibwa Bay	Wet Meadow	7/30/02	Ojibwa - WM	22.75	6.44	77.0	97.2	7.14	5.6	1.7	0.0622	440	1.4	2.0	<0.01	0.029	<0.01	42.0
Ojibwa Bay	Wild Rice	7/30/02	Ojibwa - WR	22.82	9.16	107.8	90.4	8.12	3.2	0.3	0.0580	464	1.4	3.0	0.135	0.031	<0.01	37.0
Pequaming Fen	Channel	7/30/02	Peq Fen - CH	29.06	4.80	63.5	40.0	6.00	6.6				0.7	0.3	0.010	0.037	<0.01	7.0
Portage River	Juncus	7/29/02	Port R - JU	22.48	8.02	94.2	101.2	7.81	6.3	6.0	0.0652	478	2.9	3.0	0.080	0.022	<0.01	37.0
Portage River	Pontederia	7/29/02	Port R - PO	24.66	5.61	71.5	91.0	7.14	5.1	3.2	0.0581	504	2.0	2.4	<0.01	0.032	0.013	35.0
Portage River	Sparganium	7/29/02	Port R - SP	24.49	5.49	67.1	93.1	7.17	8.5	6.0	0.0601	483	2.1	2.6	0.010	0.044	0.010	44.0
Portage River	Wet Meadow	7/29/02	Port R - WM	22.35	3.81	44.8	95.3	6.88	12.6	6.6	0.0610	418	1.6	1.2	<0.01	0.028	<0.01	
Tahquamenon	Nuphar	7/17/02	Tahq - NU	25.36	8.61	106.0	160.0	8.01	5.6				1.7	6.1	0.060	<0.016	0.010	95.0
Tahquamenon	Scirpus	7/17/02	Tahq - SC	27.21	8.29	49.8	155.9	7.53	4.1				1.5	5.1	0.039	<0.016	0.010	78.0
Tahquamenon	Typha	7/17/02	Tahq - TY	25.47	8.66	116.4	14.0	7.90	6.2				1.3	5.9	<0.01	0.016	0.010	72.0

Table 2., Continuted

Site - Zone Abbr.	1-KM LAND USE %Developed	%Agriculture	%Forest	% Meadow + %Idle lands	Total %Upland	20-KM LAND USE %Urban	%Agricultural	%Forest	%Rangeland	%Wetlands	%Barren	%Range+ %Wetland+ %Barren
Thunder Bay												
Squaw - JE						5.44	22.28	52.82	8.88	10.41	0.15	19.45
Whitefish - SC						8.12	8.21	61.58	9.86	11.93	0.29	22.09
Whitefish - TY						8.12	8.21	61.58	9.86	11.93	0.29	22.09
Whitefish - JS						8.12	8.21	61.58	9.86	11.93	0.29	22.09
Saginaw Bay												
Allen Rd - TS	5.7	60.4	24.4	0.0	90.49	3.19	90.55	3.05	1.22	1.99		3.21
Almeda - IS	23.0	21.6	2.3	14.4	61.38	7.01	60.86	20.42	8.31	3.36	0.05	11.71
Almeda - TY	26.5	16.2	4.2	1.2	48.12	7.01	60.86	20.42	8.31	3.36	0.05	11.71
Almeda - WM	26.5	16.2	4.2	1.2	48.12	7.01	60.86	20.42	8.31	3.36	0.05	11.71
Bradley - IS	0.3	40.6	33.9	9.0	83.83	4.59	86.09	2.95	1.60	4.76	0.01	6.37
Bradley- OS	0.3	40.6	33.9	9.0	83.83	4.59	86.09	2.95	1.60	4.76	0.01	6.37
Jones - TY	83.7	0.00	0.00	0.00	83.68	13.23	75.24	3.63	3.61	4.25	0.04	7.90
Nayanq - IS	0.0	25.8	0.0	8.0	33.88	9.69	61.67	17.75	7.48	3.36	0.04	10.88
Nayanq - OS	0.0	32.0	0.0	7.8	39.87	9.69	61.67	17.75	7.48	3.36	0.04	10.88
Nayanq - TY	0.0	32.0	0.0	7.8	39.87	9.69	61.67	17.75	7.48	3.36	0.04	10.88
Pinn - IS	11.1	17.9	12.9	43.8	85.82	4.47	59.30	23.71	9.59	2.91	0.02	12.53
Pinn - OS	11.1	17.9	12.9	43.8	85.82	4.47	59.30	23.71	9.59	2.91	0.02	12.53
Thomas - JU	22.2	8.0	1.3	40.1	71.60	1.57	89.90	3.97	1.06	3.50		4.56
Thomas - OS	22.2	8.0	1.3	40.1	71.60	1.57	89.90	3.97	1.06	3.50		4.56
Thomas - SC	22.2	8.0	1.3	40.1	71.60	1.57	89.90	3.97	1.06	3.50		4.56
Tob Mar - NY	12.5	0.0	33.0	2.4	47.90	12.84	70.29	8.55	4.98	3.30	0.04	8.32
Tob Mar - TY	12.5	0.0	33.0	2.4	47.90	12.84	70.29	8.55	4.98	3.30	0.04	8.32
Vand Park - IS	0.0	33.7	7.4	7.2	48.29	6.65	86.92	2.79	1.82	1.82	0.01	3.65
Vand Park - OS	0.0	33.7	7.4	7.2	48.29	6.65	86.92	2.79	1.82	1.82	0.01	3.65
Wigwam - IS	0.0	1.3	0.0	17.5	18.82	3.68	44.01	37.13	12.28	2.90	0.00	15.18
Wigwam - JU	0.0	1.3	0.0	17.5	18.82	3.68	44.01	37.13	12.28	2.90	0.00	15.18
Wigwam - OS	0.0	1.3	0.0	17.5	18.82	3.68	44.01	37.13	12.28	2.90	0.00	15.18
Wildfowl - IS	0.0	0.0	27.9	0.0	28.00	3.05	85.77	6.51	1.45	3.22	0.00	4.67
Southern Lake Superior												
Baraga - NU	0.00	0.00	57.61	6.24	63.85	1.08	5.76	84.10	4.80	4.20	0.06	9.06
Lightfoot - EJ	4.33	0.00	40.89	2.18	47.40	0.53	0.92	93.89	1.83	2.35	0.48	4.66
Ojibwa - EL	10.24	0.00	32.69	18.27	61.21	1.18	6.40	83.00	5.03	4.33	0.06	9.43
Ojibwa - WM	10.24	0.00	32.69	18.27	61.21	1.18	6.40	83.00	5.03	4.33	0.06	9.43
Ojibwa - WR	10.24	0.00	32.69	18.27	61.21	1.18	6.40	83.00	5.03	4.33	0.06	9.43
Peq Fen - CH												
Port R - JU	1.40	4.33	47.39	4.42	57.54	3.20	9.25	71.93	8.19	7.42	0.02	15.63
Port R - PO	1.40	4.33	47.39	4.42	57.54	3.20	9.25	71.93	8.19	7.42	0.02	15.63
Port R - SP	1.40	4.33	47.39	4.42	57.54	3.20	9.25	71.93	8.19	7.42	0.02	15.63
Port R - WM	1.40	4.33	47.39	4.42	57.54	3.20	9.25	71.93	8.19	7.42	0.02	15.63
Tahq - NU	0.67	0.79	79.51	3.97	84.94	0.98	0.07	87.26	0.67	11.02	0.00	11.69
Tahq - SC	0.67	0.79	79.51	3.97	84.94	0.98	0.07	87.26	0.67	11.02	0.00	11.69
Tahq - TY	0.67	0.79	79.51	3.97	84.94	0.98	0.07	87.26	0.67	11.02	0.00	11.69

Table 2., Continuted

Site	Zone	Date	Site - Zone Abbr.	Water Temp (°C)	DO (mg/L)	DO (% Sat)	Spec. Cond (uS/cm)	pH	Turb (NTU)	Chl a (mg/L)	TDS (mg/L)	ORP (mV)	Cl^- (mg/L)	SO_4 (mg/L)	NO_3-N (mg/L)	NH_4-N (mg/L)	SRP-P* (mg/L)	Alk (mg $CaCO_3$/L)
Lake Ontario Fringing																		
Bayfield Bay	Typha	7/16/02	Bayfield - TY	25.03	6.40		265.0	7.43	23.2			363			1.200	0.040	0.500	100.0
Button Bay	Phalaris	7/16/02	Bayfield - TY	23.57	2.90		312.0	7.09	5.6			340			0.600	0.020	0.250	100.0
Button Bay	Sagittaria/Typha/grass	7/16/02	Button - PH															
Button Bay	Sparganium	7/16/02	Button - PH	23.09	2.36		304.0	6.97	2.5			376			0.700	0.050	0.240	100.0
Button Bay	Typha	7/16/02	Button - PH															
Frenchman's Bay	Typha	7/31/02	French - TY	25.60	6.58		369.0	7.57	4.7			441			0.600	0.050	0.080	100.0
Hay Bay	Typha	7/22/02	Hay Bay - TY	25.63	5.69		337.0	7.57	16.4			407			0.900	0.090	0.130	140.0
Hill Island	Typha	7/29/02	Hill Is - TY	28.56	6.80		300.0	7.01	10.2			432			0.400	0.010	0.100	100.0
Huyck's Bay	Scirpus/Typha	7/10/02	Huyck - ST															
Huyck's Bay	Sparganium	7/10/02	Huyck - SP	21.59	0.15		401.0	6.65	9.1			254			0.700	0.040	0.190	100.0
Huyck's Bay	Typha	7/10/02	Huyck - TY															
Lynde Creek	Typha	8/6/02	Lynde - TY	21.66	7.05		704.0	7.18	69.1			201			0.800	0.030	0.210	180.0
Parrott Bay	Typha	7/18/02	Parrot - TY	25.19	2.44		321.0	7.19	1.5			447			0.400	0.000	0.030	120.0
Port Britain	Typha	7/4/02	Pt Brit - TY	25.85	2.48		497.0	7.18	15.5			408			0.900	0.130	0.280	140.0
Presqu'ile	Carex	7/24/02	Presq - CX	21.75	0.75		358.0	7.07	6.8			342			0.900	0.030	0.560	170.0
Presqu'ile	Scirpus	7/24/02	Presq - SC															
Presqu'ile	Typha	7/24/02	Presq - TY	22.84	6.08		290.0	7.77	1.3			312			0.300	0.050	0.110	100.0
Presqu'ile	Zizinia	7/24/02	Presq - ZZ															
Robinson Cove	Scirpus	7/11/02	Rob Cove - SC															
Robinson Cove	Typha	7/11/02	Rob Cove - TY	21.21	5.13		261.0	7.48	9.7			296			0.500	0.090	0.280	80.0
South Bay	Scirpus	7/8/02	S Bay - SC															
South Bay	Typha	7/8/02	S Bay - TY	17.64	11.23		299.0	8.46	5.8			279			0.300	0.010	0.060	60.0
Lake Erie																		
Bluff Marsh	floating/submer.	7/31/02	Bluff - FL (1)															
Bluff Marsh	floating/submer.	8/4/02	Bluff - FL (2)															
Bluff Marsh	floating/submer.	9/4/02	Bluff - FL (3)	25.70	9.05		234.0	8.80	0.8		0.1190				<0.01	0.154	<0.02	
Bluff Marsh	Typha	7/21/02	Bluff - TY	27.40	8.34		206.0	7.19	1.3		0.1050				<0.01	0.048	<0.02	
Booth's Harbor	Typha	7/18/02	Booth - TY (1)															
Booth's Harbor	Typha	8/6/02	Booth - TY (2)															
Booth's Harbour	Scirpus	8/6/02	Booth - SC	20.20	6.68		403.0	7.71	3.4		0.2060				<0.01	0.079	<0.02	
Causeway	floating/submer.	7/25/02	Causewy - FL															
Coletta Bay	Typha	7/24/02	Coletta - TY															
Crown Marsh	floating/submer.	7/24/02	Crown - FL															
Crown Marsh	Typha	7/20/02	Crown - TY (1)															
Crown Marsh	Typha	7/24/02	Crown - TY (2)															
Crown Marsh	Typha	9/4/02	Crown - TY (3)															
Hahn Marsh	wet meadow	8/14/02	Hahn - WM	25.00	3.83		401.0	7.30	185.0		0.2060				<0.01	1.730	0.0754	
Helmer's Pond	floating/submer.	7/31/02	Helmer - FL	27.50	9.94		230.0	8.88	2.9		0.1160				<0.01	0.035	<0.02	
Helmer's Pond	Scirpus	7/31/02	Helmer - SC	29.30	7.63		251.0	7.19	1.7		0.1280				<0.01	0.049	<0.02	
Lee Brown Marsh	floating/submer.	7/16/02	LB Mar - FL (1)															
Lee Brown Marsh	floating/submer.	8/15/02	LB Mar - FL (2)															
Lee Brown Marsh	Typha	7/16/02	LB Mar- TY	26.90	7.76		215.0	7.19	9.4		0.1080				<0.01	0.045	<0.02	
Lee Brown Marsh	wet meadow	8/15/02	LB Mar - WM															
Little Rice Bay	floating/submer.	8/13/02	L Rice - FL															

Table 2., Continuted

	1-KM LAND USE					20-KM LAND USE						
Site - Zone Abbr.	%Developed	%Agriculture	%Forest	% Meadow + %Idle lands	Total %Upland	Wetland	Forested	Mines, Quarries	Urban	Pasture/ Abandonded Field	Crop	Alvar
Lake Ontario Fringing												
Bayfield - TY	2.88	88.07	5.13	3.89	99.97	8.50	25.19	0.56	7.90	21.88	35.97	0.65
Bayfield - TY	5.08	79.19	7.96	7.77	100.00	8.55	19.71	0.09	11.50	23.23	36.92	0.19
Button - PH	5.08	79.19	7.96	7.77	100.00	8.55	19.71	0.09	11.50	23.23	36.92	0.19
Button - PH	5.08	79.19	7.96	7.77	100.00	8.55	19.71	0.09	11.50	23.23	36.92	0.19
Button - PH	5.08	79.19	7.96	7.77	100.00	8.55	19.71	0.09	11.50	23.23	36.92	0.19
French - TY	84.17	1.72	1.17	12.94	100.00	1.45	13.04	0.05	31.48	9.02	44.96	0.00
Hay Bay - TY	8.02	69.69	14.39	6.81	98.92	6.10	26.41	0.53	0.87	26.81	39.28	6.28
Hill Is - TY	4.56	0.00	93.95	0.00	98.51	12.01	52.09	0.00	0.56	15.10	20.23	0.00
Huyck - ST	5.37	84.59	4.95	3.72	98.63	23.14	10.84	0.42	1.64	21.29	40.62	6.74
Huyck - SP	5.37	84.59	4.95	3.72	98.63	23.14	10.84	0.42	1.64	21.29	40.62	6.74
Huyck - TY	5.37	84.59	4.95	3.72	98.63	23.14	10.84	0.42	1.64	21.29	40.62	6.74
Lynde - TY	45.09	22.81	6.55	24.61	99.04	1.98	18.33	0.07	15.48	12.57	51.58	0.00
Parrot - TY	7.43	21.58	30.21	40.60	99.82	4.79	27.70	0.72	5.61	26.65	34.54	4.66
Pt Brit - TY	8.17	61.04	9.72	20.24	99.16	3.25	27.41	0.00	2.06	12.95	54.33	0.00
Presq - CX	20.19	3.34	49.47	13.06	86.06	13.06	23.67	0.14	2.14	15.04	43.47	2.75
Presq - SC	20.19	3.34	49.47	13.06	86.06	13.06	23.67	0.14	2.14	15.04	43.47	2.75
Presq - TY	20.19	3.34	49.47	13.06	86.06	13.06	23.67	0.14	2.14	15.04	43.47	2.75
Presq - ZZ	20.19	3.34	49.47	13.06	86.06	13.06	23.67	0.14	2.14	15.04	43.47	2.75
Rob Cove - SC	2.90	83.21	7.62	6.27	100.00	18.15	17.80	0.06	1.83	24.39	37.63	5.95
Rob Cove - TY	2.90	83.21	7.62	6.27	100.00	18.15	17.80	0.06	1.83	24.39	37.63	5.95
S Bay - SC	10.91	71.41	8.27	9.15	99.74	9.42	21.66	0.35	0.00	22.47	45.93	8.39
S Bay - TY	10.91	71.41	8.27	9.15	99.74	9.42	21.66	0.35	0.00	22.47	45.93	8.39
Lake Erie												
Bluff - FL (1)	0.22	0.00	1.34	78.96	80.53	98.76	0.67	0.45	0.00	0.00	0.13	
Bluff - FL (2)	0.22	0.00	1.34	78.96	80.53	98.76	0.67	0.45	0.00	0.00	0.13	
Bluff - FL (3)	0.22	0.00	1.34	78.96	80.53	98.76	0.67	0.45	0.00	0.00	0.13	
Bluff - TY	0.22	0.00	1.34	78.96	80.53	98.76	0.67	0.45	0.00	0.00	0.13	
Booth - TY (1)	4.31	70.12	21.84	0.00	96.28	51.57	16.19	0.21	0.00	0.24	31.79	
Booth - TY (2)	4.31	70.12	21.84	0.00	96.28	51.57	16.19	0.21	0.00	0.24	31.79	
Booth - SC	4.31	70.12	21.84	0.00	96.28	51.57	16.19	0.21	0.00	0.24	31.79	
Causewy - FL	4.31	70.12	21.84	0.00	96.28	51.57	16.19	0.21	0.00	0.24	31.79	
Coletta - TY	54.26	0.00	1.43	29.65	85.33							
Crown - FL	56.09	0.00	0.00	30.50	86.60	72.17	9.98	0.31	0.00	0.13	17.40	
Crown - TY (1)	56.09	0.00	0.00	30.50	86.60	72.17	9.98	0.31	0.00	0.13	17.40	
Crown - TY (2)	56.09	0.00	0.00	30.50	86.60	72.17	9.98	0.31	0.00	0.13	17.40	
Crown - TY (3)	56.09	0.00	0.00	30.50	86.60	72.17	9.98	0.31	0.00	0.13	17.40	
Hahn - WM						63.78	12.04	0.20	0.00	0.21	23.77	
Helmer - FL	0.20	0.00	12.00	39.54	51.73	94.78	2.17	0.46	0.00	0.01	2.58	
Helmer - SC	0.20	0.00	12.00	39.54	51.73	94.78	2.17	0.46	0.00	0.01	2.58	
LB Mar - FL (1)	2.39	72.83	2.16	12.26	89.65	63.78	12.04	0.20	0.00	0.21	23.77	
LB Mar - FL (2)	2.39	72.83	2.16	12.26	89.65	63.78	12.04	0.20	0.00	0.21	23.77	
LB Mar- TY	2.39	72.83	2.16	12.26	89.65	63.78	12.04	0.20	0.00	0.21	23.77	
LB Mar - WM	2.39	72.83	2.16	12.26	89.65	63.78	12.04	0.20	0.00	0.21	23.77	
L Rice - FL	0.00	0.00	0.00	91.34	91.34	72.17	9.98	0.31	0.00	0.13	17.40	

Table 2., Continuted

Site	Zone	Date	Site - Zone Abbr.	Water Temp (°C)	DO (mg/L)	DO (% Sat)	Spec. Cond (uS/cm)	pH	Turb (NTU)	Chl a (mg/L)	TDS (mg/L)	ORP (mV)	Cl^- (mg/L)	SO_4 (mg/L)	NO_3-N (mg/L)	NH_4-N (mg/L)	SRP-P* (mg/L)	Alk (mg $CaCO_3$/L)
Lake Erie																		
Little Rice Bay	submer./Typha	7/27/02	L Rice - ST (1)															
Little Rice Bay	submer./Typha	8/13/02	L Rice - ST (2)															
Little Rice Bay	Typha	7/22/02	L Rice - TY (1)	26.40	13.55		220.0	7.19	3.0		0.1100				0.022	0.112	<0.02	
Little Rice Bay	Typha	8/13/02	L Rice - TY (2)	26.00	5.19		244.0	8.82	2.7		0.1230				<0.01	0.050	<0.02	
Long Point PP	floating/submer.	7/23/02	Long Pt - FL															
Long Point PP	Typha	7/23/02	Long Pt - TY	24.30	6.84		286.0	7.20	2.5		0.1430				<0.01	0.042	<0.02	
Port Rowan	Scirpus	7/26/02	Pt Row - SC															
Port Rowan	submer./Typha	7/19/02	Pt Row - ST (1)															
Port Rowan	submer./Typha	8/13/02	Pt Row - ST (2)															
Port Rowan	Typha	7/26/02	Pt Row - TY (1)															
Port Rowan	Typha	8/6/02	Pt Row - TY (2)	26.10	10.63		263.0	7.19	2.4		0.1330				<0.01	0.023	<0.02	
Smith Marsh	floating/submer.	7/26/02	Smith - FL	24.20	10.27		234.0	7.19	6.1		0.1180				<0.01	0.093	<0.02	
Thoroghfare	Scirpus	7/21/02	Thorogh - SC															
Thoroghfare	Typha	7/21/02	Thorogh - TY	25.90	8.51		221.0	9.14	4.5		0.1120				0.012	0.052	0.0233	

Table 2., Continuted

	1-KM LAND USE					20-KM LAND USE						
Site - Zone Abbr.	%Developed	%Agriculture	%Forest	% Meadow + %Idle lands	Total %Upland	Wetland	Forested	Mines, Quarries	Urban	Pasture/ Abandonded Field	Crop	Alvar
Lake Erie												
L Rice - ST (1)	0.00	0.00	0.00	91.34	91.34	72.17	9.98	0.31	0.00	0.13	17.40	
L Rice - ST (2)	0.00	0.00	0.00	91.34	91.34	72.17	9.98	0.31	0.00	0.13	17.40	
L Rice - TY (1)	0.00	0.00	0.00	91.34	91.34	72.17	9.98	0.31	0.00	0.13	17.40	
L Rice - TY (2)	0.00	0.00	0.00	91.34	91.34	72.17	9.98	0.31	0.00	0.13	17.40	
Long Pt - FL	15.84	0.00	11.00	48.87	75.71	72.17	9.98	0.31	0.00	0.13	17.40	
Long Pt - TY	15.84	0.00	11.00	48.87	75.71	72.17	9.98	0.31	0.00	0.13	17.40	
Pt Row - SC	22.90	38.67	16.52	3.46	81.56	51.57	16.19	0.21	0.00	0.24	31.79	
Pt Row - ST (1)	22.90	38.67	16.52	3.46	81.56	51.57	16.19	0.21	0.00	0.24	31.79	
Pt Row - ST (2)	22.90	38.67	16.52	3.46	81.56	51.57	16.19	0.21	0.00	0.24	31.79	
Pt Row - TY (1)	22.90	38.67	16.52	3.46	81.56	51.57	16.19	0.21	0.00	0.24	31.79	
Pt Row - TY (2)	22.90	38.67	16.52	3.46	81.56	51.57	16.19	0.21	0.00	0.24	31.79	
Smith - FL	16.66	47.34	5.49	18.46	87.94	51.57	16.19	0.21	0.00	0.24	31.79	
Thorogh - SC	0.93	0.00	0.00	99.07	100.00	72.17	9.98	0.31	0.00	0.13	17.40	
Thorogh - TY	0.93	0.00	0.00	99.07	100.00	72.17	9.98	0.31	0.00	0.13	17.40	

Table 3.

Parameters	Fish Sites				Invertebrate Sites			
	Outer *Scirpus*	Inner *Scirpus*	Lily	*Typha*	Outer *Scirpus*	Inner *Scirpus*	Wet meadow	*Typha*
Land Use - 20-km or watershed								
% Developed	x	x	x		x	x	x	x
% Agriculture	x	x	x		x	x	x	x
% Forest	x	x	x		x	x	x	x
% Wetland & Meadow	x	x	x		x	x	x	x
Land Use - 1-km								
% Developed	x	x		x	x	x	x	
% Agriculture	x	x		x	x	x	x	
% Forest	x	x		x	x	x	x	
% Wetland & Meadow	x	x		x	x	x	x	
Water Quality								
Specific conductance	x	x	x	x	x	x	x	x
|pH - median pH|	x	x			x	x	x	x
Turbidity	x	x	x	x	x	x	x	x
NO_3-N			x	x				
|NO_3-N - median NO_3-N|	x				x	x	x	x
NH_4-N			x					
|NH_4-N - median NH_4-N|					x	x	x	x
SRP-P			x					
|SRP-P - median SRP-P|						x		x
Cl	x	x	x		x	x	x	
|% DO - median % DO|	x	x			x	x	x	
SO_4-S					x	x	x	
PC1				x	x	x	x	x

Table 4a.

	20-km Land Use				1-km Land Use				Water Quality						
	%Dev	%Ag	%For^{-1}	%Wet/Mead^{-1}	%Dev	%Ag	%For^{-1}	%Wet/Mead^{-1}	Sp. Cond. (μS cm^{-1})	pH	Turb. (NTU)	NO_3-N (mg L^{-1})	Cl (mg L^{-1})	%DO	
Inner *Scirpus*															
Mean ± SE:	2.9±0.4	24.0±6.7	63.0±6.6	10.2±1.0	16.1±4.4	5.7±3.0	42.4±6.3	10.5±2.3	292.2±20.7	8.1±0.1	8.5±2.9	0.06±0.03	11.7±2.3	8.6±0.6	**Rank**
Range:	0.5-6.7	0.9-86.9	2.8-93.9	3.6-16.1	0.0-66.6	0.0-42.7	0.0-81.9	0.0-26.8	155.9-569.0	7.0-9.6	1.7-63.7	0.01-0.60	0.8-30.5	5.0-16.6	**Sum**
Big Fishdam	32	30	30	28	15	7	16	6	13	16	5		7	16	221
Rapid River	12	28	26	20	7	5	3	15	12	16	12		13	14	183
Lightfoot Bay	34	34	32	4	11	10	7	5	17	3	4		17	2	180
Garden Bay	30	18	10	30	12	1	6	11	9	14	7		9	17	174
Ogontz Bay	28	26	14	22	13	6	15	0	10	11	9		7	9	170
Shepards Bay	22	22	28	14	6	10	13	7	8	5	14		10	11	170
Hill Island	18	24	24	18	4	10	12	4	16	12	11		12	5	170
Moscoe Channel	20	16	22	16	8	10	14	1	15	8	8		15	15	168
St. Ignace	6	32	16	34	2	10	9	13	11	9	2		6	7	157
Mackinac Bay	24	12	18	10	9	10	11	9	1	15	12		16	1	148
Hessel Bay	16	10	20	8	5	4	8	14	14	7	6		14	12	138
Cedarville	26	14	12	12	3	3	10	10	6	2	17		11	10	136
Escanaba	4	20	8	24	1	10	5	3	4	10	16		5	13	123
Pinconning	8	6	4	26	10	9	4	16	3	4	14		1	6	111
Wigwam Bay	10	8	6	32	14	8	0	12	5	1	3		3	4	106
Wildfowl Bay	14	4	2	6	15	10	1	2	7	6	1		4	7	79
Vanderbilt Park	2	2	0	2	15	2	2	8	2	13	9		2	3	62
Outer *Scirpus*															
Mean ± SE:	3.2±0.5	25.1±7.0	60.6±6.8	11.1±1.0	15.0±4.6	6.3±3.2	45.0±6.2	11.2±2.3	254.7±18.0	8.5±0.1	9.1±1.7	0.04±0.01	12.5±2.8	105.3±3.6	**Rank**
Range:	0.6-6.7	2.7-86.9	2.8-77.6	3.6-16.1	0.0-66.6	0.0-42.7	0.0-81.9	0.0-26.8	101.2-366.0	7.8-9.5	2.3-25.3	0.01-0.12	2.9-35.1	78.8-124.1	**Sum**
Big Fishdam	32	30	30	22	14	8	15	4	11	6	4	14	9	9	208
Ogontz Bay	28	24	14	16	11	7	14	0	10	7	13	16	6	16	182
Shepards Bay	24	20	28	8	5	11	12	6	13	11	8	15	13	6	180
Portage River	16	26	12	28	12	5	9	5	16	3	9	3	16	12	172
Garden Bay	30	16	10	24	10	1	5	10	9	15	14	4	8	11	167
Hill Island	20	22	24	12	3	11	11	3	15	11	15	2	12	2	163
St. Ignace	6	32	16	30	2	11	8	12	8	10	1	6	7	14	163
Moscoe Channel	22	14	22	10	7	11	13	1	14	15	10	1	14	7	161
Rapid River	14	28	26	14	6	6	2	14	2	4	12	7	10	1	146
Mackinac Bay	26	12	18	6	8	11	10	8	7	8	2	7	11	10	144
Hessel Bay	18	10	20	4	4	4	6	13	12	5	11	5	15	13	140
Escanaba	4	18	8	18	1	11	4	2	6	13	16	7	5	8	121
Wigwam Bay	12	8	6	26	13	9	0	11	5	1	6	7	4	4	112
Pinconning	10	6	4	20	9	10	3	15	4	2	4	7	1	5	100
Bradleyville	8	4	2	2	14	3	7	9	3	9	3	7	2	15	88
Vanderbilt Park	2	2	0	0	14	2	1	7	1	13	7	7	3	3	62

Table 4b.

	1-km Land Use				Water Quality				
	%Dev	%Ag	%For^{-1}	%Wet/Mead^{-1}	Sp. Cond. (μS cm^{-1})	Turb. (NTU)	NO_3-N (mg L^{-1})	PC1 Score	
Mean ± SE:	18.2±4.5	28.8±5.5	21.2±4.2	22.5±4.8	369.0±31.2	11.2±2.5	0.30±0.08	0.14±0.33	**Rank**
Range:	0.0-84.2	0.0-88.1	0.0-94.0	0.0-99.1	206.0-957.5	1.3-69.1	0.01-1.63	-2.96-3.97	**Sum**
Bluff Marsh	28	23	6	28	30	30	19	28	192
Helmers Pond	29	23	15	25	25	28	19	27	191
Thoroughfare	27	23	1	30	28	23	19	29	180
Little Rice Bay	30	23	1	29	26	22	18	30	179
Long Point	10	23	14	27	19	25	18	26	162
Rapid River	8	19	16	22	23	24	18	21	151
Parrott Bay	15	16	21	26	15	27	8	17	145
Crown Marsh	4	23	1	24	29	21	17	25	144
Presqu'ile	9	18	27	17	18	29	9	12	139
Lincoln	21	13	25	19	13	9	12	19	131
Coletta Bay	5	23	7	23	19	19	15	22	133
Lee Brown Marsh	25	3	8	15	27	14	15	23	130
Muskegon	20	14	28	12	12	16	15	13	130
Pentwater	26	10	26	18	8	5	14	20	127
Port Rowan	7	11	18	5	22	26	14	24	127
Hill Island Canada	18	23	30	1	16	12	8	18	126
Pere Marquette	24	17	29	9	7	4	10	15	115
AllenRd	16	8	20	4	10	15	12	16	101
Booths Harbor	19	5	19	1	9	20	12	10	95
South Bay	11	4	12	11	17	17	8	14	94
Robinson Cove	22	2	11	7	24	13	7	8	94
Bruces Bayou	12	12	24	14	5	2	8	11	88
Little Black Creek	3	22	22	13	1	10	9	2	82
Pigeon	17	9	23	10	4	11	1	7	82
Frenchman's Bay	1	20	5	16	10	18	5	5	80
Hay Bay South	14	6	17	8	14	7	2	9	77
Port Britain	13	7	13	20	6	8	2	4	73
Bayfield Bay	23	1	9	6	21	3	1	6	70
Lynde Creek	6	15	10	21	2	1	1	1	57
Jones Road	2	21	4	1	3	5	1	3	40

Table 4c.

	Watershed Land Use				Water Quality						
	%Dev	%Ag	%For^{-1}	%Wet/Mead^{-1}	Sp. Cond. (*uS* cm^{-1})	Turb. (NTU)	NO_3-N (mg L^{-1})	NH_4-N (mg L^{-1})	SRP-P (mg L^{-1})	Cl (mg L^{-1})	
Range:	1.0-9.4	0.1-50.1	34.8-87.3	7.3-28.9	160.0-553.9	3.0-35.5	0.01-1.48	0.03-0.217	0.01-0.02	0.7-47.1	**Rank**
Mean ± SE:	4.1±0.8	24.5±4.2	54.4±5.4	13.0±1.7	352.6±32.8	13.4±2.7	0.26±0.12	0.058±0.016	0.01±0.00	12.9±3.7	**Sum**
Taquamenon	12	12	12	7	12	11	9	12	7	11	105
Baraga	11	11	11	3	11	12	12	7	7	12	97
Arcadia River	10	6	3	12	8	5	3	9	7	10	73
Lincoln	6	5	4	11	9	7	4	10	7	9	72
Pere Marquette	8	9	10	1	6	6	9	11	4	8	72
Little Pigeon	1	10	9	10	10	1	5	5	6	6	63
Muskegon	5	8	7	5	2	10	9	6	3	4	59
Pentwater	9	2	5	9	3	8	8	3	3	7	57
White	7	7	8	4	5	4	7	2	3	5	52
Norris Creek	3	4	6	8	7	3	2	1	2	3	39
Bruces Bayou	2	3	2	6	4	2	5	4	2	2	32
Pigeon	4	1	1	2	1	9	1	8	1	1	29

Table 5a

	20-KM LAND USE (double weighted)				1-KM LAND USE			
Site	%Urban	%Agricultural	%Non-Forest	% NonMeadow/ %Idle lands	%Urban	%Agriculture	%Non-Forest	% NonMeadow/ %Idle lands
Wet Meadow								
Thomas Rd.	18	2	2	2	4	2	2	11
Almeda Beach	2	4	4	12	3	1	3	6
Big Fishdam	22	18	18	16	11	5	11	2
Shepard Island	14	10	16	6	2	7	9	4
Prentiss Bay	12	12	20	8	8	7	10	1
Pt.St. Ignace	4	22	10	22	1	7	6	9
Ojibwa Bay	20	20	22	10	7	7	5	8
Mackinaw Bay	16	8	12	4	6	7	8	5
Wigwam Bay	6	6	6	18	10	6	1	7
Portage River	10	14	8	20	9	3	7	3
Rapid River	8	16	14	14	5	4	4	10
Inner Scirpus								
Ojibwa Bay	60	64	64	32	13	20	10	31
Epoufette Bay	64	70	66	50	24	20	30	5
Mismer Bay	36	32	56	14	16	20	22	21
Cedarville	52	30	38	20	3	10	18	22
Escanaba	16	38	30	44	1	20	9	7
Nayanquing	2	10	10	34	32	8	1	20
Rapid River	28	58	52	40	9	14	7	34
Squaw Bay	14	22	22	68	25	20	19	3
Whitefish Bay (N)	4	54	24	70	20	20	24	16
Pinnconning	22	14	14	46	15	19	8	35
Shepard Island	48	40	54	24	6	20	28	17
Almeda Beach	8	12	12	38	7	5	4	25
Ludington Park	10	24	28	48	14	7	27	26
Mackinaw Bay	50	28	44	18	12	20	23	19
Pt.St. Ignace	18	66	42	64	2	20	17	32
Hill Island	42	42	50	30	4	20	25	8
Prentiss Bay	38	46	60	26	19	20	29	2
Vanderbilt Park	12	4	2	4	32	3	6	18
Ogontz Bay	54	44	40	42	28	15	32	1
Tahquamenon	62	72	70	36	30	18	33	12
Moscoe Channel	44	34	48	28	11	20	31	4
Hessel Bay	40	26	46	16	5	12	15	33
Garden Bay	66	36	32	58	27	1	11	28
Nahma	70	52	36	54	10	6	21	27
Big Fishdam	68	62	58	56	32	16	34	10
Search Bay	32	60	68	2	21	20	35	15
Portage River	30	50	34	62	29	13	20	13
Lightfoot Bay	72	68	72	8	17	20	14	9
Whitefish Bay (S)	4	54	24	70	22	20	26	14
Bradleyville Rd	20	6	4	12	32	11	16	23
Pentwater River	46	18	20	52	26	2	13	24
Wigwam Bay	24	16	16	60	31	17	1	29
Lincoln River	26	20	18	66	18	4	12	30
Thomas Rd.	58	2	6	6	8	9	3	36
Wildfowl Bay	34	8	8	10	32	20	5	6
Pine River	56	48	62	22	23	20	36	11

Table 5a, Continued

Site	Water Quality: Cl^-	Spc. Cond	Turb	SO_4	pH*	DO* (% Sat)	NO_3-N*	NH_4-N*	SRP-P*	PC 1 (-For, Ag, Cl, SO_4)	Rank Sum	Rank as % of Highest Score
Wet Meadow												
Thomas Rd.	1	2	11	1	8	7	2	4		1	**80**	**47.90**
Almeda Beach	2	6	10	2	6	1	2	2		2	**68**	**40.72**
Big Fishdam	4	3	9	6	10	11	2	5		6	**159**	**95.21**
Shepard Island	5	1	8	11	4	4	2	1		8	**112**	**67.07**
Prentiss Bay	7	9	7	5	5	5	2	3		9	**130**	**77.84**
Pt.St. Ignace	8	5	6	7	9	10	2	6		7	**141**	**84.43**
Ojibwa Bay	11	10	5	9	3	8	2	10		10	**167**	**100.00**
Mackinaw Bay	9	4	4	8	11	2	2	9		5	**120**	**71.86**
Wigwam Bay	3	7	3	3	2	6	2	6		3	**95**	**56.89**
Portage River	10	11	2	10	1	3	2	8		11	**132**	**79.04**
Rapid River	6	8	1	4	7	9	1	11		4	**126**	**75.45**
Inner Scirpus												
Ojibwa Bay	35	35	36	32	23	31	4	27	4	26	**547**	**100.00**
Epoufette Bay	12	15	34	10	16	6	18	18	4	34	**496**	**90.68**
Mismer Bay	31	21	34	24	31	35	8	8	4	17	**430**	**78.61**
Cedarville	21	19	33	28	4	12	18	24	4	28	**384**	**70.20**
Escanaba	10	13	30	36	19	20	36	27	4	19	**379**	**69.29**
Nayanquing	6	9	30	3	12	14	18	22	4	6	**241**	**44.06**
Rapid River	23	11	30	30	6	2	18	11	4	22	**399**	**72.94**
Squaw Bay	1	1	28	19	17	13	18	35	4	10	**339**	**61.97**
Whitefish Bay (N)	24	14	28	8	34	1	18	33	4	14	**410**	**74.95**
Pinnconning	5	10	26	7	10	5	18	17	4	8	**283**	**51.74**
Shepard Island	18	22	26	26	11	17	18	18	4	31	**428**	**78.24**
Almeda Beach	3	2	25	13	26	11	18	30	4	4	**247**	**45.16**
Ludington Park	11	18	22	16	30	35	18	20	4	13	**371**	**67.82**
Mackinaw Bay	30	4	22	31	33	7	18	22	4	16	**401**	**73.31**
Pt.St. Ignace	27	24	22	34	27	24	18	27	4	21	**489**	**89.40**
Hill Island	25	32	21	19	20	23	6	11	4	25	**407**	**74.41**
Prentiss Bay	20	27	20	18	9	3	17	13	4	35	**406**	**74.22**
Vanderbilt Park	7	5	19	15	35	19	18	1	4	2	**206**	**37.66**
Ogontz Bay	14	17	18	11	35	32	18	32	4	23	**460**	**84.10**
Tahquamenon	34	33	17	29	13	4	13	5	3	36	**520**	**95.06**
Moscoe Channel	29	30	16	21	15	26	16	35	4	33	**445**	**81.35**
Hessel Bay	28	29	15	23	14	18	12	26	4	18	**380**	**69.47**
Garden Bay	17	23	14	9	25	29	11	4	4	12	**407**	**74.41**
Nahma	22	25	13	21	18	8	9	2	4	24	**422**	**77.15**
Big Fishdam	14	26	11	12	27	28	15	31	4	30	**534**	**97.62**
Search Bay	26	31	11	17	32	27	5	20	4	27	**453**	**82.82**
Portage River	33	34	10	33	22	34	7	16	4	32	**476**	**87.02**
Lightfoot Bay	36	36	9	35	3	15	18	3	4	29	**468**	**85.56**
Whitefish Bay (S)	32	3	8	5	29	25	14	15	4	15	**384**	**70.20**
Bradleyville Rd	4	8	7	2	5	16	18	5	4	3	**196**	**35.83**
Pentwater River	13	6	6	24	24	9	2	34	1	9	**329**	**60.15**
Wigwam Bay	8	16	5	6	1	20	18	9	4	7	**288**	**52.65**
Lincoln River	16	12	4	27	21	30	3	14	2	11	**334**	**61.06**
Thomas Rd.	2	7	3	1	2	10	1	10	4	1	**169**	**30.90**
Wildfowl Bay	9	20	2	4	7	33	18	25	4	5	**250**	**45.70**
Pine River	18	28	1	14	8	22	10	7	4	20	**410**	**74.95**

Table 5a, Continued

Site	20-KM LAND USE (double weighted)				1-KM LAND USE			
	%Urban	%Agricultural	%Non-Forest	% NonMeadow/ %Idle lands	%Urban	%Agriculture	%Non-Forest	% NonMeadow/ %Idle lands
Outer Scirpus								
Mismer Bay	20	20	38	8	13	14	13	11
Nayanquing	2	8	8	22	18	5	1	10
Thomas Rd.	36	2	6	4	6	6	3	21
Escanaba	8	26	16	28	1	14	7	4
Hill Island	26	30	32	20	3	14	15	5
Pt.St. Ignace	10	42	24	42	2	14	11	17
Ludington Park	4	14	14	32	11	4	16	13
Garden Bay	38	24	18	38	15	1	8	15
Ogontz Bay	34	32	22	26	16	10	20	1
Prentiss Bay	22	34	42	16	14	14	18	2
Wigwam Bay	16	12	12	40	17	12	1	16
Hessel Bay	24	16	28	10	4	8	9	18
Moscoe Channel	28	22	30	18	9	14	19	3
Shepard Island	30	28	36	14	5	14	17	7
Vanderbilt Park	6	4	2	2	18	2	4	8
Big Fishdam	40	40	40	36	18	11	21	6
Pinnconning	14	10	10	30	12	13	6	20
Rapid River	18	38	34	24	7	9	5	19
Bradleyville Rd	12	6	4	6	18	7	10	12
Nahma	42	36	20	34	8	3	12	14
Mackinaw Bay	32	18	26	12	10	14	14	9

Table 5a, Continued

Site	Water Quality: Cl^-	Spc. Cond	Turb	SO_4	pH*	DO* (% Sat)	NO_3-N*	NH_3-N*	SRP-P*	PC 1 (-For, Ag, Cl, SO4)	**Rank Sum**	**Rank as % of Highest Score**
Outer Scirpus												
Mismer Bay	18	19	21	16	20	15	2	8		13	**269**	**88.78**
Nayanquing	7	6	19	5	9	21	11	15		5	**172**	**56.77**
Thomas Rd.	2	2	19	1	8	2	11	12		1	**142**	**46.86**
Escanaba	8	8	18	11	18	18	11	14		10	**220**	**72.61**
Hill Island	17	21	17	15	15	10	4	8		17	**269**	**88.78**
Pt.St. Ignace	16	12	16	21	3	4	11	20		18	**283**	**93.40**
Ludington Park	1	1	15	2	12	1	11	7		2	**160**	**52.81**
Garden Bay	11	10	14	7	20	9	6	5		9	**248**	**81.85**
Ogontz Bay	10	13	13	8	7	19	10	10		14	**265**	**87.46**
Prentiss Bay	14	18	12	12	3	8	1	17		20	**267**	**88.12**
Wigwam Bay	4	3	11	14	1	3	20	20		7	**209**	**68.98**
Hessel Bay	21	16	10	19	5	11	7	16		12	**234**	**77.23**
Moscoe Channel	20	20	9	17	19	17	3	6		19	**273**	**90.10**
Shepard Island	18	17	8	18	16	16	21	19		16	**300**	**99.01**
Vanderbilt Park	6	4	7	10	17	12	11	2		3	**118**	**38.94**
Big Fishdam	13	15	5	13	6	5	9	4		21	**303**	**100.00**
Pinnconning	3	7	5	4	2	13	11	18		4	**182**	**60.07**
Rapid River	9	11	4	6	11	20	5	11		8	**239**	**78.88**
Bradleyville Rd	5	5	3	3	13	14	11	3		6	**138**	**45.54**
Nahma	12	14	2	9	14	7	8	1		11	**247**	**81.52**
Mackinaw Bay	15	9	1	20	10	6	11	13		15	**235**	**77.56**

* absolute value of the difference from the median

Table 5b

	20-km/Watershed Land Use				Water Quality						
	%Dev	%Ag	%For	%Wet/Mead	Sp. Cond. (uS cm^{-1})	Turb. (NTU)	NO_3-N* (mg L^{-1})	NH_4-N* (mg L^{-1})	SRP-P* (mg L-1)	PC1 Score	Rank Sum
Mean ± SE:	7.7±2.19	38.17±4.16	33.46+4.03	23.5+3.2	409.41±31.72	17.93±6.23	0.35±0.08	0.06±0.01	0.75±0.02		
Range:	0.0-56.8	0.79-90.55	3.05-79.51	3.05-76.91	160.0-957.5	1.3-171.1	<0.05-1.6	<0.05-0.27	<0.05-0.50		
Rapid River	15	26	27	28	26	24	9	18	13	27	**214**
Tahquamenon	26	28	28	15	28	17	9	25	22	28	**211**
Arcadia River	24	20	19	20	15	12	22	10	25	15	**193**
Presqu'ile	20	11	11	19	24	28	23	12	7	24	**192**
Whitefish Bay (N. of Rd.)	8	25	25	27	21	22	9	20	13	21	**188**
Hill Island	27	23	22	18	22	12	18	26	8	22	**180**
South Bay	28	9	10	23	23	19	23	26	10	23	**176**
Pere Marquette River	18	24	26	7	8	5	26	12	24	8	**171**
Parrott Bay	11	18	15	22	20	27	18	28	12	20	**168**
Lincoln River	14	19	20	17	16	10	26	24	13	16	**162**
Pentwater River	19	13	21	13	9	6	20	16	26	9	**159**
White River	16	21	24	9	11	20	21	2	22	10	**156**
Robinson Cove	22	15	7	25	27	14	8	5	2	26	**152**
Muskegon River	13	22	23	11	14	18	9	8	11	14	**150**
Hay Bay	25	14	13	24	19	8	3	5	6	19	**137**
Nayanquing	6	4	6	14	17	26	9	15	13	17	**137**
Bayfield Bay	9	16	12	21	25	4	2	18	1	25	**134**
Almeda Beach	10	5	9	16	18	23	9	9	13	12	**133**
Grand-Bruces Bayou	7	17	18	8	6	3	26	10	13	6	**125**
Huyck's Bay	23	12	4	26	10	15	6	23	5	11	**124**
Frenchman's Bay	2	10	5	6	12	21	7	12	9	13	**110**
Allen Rd	17	1	1	1	12	16	9	21	13	18	**103**
Pigeon River	12	8	17	4	5	11	1	7	26	5	**102**
Tobico Marsh	5	3	3	3	4	25	9	16	13	4	**92**
Little Black Creek	1	27	16	5	1	1	9	1	28	1	**90**
Port Britain	21	6	14	12	7	9	3	3	2	7	**84**
Jones Rd	4	2	2	2	3	6	23	4	13	3	**62**
Lynde Creek	3	7	8	10	2	2	5	22	4	2	**57**

Table 6.

Site	Listed Zone	Zone	Crustacea+ Mollusca Richness		Odonata Richness		Genera Richness		% Gastropoda	
			value	score	value	score	value	score	value	score
Whitefish Bay (S. of Rd.)	Juncus/Scirpus	Inner Scirpus	7	7	1	5	24	7	63.19	7
Whitefish Bay (N. of Rd.)	Scirpus	Inner Scirpus	3	3	3	7	19	7	45.10	7
Squaw Bay	Juncus/Eleocharis	Inner Scirpus	3	3	2	5	13	3	63.46	7
Thomas Rd. Coastal	Juncus spp.	Wet Meadow	4	3	2	3	17	3	60.58	5
Thomas Rd. Coastal	Scirpus	Inner Scirpus	5	5	2	5	19	7	12.59	7
Thomas Rd. Coastal	Outer Scirpus	Outer Scirpus	2	1	0	1	12	3	0.00	1
Nayanquing	Inner Scirpus	Inner Scirpus	1	1	1	5	13	3	0.00	1
Nayanquing	Outer Scirpus	Outer Scirpus	2.5	3	1	5	18	7	0.50	3
Almeda Beach	Wet Meadow	Wet Meadow	4	3	2	3	15	3	22.64	3
Almeda Beach	Inner Scirpus	Inner Scirpus	4	3	2	5	15	5	2.53	5
Wigwam Bay	Inner Scirpus	Inner Scirpus	4	3	1	5	16	5	3.85	5
Wigwam Bay	Outer Scirpus	Outer Scirpus	3	3	1	5	16	5	3.85	5
Wigwam Bay	Juncus	Wet Meadow	2	3	2	3	22	5	1.19	3
Pinnconning	Inner Scirpus	Inner Scirpus	3	3	1	5	19	7	3.17	5
Pinnconning	Outer Scirpus	Outer Scirpus	4	3	0	1	13	3	4.17	5
Vanderbilt Park	Inner Scirpus	Inner Scirpus	3	3	1	5	14	3	9.94	7
Vanderbilt Park	Outer Scirpus	Outer Scirpus	4	3	0	1	11	3	1.54	3
Wildfowl Bay	Inner Scirpus	Inner Scirpus	3	3	1	5	13	3	0.55	3
Bradleyville Rd	Inner Scirpus	Inner Scirpus	3	3	1	5	12	3	0.00	1
Bradleyville Rd	Outer Scirpus	Outer Scirpus	2	1	0	1	10	3	0.00	1
Hessel Bay	Outer Scirpus	Outer Scirpus	7	7	1	5	17	5	24.67	7
Hessel Bay	Inner Scirpus	Inner Scirpus	6	5	2	5	20	7	17.53	7
Mismer Bay	Outer Scirpus	Outer Scirpus	8	7	1	5	18	7	54.44	7
Mismer Bay	Inner Scirpus	Inner Scirpus	10	7	2	5	30	7	17.72	7
Mackinaw Bay	Outer Scirpus	Outer Scirpus	7	7	2	5	17	5	17.51	7
Mackinaw Bay	Inner Scirpus	Inner Scirpus	7	7	2	5	29	7	23.61	7
Mackinaw Bay	Wet Meadow	Wet Meadow	5	3	2	3	23	5	57.14	5
Cedarville	Inner Scirpus	Inner Scirpus	8	7	2	5	20	7	27.42	7
Moscoe Channel	Outer Scirpus	Outer Scirpus	4	3	1	5	13	3	8.00	7
Moscoe Channel	Inner Scirpus	Inner Scirpus	6	5	2	5	22	7	6.04	7
Hill Island	Outer Scirpus	Outer Scirpus	6	7	1	5	15	5	19.27	7
Hill Island	Inner Scirpus	Inner Scirpus	8	7	2	5	19	7	44.27	7
Shepard Island	Inner Scirpus	Inner Scirpus	8	7	2	5	20	7	19.21	7
Shepard Island	Outer Scirpus	Outer Scirpus	5	5	0	1	19	7	10.81	7
Shepard Island	Wet Meadow	Wet Meadow	6	3	2	3	20	5	62.03	5
Prentiss Bay	Inner Scirpus	Inner Scirpus	4	3	2	5	13	3	1.92	3
Prentiss Bay	Outer Scirpus	Outer Scirpus	8	7	0	1	17	5	20.00	7
Prentiss Bay	Wet Meadow	Wet Meadow	6	3	1	3	22	5	22.83	3
Search Bay	Inner Scirpus	Inner Scirpus	7	7	2	5	25	7	21.62	7

Table 6., Continued

Site	Listed Zone	Zone	% Odonata		% Sphaeriidae		Ephemeroptera+ Trichoptera Richness		% Crustacea+ Mollusca	
			value	score	value	score	value	score	value	score
Whitefish Bay (S. of Rd.)	Juncus/Scirpus	Inner Scirpus	0.64	3	0.00	1	1	3	64.42	5
Whitefish Bay (N. of Rd.)	Scirpus	Inner Scirpus	21.57	7	0.00	1	0	1	45.10	5
Squaw Bay	Juncus/Eleocharis	Inner Scirpus	7.86	7	0.00	1	0	1	63.46	5
Thomas Rd. Coastal	Juncus spp.	Wet Meadow	10.22	5	0.00	1	1		60.58	
Thomas Rd. Coastal	Scirpus	Inner Scirpus	5.66	5	0.00	1	3	3	16.78	3
Thomas Rd. Coastal	Outer Scirpus	Outer Scirpus	0.00	1	0.00	1	3		5.61	1
Nayanquing	Inner Scirpus	Inner Scirpus	16.49	7	0.00	1	2	3	5.84	1
Nayanquing	Outer Scirpus	Outer Scirpus	3.87	7	0.00	1	4.5		5.49	1
Almeda Beach	Wet Meadow	Wet Meadow	6.80	5	0.00	1	2		22.64	
Almeda Beach	Inner Scirpus	Inner Scirpus	27.22	7	0.00	1	1	3	7.59	1
Wigwam Bay	Inner Scirpus	Inner Scirpus	5.77	5	0.00	1	3	3	31.37	5
Wigwam Bay	Outer Scirpus	Outer Scirpus	4.81	7	0.00	1	2		30.43	5
Wigwam Bay	Juncus	Wet Meadow	17.05	5	0.00	1	2		8.33	
Pinnconning	Inner Scirpus	Inner Scirpus	12.70	7	0.00	1	2	3	11.11	3
Pinnconning	Outer Scirpus	Outer Scirpus	0.00	1	0.00	1	2		54.17	5
Vanderbilt Park	Inner Scirpus	Inner Scirpus	1.10	3	0.00	1	3	3	14.36	3
Vanderbilt Park	Outer Scirpus	Outer Scirpus	0.00	1	0.00	1	2		12.12	3
Wildfowl Bay	Inner Scirpus	Inner Scirpus	12.12	7	0.00	1	2	3	26.47	3
Bradleyville Rd	Inner Scirpus	Inner Scirpus	1.72	3	0.00	1	2	3	18.18	3
Bradleyville Rd	Outer Scirpus	Outer Scirpus	0.00	1	0.00	1	2		12.07	3
Hessel Bay	Outer Scirpus	Outer Scirpus	1.55	5	0.00	1	2		67.33	5
Hessel Bay	Inner Scirpus	Inner Scirpus	1.84	3	0.00	1	2	3	53.69	5
Mismer Bay	Outer Scirpus	Outer Scirpus	0.64	3	0.00	1	2		71.60	5
Mismer Bay	Inner Scirpus	Inner Scirpus	3.16	5	0.00	1	1	3	33.11	5
Mackinaw Bay	Outer Scirpus	Outer Scirpus	1.18	5	0.00	1	4		59.68	5
Mackinaw Bay	Inner Scirpus	Inner Scirpus	4.86	5	0.00	1	3	3	50.82	5
Mackinaw Bay	Wet Meadow	Wet Meadow	2.26	3	0.00	1	1		69.17	
Cedarville	Inner Scirpus	Inner Scirpus	2.70	5	1.35	5	0	1	79.03	5
Moscoe Channel	Outer Scirpus	Outer Scirpus	0.79	3	0.00	1	1		21.33	3
Moscoe Channel	Inner Scirpus	Inner Scirpus	8.72	7	0.00	1	2	3	46.98	5
Hill Island	Outer Scirpus	Outer Scirpus	2.68	7	0.00	1	2		43.07	5
Hill Island	Inner Scirpus	Inner Scirpus	4.55	5	0.00	1	3	3	70.23	5
Shepard Island	Inner Scirpus	Inner Scirpus	2.06	5	6.19	5	1	3	64.79	5
Shepard Island	Outer Scirpus	Outer Scirpus	0.00	1	0.00	1	3		43.24	5
Shepard Island	Wet Meadow	Wet Meadow	1.64	3	0.00	1	0		83.54	
Prentiss Bay	Inner Scirpus	Inner Scirpus	6.73	5	0.00	1	1	3	77.22	5
Prentiss Bay	Outer Scirpus	Outer Scirpus	0.00	1	0.00	1	1		55.67	5
Prentiss Bay	Wet Meadow	Wet Meadow	7.09	5	0.00	1	1		63.78	
Search Bay	Inner Scirpus	Inner Scirpus	6.86	5	0.00	1	1	3	53.15	5

Table 6., Continued

Site	Listed Zone	Zone	Family Richness		Evenness		Shannon		Simpson	
			value	score	value	score	value	score	value	score
Whitefish Bay (S. of Rd.)	Juncus/Scirpus	Inner Scirpus	13		0.62	3	0.86	3	0.31	1
Whitefish Bay (N. of Rd.)	Scirpus	Inner Scirpus	16		0.86	5	1.10	5	0.08	5
Squaw Bay	Juncus/Eleocharis	Inner Scirpus	9		0.55	3	0.72	3	0.40	1
Thomas Rd. Coastal	Juncus spp.	Wet Meadow	14		0.70	5	0.86	3	0.24	3
Thomas Rd. Coastal	Scirpus	Inner Scirpus	12		0.74	5	0.95	5	0.15	3
Thomas Rd. Coastal	Outer Scirpus	Outer Scirpus	9	3	0.60	3	0.65	3	0.32	5
Nayanquing	Inner Scirpus	Inner Scirpus	12		0.85	5	0.90	5	0.14	5
Nayanquing	Outer Scirpus	Outer Scirpus	14.5	5	0.75	5	0.94	3	0.17	3
Almeda Beach	Wet Meadow	Wet Meadow	13		0.78	5	0.93	5	0.15	3
Almeda Beach	Inner Scirpus	Inner Scirpus	14		0.61	3	0.72	3	0.30	3
Wigwam Bay	Inner Scirpus	Inner Scirpus	15		0.84	5	1.01	5	0.13	5
Wigwam Bay	Outer Scirpus	Outer Scirpus	13	5	0.87	5	1.04	5	0.11	5
Wigwam Bay	Juncus	Wet Meadow	18		0.87	5	1.15	5	0.09	5
Pinnconning	Inner Scirpus	Inner Scirpus	16		0.77	5	0.99	5	0.14	5
Pinnconning	Outer Scirpus	Outer Scirpus	10	3	0.76	5	0.79	3	0.23	3
Vanderbilt Park	Inner Scirpus	Inner Scirpus	13		0.56	3	0.64	3	0.34	1
Vanderbilt Park	Outer Scirpus	Outer Scirpus	10	3	0.77	5	0.81	3	0.18	3
Wildfowl Bay	Inner Scirpus	Inner Scirpus	12		0.78	5	0.90	5	0.15	5
Bradleyville Rd	Inner Scirpus	Inner Scirpus	11		0.82	5	0.95	5	0.11	3
Bradleyville Rd	Outer Scirpus	Outer Scirpus	8	3	0.73	5	0.73	3	0.30	1
Hessel Bay	Outer Scirpus	Outer Scirpus	14	5	0.81	5	0.96	5	0.15	5
Hessel Bay	Inner Scirpus	Inner Scirpus	18		0.79	5	1.05	5	0.12	5
Mismer Bay	Outer Scirpus	Outer Scirpus	14	5	0.73	5	0.91	5	0.17	3
Mismer Bay	Inner Scirpus	Inner Scirpus	24		0.78	5	1.19	5	0.10	5
Mackinaw Bay	Outer Scirpus	Outer Scirpus	14	5	0.73	5	0.91	5	0.18	3
Mackinaw Bay	Inner Scirpus	Inner Scirpus	23		0.80	5	1.15	5	0.12	5
Mackinaw Bay	Wet Meadow	Wet Meadow	18		0.69	3	0.94	5	0.20	3
Cedarville	Inner Scirpus	Inner Scirpus	20		0.76	5	0.99	5	0.18	3
Moscoe Channel	Outer Scirpus	Outer Scirpus	12	3	0.72	5	0.82	3	0.21	3
Moscoe Channel	Inner Scirpus	Inner Scirpus	20		0.84	5	1.05	5	0.11	5
Hill Island	Outer Scirpus	Outer Scirpus	12	3	0.83	5	1.02	5	0.13	5
Hill Island	Inner Scirpus	Inner Scirpus	17		0.73	5	0.94	5	0.18	3
Shepard Island	Inner Scirpus	Inner Scirpus	19		0.74	5	0.97	5	0.16	3
Shepard Island	Outer Scirpus	Outer Scirpus	16	5	0.90	5	1.17	5	0.07	5
Shepard Island	Wet Meadow	Wet Meadow	17		0.61	3	0.78	3	0.29	3
Prentiss Bay	Inner Scirpus	Inner Scirpus	11		0.72	5	0.81	3	0.26	3
Prentiss Bay	Outer Scirpus	Outer Scirpus	12	3	0.88	5	1.04	5	0.10	5
Prentiss Bay	Wet Meadow	Wet Meadow	17		0.78	5	0.98	5	0.14	5
Search Bay	Inner Scirpus	Inner Scirpus	18		0.80	5	1.11	5	0.13	5

Table 6., Continued

Site	Listed Zone	Zone	% Isopoda		% Amphipoda		Final IBI Score per veg. Zone	Total Score per site	Disturbance Category
			value	score	value	score			
Whitefish Bay (S. of Rd.)	Juncus/Scirpus	Inner Scirpus	0.00	0	3.01	0	45	45	Mod. Imp.
Whitefish Bay (N. of Rd.)	Scirpus	Inner Scirpus	0.00	0	0.00	0	53	53	Mod. Imp.
Squaw Bay	Juncus/Eleocharis	Inner Scirpus	0.00	0	0.00	0	39	39	Mod. Deg.
Thomas Rd. Coastal	Juncus spp.	Wet Meadow	0.00	0	0.00		31		
Thomas Rd. Coastal	Scirpus	Inner Scirpus	0.00	0	4.20	0	49		
Thomas Rd. Coastal	Outer Scirpus	Outer Scirpus	0.00	0	3.80		23	103	Mod. Deg.
Nayanquing	Inner Scirpus	Inner Scirpus	0.00	0	5.84	0	37		
Nayanquing	Outer Scirpus	Outer Scirpus	0.00	0	4.50		43	80	Mod. Imp.
Almeda Beach	Wet Meadow	Wet Meadow	0.00	0	0.00		31		
Almeda Beach	Inner Scirpus	Inner Scirpus	0.00	0	5.06	0	39	70	Mod. Imp.
Wigwam Bay	Inner Scirpus	Inner Scirpus	0.00	0	30.43	0	47		
Wigwam Bay	Outer Scirpus	Outer Scirpus	0.00	0	30.43		51		
Wigwam Bay	Juncus	Wet Meadow	0.00	0	6.82		35	133	Mod. Imp.
Pinnconning	Inner Scirpus	Inner Scirpus	0.00	0	6.56	0	49		
Pinnconning	Outer Scirpus	Outer Scirpus	0.00	0	50.00		33	82	Mod. Imp.
Vanderbilt Park	Inner Scirpus	Inner Scirpus	0.00	0	0.72	0	35		
Vanderbilt Park	Outer Scirpus	Outer Scirpus	0.00	0	5.56		29	64	Mod. Deg.
Wildfowl Bay	Inner Scirpus	Inner Scirpus	0.00	0	25.49	0	43	43	Mod. Imp.
Bradleyville Rd	Inner Scirpus	Inner Scirpus	0.00	0	13.22	0	35		
Bradleyville Rd	Outer Scirpus	Outer Scirpus	0.00	0	5.17		23	58	Mod. Deg.
Hessel Bay	Outer Scirpus	Outer Scirpus	2.34	3	35.16		55		
Hessel Bay	Inner Scirpus	Inner Scirpus	0.00	0	24.54	0	51	106	Mild Imp.
Mismer Bay	Outer Scirpus	Outer Scirpus	10.06	5	4.46		53		
Mismer Bay	Inner Scirpus	Inner Scirpus	0.00	0	11.31	0	55	108	Mild Imp.
Mackinaw Bay	Outer Scirpus	Outer Scirpus	0.00	0	33.06		53		
Mackinaw Bay	Inner Scirpus	Inner Scirpus	0.00	0	31.25	0	55		
Mackinaw Bay	Wet Meadow	Wet Meadow	0.00	0	12.03		31	139	Mild Imp.
Cedarville	Inner Scirpus	Inner Scirpus	39.52	7	4.73	0	62	62	Mild Imp.
Moscoe Channel	Outer Scirpus	Outer Scirpus	0.00	0	13.33		39		
Moscoe Channel	Inner Scirpus	Inner Scirpus	12.75	5	24.85	0	60	99	Mod. Imp.
Hill Island	Outer Scirpus	Outer Scirpus	9.17	3	8.76		55		
Hill Island	Inner Scirpus	Inner Scirpus	9.92	3	12.88	0	56	111	Mild Imp.
Shepard Island	Inner Scirpus	Inner Scirpus	1.03	3	37.75	0	60		
Shepard Island	Outer Scirpus	Outer Scirpus	3.57	3	15.91		47		
Shepard Island	Wet Meadow	Wet Meadow	2.01	3	13.42		29	136	Mod. Imp.
Prentiss Bay	Inner Scirpus	Inner Scirpus	0.00	0	55.77	5	44		
Prentiss Bay	Outer Scirpus	Outer Scirpus	5.31	3	25.45		45		
Prentiss Bay	Wet Meadow	Wet Meadow	0.00	0	37.66		35	124	Mod. Imp.
Search Bay	Inner Scirpus	Inner Scirpus	0.00	0	30.63	0	55	55	Mild Imp.

Table 6., Continued

Site	Listed Zone	Zone	Total Possible per zone	% Score per zone	% Score per site
Whitefish Bay (S. of Rd.)	Juncus/Scirpus	Inner Scirpus	77	58.44	58.44
Whitefish Bay (N. of Rd.)	Scirpus	Inner Scirpus	77	68.83	68.83
Squaw Bay	Juncus/Eleocharis	Inner Scirpus	77	50.65	50.65
Thomas Rd. Coastal	Juncus spp.	Wet Meadow	45	68.89	
Thomas Rd. Coastal	Scirpus	Inner Scirpus	77	63.64	
Thomas Rd. Coastal	Outer Scirpus	Outer Scirpus	65	35.38	55.08
Nayanquing	Inner Scirpus	Inner Scirpus	77	48.05	
Nayanquing	Outer Scirpus	Outer Scirpus	65	66.15	56.34
Almeda Beach	Wet Meadow	Wet Meadow	45	68.89	
Almeda Beach	Inner Scirpus	Inner Scirpus	77	50.65	57.38
Wigwam Bay	Inner Scirpus	Inner Scirpus	77	61.04	
Wigwam Bay	Outer Scirpus	Outer Scirpus	65	78.46	
Wigwam Bay	Juncus	Wet Meadow	45	77.78	71.12
Pinnconning	Inner Scirpus	Inner Scirpus	77	63.64	
Pinnconning	Outer Scirpus	Outer Scirpus	65	50.77	57.75
Vanderbilt Park	Inner Scirpus	Inner Scirpus	77	45.45	
Vanderbilt Park	Outer Scirpus	Outer Scirpus	65	44.62	45.07
Wildfowl Bay	Inner Scirpus	Inner Scirpus	77	55.84	55.84
Bradleyville Rd	Inner Scirpus	Inner Scirpus	77	45.45	
Bradleyville Rd	Outer Scirpus	Outer Scirpus	65	35.38	40.85
Hessel Bay	Outer Scirpus	Outer Scirpus	65	84.62	
Hessel Bay	Inner Scirpus	Inner Scirpus	77	66.23	74.65
Mismer Bay	Outer Scirpus	Outer Scirpus	65	81.54	
Mismer Bay	Inner Scirpus	Inner Scirpus	77	71.43	76.06
Mackinaw Bay	Outer Scirpus	Outer Scirpus	65	81.54	
Mackinaw Bay	Inner Scirpus	Inner Scirpus	77	71.43	
Mackinaw Bay	Wet Meadow	Wet Meadow	45	68.89	74.33
Cedarville	Inner Scirpus	Inner Scirpus	77	80.52	80.52
Moscoe Channel	Outer Scirpus	Outer Scirpus	65	60.00	
Moscoe Channel	Inner Scirpus	Inner Scirpus	77	77.92	69.72
Hill Island	Outer Scirpus	Outer Scirpus	65	84.62	
Hill Island	Inner Scirpus	Inner Scirpus	77	72.73	78.17
Shepard Island	Inner Scirpus	Inner Scirpus	77	77.92	
Shepard Island	Outer Scirpus	Outer Scirpus	65	72.31	
Shepard Island	Wet Meadow	Wet Meadow	45	64.44	72.73
Prentiss Bay	Inner Scirpus	Inner Scirpus	77	57.14	
Prentiss Bay	Outer Scirpus	Outer Scirpus	65	69.23	
Prentiss Bay	Wet Meadow	Wet Meadow	45	77.78	66.31
Search Bay	Inner Scirpus	Inner Scirpus	77	71.43	71.43

Table 6., Continued

Site	Eleocharis	Zone	Crustacea+ Mollusca Richness		Odonata Richness		Genera Richness		% Gastropoda	
Pine River	Scirpus	Inner Scirpus	6	5	0	1	19	7	6.21	7
Tahquamenon	Scirpus	Inner Scirpus	7	7	1	5	19	7	12.95	7
Portage River	Juncus	Inner/Outer Scir	4	3	1	5	10	3	18.00	7
Portage River	Wet Meadow	Wet Meadow	5	3	0	1	10	3	8.28	3

Table 6., Continued

	Wet Meadow		value	score	value	score	value	score	value	score
Ojibwa Bay		Inner Scirpus	7	7	5	7	23	7	3.36	5
Ojibwa Bay	Eleocharis/Juncus	Wet Meadow	7	5	5	5	27	5	8.86	3
Lightfoot Bay	Juncus	Inner Scirpus	6	5	2	5	22	7	24.52	7
Epoufette Bay	Outer Scirpus Inner Scirpus	Inner Scirpus	6	5	2	5	23	7	56.39	7
Pt.St. Ignace	Juncus	Outer Scirpus	7	7	0	1	20	7	11.48	7
Pt.St. Ignace		Inner Scirpus	6	5	1	5	16	5	5.84	7
Pt.St. Ignace	Inner Scirpus Outer Scirpus	Wet Meadow	5	3	4	5	17	3	18.75	3
Escanaba		Inner Scirpus	5	5	3	7	21	7	29.19	7
Escanaba	Scirpus Scirpus Island	Outer Scirpus	4	3	0	1	14	5	5.17	7
Ludington Park		Outer Scirpus	2	1	5	7	21	7	8.77	7
Ludington Park	Outer Scirpus Wet Meadow	Inner Scirpus	5	5	2	5	20	7	4.47	7
Rapid River	Inner Scirpus	Outer Scirpus	8	7	2	5	22	7	11.76	7
Rapid River		Wet Meadow	4	3	2	3	26	5	25.00	3
Rapid River	Inner Scirpus Outer Scirpus	Inner Scirpus	7	7	1	5	25	7	20.13	7
Ogontz Bay		Inner Scirpus	7	7	3	7	27	7	6.04	7
Ogontz Bay	Inner Scirpus Outer Scirpus	Outer Scirpus	4	3	1	5	14	5	24.00	7
Nahma		Inner Scirpus	5	5	1	5	24	7	2.35	5
Nahma	Inner Scirpus Outer Scirpus	Outer Scirpus	5	5	0	1	16	5	4.55	5
Garden Bay		Inner Scirpus	7	7	2	5	19	7	13.07	7
Garden Bay	Outer Scirpus Inner Scirpus	Outer Scirpus	8	7	0	1	15	5	20.39	7
Big Fishdam	Juncus	Outer Scirpus	5	5	0	1	16	5	4.97	5
Big Fishdam		Inner Scirpus	7	7	1	5	23	7	19.73	7
Big Fishdam	Scirpus	Wet Meadow	6	3	3	3	22	5	28.67	5
Lincoln River	Scirpus	Inner Scirpus	7	7	1	5	19	7	6.21	7
Pentwater River	Scirpus	Inner Scirpus	7	7	2	5	23	7	19.21	7
Robinson Cove	wet meadow	Inner Scirpus	6	5	1	5	11	3	10.71	7
Hahn Marsh	wet meadow	Wet Meadow	2	3	2	3	7	1	9.09	3
Lee Brown Marsh	Scirpus	Wet Meadow	6	3	1	3	13	3	57.14	5
Booth's Harbour	Scirpus	Inner Scirpus	5	5	2	5	9	1	63.04	7
Port Rowan		Inner Scirpus	5	5	3	7	12	3	37.80	7

Table 6., Continued

Site	Eleocharis	Zone	% Odonata		% Sphaeriidae		Ephemeroptera+ Trichoptera Richness		% Crustacea+ Mollusca	
Pine River	Scirpus	Inner Scirpus	0.00	1	0.00	1	2	3	26.36	3
Tahquamenon	Scirpus	Inner Scirpus	2.04	5	0.00	1	3	3	58.99	5
Portage River	Juncus	Inner/Outer Scir	1.03	3	0.00	1	2	3	87.00	5
Portage River	Wet Meadow	Wet Meadow	0.00	1	0.36	5	0		84.90	
Table 6., Continued										
	Wet Meadow		value	score	value	score	value	score	value	score
Ojibwa Bay		Inner Scirpus	6.72	5	0.00	1	1	3	61.74	5
Ojibwa Bay	Eleocharis/Juncus	Wet Meadow	6.96	5	0.00	1	0		61.08	
Lightfoot Bay	Juncus	Inner Scirpus	5.49	5	0.00	1	1	3	28.39	3
Epoufette Bay	Outer Scirpus Inner Scirpus	Inner Scirpus	1.50	3	0.00	1	2	3	71.54	5
Pt.St. Ignace	Juncus	Outer Scirpus	0.00	1	1.64	5	4		34.43	5
Pt.St. Ignace		Inner Scirpus	1.35	3	0.00	1	4	5	25.97	3
Pt.St. Ignace	Inner Scirpus Outer Scirpus	Wet Meadow	14.20	5	0.00	1	1		27.84	
Escanaba		Inner Scirpus	10.96	7	0.68	5	3	3	39.04	5
Escanaba	Scirpus Scirpus Island	Outer Scirpus	0.00	1	3.08	5	2		12.31	3
Ludington Park		Outer Scirpus	9.29	7	0.00	1	1		8.77	3
Ludington Park	Outer Scirpus Wet Meadow	Inner Scirpus	1.92	3	0.00	1	2	3	21.79	3
Rapid River	Inner Scirpus	Outer Scirpus	4.58	7	0.00	1	4		53.72	5
Rapid River		Wet Meadow	17.50	5	0.00	1	1		30.26	
Rapid River	Inner Scirpus Outer Scirpus	Inner Scirpus	2.52	5	0.00	1	2	3	77.78	5
Ogontz Bay		Inner Scirpus	9.32	7	1.34	5	2	3	31.76	5
Ogontz Bay	Inner Scirpus Outer Scirpus	Outer Scirpus	2.00	5	0.00	1	2		47.46	5
Nahma		Inner Scirpus	2.33	5	0.00	1	2	3	13.53	3
Nahma	Inner Scirpus Outer Scirpus	Outer Scirpus	0.00	1	1.54	5	4		43.94	5
Garden Bay		Inner Scirpus	12.78	7	0.00	1	2	3	64.03	5
Garden Bay	Outer Scirpus Inner Scirpus	Outer Scirpus	0.00	1	0.00	1	4		53.40	5
Big Fishdam	Juncus	Outer Scirpus	0.00	1	2.74	5	3		13.66	3
Big Fishdam		Inner Scirpus	0.53	3	1.26	5	5	5	53.16	5
Big Fishdam	Scirpus	Wet Meadow	4.48	3	0.00	1	2		66.22	
Lincoln River	Scirpus	Inner Scirpus	0.60	3	0.00	1	1	3	44.10	5
Pentwater River	Scirpus	Inner Scirpus	5.96	5	0.00	1	3	3	57.62	5
Robinson Cove	wet meadow	Inner Scirpus	11.64	7	0.00	1	1	3	73.21	5
Hahn Marsh	wet meadow	Wet Meadow	18.18	5	0.00	1	0		45.45	
Lee Brown Marsh	Scirpus	Wet Meadow	4.76	3	0.00	1	1		75.00	
Booth's Harbour	Scirpus	Inner Scirpus	19.57	7	0.00	1	1	3	73.91	5
Port Rowan		Inner Scirpus	9.76	7	0.00	1	0	1	82.93	5

Table 6., Continued

Site	Eleocharis	Zone	Family Richness		Evenness		Shannon		Simpson	
Pine River	Scirpus	Inner Scirpus	15		0.81	5	1.04	5	0.11	5
Tahquamenon	Scirpus	Inner Scirpus	17		0.76	5	0.97	5	0.15	5
Portage River	Juncus	Inner/Outer Scir	10		0.52	3	0.52	3	0.47	1
Portage River	Wet Meadow	Wet Meadow	9		0.58	3	0.58	3	0.34	1
Table 6., Continued										
	Wet Meadow		value	score	value	score	value	score	value	score
Ojibwa Bay		Inner Scirpus	20		0.69	3	0.94	5	0.22	3
Ojibwa Bay	Eleocharis/Juncus	Wet Meadow	22		0.71	5	1.06	5	0.18	3
Lightfoot Bay	Juncus	Inner Scirpus	21		0.87	5	1.17	5	0.08	5
Epoufette Bay	Outer Scirpus	Inner Scirpus	19		0.78	5	0.98	5	0.14	5
Pt.St. Ignace	Inner Scirpus Juncus	Outer Scirpus	13	5	0.85	5	1.05	5	0.12	5
Pt.St. Ignace		Inner Scirpus	14		0.83	5	1.05	5	0.10	5
Pt.St. Ignace	Inner Scirpus	Wet Meadow	13		0.74	5	0.98	5	0.16	3
Escanaba	Outer Scirpus	Inner Scirpus	15		0.82	5	1.14	5	0.11	5
Escanaba	Scirpus	Outer Scirpus	10	3	0.70	3	0.79	3	0.29	3
Ludington Park	Scirpus Island	Outer Scirpus	18	5	0.68	3	0.80	3	0.25	3
Ludington Park	Outer Scirpus	Inner Scirpus	18		0.71	5	0.92	5	0.21	3
Rapid River	Wet Meadow Inner Scirpus	Outer Scirpus	19	5	0.80	5	1.07	5	0.13	5
Rapid River		Wet Meadow	23		0.85	5	1.21	5	0.08	5
Rapid River	Inner Scirpus	Inner Scirpus	21		0.77	5	1.08	5	0.12	5
Ogontz Bay	Outer Scirpus	Inner Scirpus	21		0.82	5	1.17	5	0.09	5
Ogontz Bay	Inner Scirpus	Outer Scirpus	12	3	0.76	5	0.84	3	0.22	3
Nahma	Outer Scirpus	Inner Scirpus	18		0.79	5	1.12	5	0.12	5
Nahma	Inner Scirpus	Outer Scirpus	13	5	0.86	5	1.04	5	0.11	5
Garden Bay	Outer Scirpus	Inner Scirpus	18		0.82	5	1.03	5	0.11	5
Garden Bay	Outer Scirpus	Outer Scirpus	12	3	0.86	5	0.99	5	0.11	5
Big Fishdam	Inner Scirpus Juncus	Outer Scirpus	13	5	0.71	5	0.85	3	0.23	3
Big Fishdam		Inner Scirpus	18		0.82	5	1.10	5	0.11	5
Big Fishdam	Scirpus	Wet Meadow	18		0.79	5	1.06	5	0.12	5
Lincoln River	Scirpus	Inner Scirpus	17		0.72	5	0.92	5	0.17	3
Pentwater River	Scirpus	Inner Scirpus	18		0.76	5	1.03	5	0.13	5
Robinson Cove	wet meadow	Inner Scirpus	10		0.67	3	0.67	3	0.33	1
Hahn Marsh	wet meadow	Wet Meadow	6		0.91	5	0.77	3	0.13	5
Lee Brown Marsh	Scirpus	Wet Meadow	11		0.78	5	0.87	3	0.18	3
Booth's Harbour	Scirpus	Inner Scirpus	9		0.79	5	0.76	3	0.21	3
Port Rowan		Inner Scirpus	9		0.66	3	0.71	3	0.28	3

Table 6., Continued

Site	Eleocharis	Zone	% Isopoda		% Amphipoda		Final IBI Score per veg. Zone	Total Score per site	Disturbance Category
Pine River	Scirpus	Inner Scirpus	0.00	0	10.73	0	43	43	Mod. Imp.
Tahquamenon	Scirpus	Inner Scirpus	17.65	5	28.06	0	60	60	Mild Imp.
Portage River	Juncus	Inner/Outer Scir	2.00	3	67.00	0	40		
Portage River	Wet Meadow	Wet Meadow	33.80	7	42.47		23	63	Mod. Deg.
Table 6., Continued									
	Wet Meadow		value	score	value	score			
Ojibwa Bay		Inner Scirpus	20.13	7	35.07	0	58		
Ojibwa Bay	Eleocharis/Juncus	Wet Meadow	38.22	7	17.72		37	95	Mild Imp.
Lightfoot Bay	Juncus	Inner Scirpus	2.20	3	4.40	0	54	54	Mild Imp.
Epoufette Bay	Outer Scirpus Inner Scirpus	Inner Scirpus	0.00	0	18.57	0	51	51	Mod. Imp.
Pt.St. Ignace	Juncus	Outer Scirpus	0.00	0	18.03		53		
Pt.St. Ignace		Inner Scirpus	0.00	0	18.83	0	49		
Pt.St. Ignace	Inner Scirpus Outer Scirpus	Wet Meadow	2.99	3	1.24		33	135	Mod. Imp.
Escanaba		Inner Scirpus	0.00	0	0.62	0	61		
Escanaba	Scirpus Scirpus Island	Outer Scirpus	0.00	0	6.90		37	98	Mod. Imp.
Ludington Park		Outer Scirpus	0.00	0	0.00		47		
Ludington Park	Outer Scirpus Wet Meadow	Inner Scirpus	0.00	0	12.44	0	47	94	Mod. Imp.
Rapid River	Inner Scirpus	Outer Scirpus	1.53	3	28.24		59		
Rapid River		Wet Meadow	0.65	1	2.50		35		
Rapid River	Inner Scirpus Outer Scirpus	Inner Scirpus	6.17	3	38.89	0	58	152	Mild Imp.
Ogontz Bay		Inner Scirpus	8.24	3	19.41	0	66		
Ogontz Bay	Inner Scirpus Outer Scirpus	Outer Scirpus	0.00	0	11.54		45	111	Mild Imp.
Nahma		Inner Scirpus	0.00	0	3.53	0	49		
Nahma	Inner Scirpus Outer Scirpus	Outer Scirpus	0.00	0	36.36		47	96	Mod. Imp.
Garden Bay		Inner Scirpus	20.30	7	24.06	0	64		
Garden Bay	Outer Scirpus Inner Scirpus	Outer Scirpus	23.21	7	12.62		45	109	Mild Imp.
Big Fishdam	Juncus	Outer Scirpus	0.00	0	6.85		41		
Big Fishdam		Inner Scirpus	0.00	0	17.37	0	59		
Big Fishdam	Scirpus	Wet Meadow	2.67	3	36.67		35	135	Mod. Imp.
Lincoln River	Scirpus	Inner Scirpus	1.86	3	36.02	0	54	54	Mild Imp.
Pentwater River	Scirpus	Inner Scirpus	1.32	3	37.75	0	58	58	Mild Imp.
Robinson Cove	wet meadow	Inner Scirpus	0.00	0	61.61	0	43	43	Mod. Imp.
Hahn Marsh	wet meadow	Wet Meadow	0.00	0	36.36		29	29	Mod. Imp.
Lee Brown Marsh	Scirpus	Wet Meadow	0.00	0	17.86		29	29	Mod. Imp.
Booth's Harbour	Scirpus	Inner Scirpus	0.00	0	8.70	0	45	45	Mod. Imp.
Port Rowan		Inner Scirpus	0.00	0	0.00	0	45	45	Mod. Imp.

Table 6., Continued

Site	Eleocharis	Zone	Total Possible per zone	% Score per zone	% Score per site
Pine River	Scirpus	Inner Scirpus	77	55.84	55.84
Tahquamenon	Scirpus	Inner Scirpus	77	77.92	77.92
Portage River	Juncus	Inner/Outer Scir	77	51.95	
Portage River	Wet Meadow	Wet Meadow	45	51.11	51.64
Table 6., Continued					
	Wet Meadow				
Ojibwa Bay		Inner Scirpus	77	75.32	
Ojibwa Bay	Eleocharis/Juncus	Wet Meadow	45	82.22	77.87
Lightfoot Bay	Juncus	Inner Scirpus	77	70.13	70.13
Epoufette Bay	Outer Scirpus	Inner Scirpus	77	66.23	66.23
	Inner Scirpus				
Pt.St. Ignace	Juncus	Outer Scirpus	65	81.54	
Pt.St. Ignace		Inner Scirpus	77	63.64	
Pt.St. Ignace	Inner Scirpus	Wet Meadow	45	73.33	72.19
	Outer Scirpus				
Escanaba		Inner Scirpus	77	79.22	
Escanaba	Scirpus	Outer Scirpus	65	56.92	69.01
	Scirpus Island				
Ludington Park		Outer Scirpus	65	72.31	
Ludington Park	Outer Scirpus	Inner Scirpus	77	61.04	66.20
	Wet Meadow				
Rapid River	Inner Scirpus	Outer Scirpus	65	90.77	
Rapid River		Wet Meadow	45	77.78	
Rapid River	Inner Scirpus	Inner Scirpus	77	75.32	81.28
	Outer Scirpus				
Ogontz Bay		Inner Scirpus	77	85.71	
Ogontz Bay	Inner Scirpus	Outer Scirpus	65	69.23	78.17
	Outer Scirpus				
Nahma		Inner Scirpus	77	63.64	
Nahma	Inner Scirpus	Outer Scirpus	65	72.31	67.61
	Outer Scirpus				
Garden Bay		Inner Scirpus	77	83.12	
Garden Bay	Outer Scirpus	Outer Scirpus	65	69.23	76.76
	Inner Scirpus				
Big Fishdam	Juncus	Outer Scirpus	65	63.08	
Big Fishdam		Inner Scirpus	77	76.62	
Big Fishdam	Scirpus	Wet Meadow	45	77.78	72.19
Lincoln River	Scirpus	Inner Scirpus	77	70.13	70.13
Pentwater River	Scirpus	Inner Scirpus	77	75.32	75.32
Robinson Cove	wet meadow	Inner Scirpus	77	55.84	55.84
Hahn Marsh	wet meadow	Wet Meadow	45	64.44	64.44
Lee Brown Marsh	Scirpus	Wet Meadow	45	64.44	64.44
Booth's Harbour	Scirpus	Inner Scirpus	77	58.44	58.44
Port Rowan		Inner Scirpus	77	58.44	58.44

Table 7.

	Dist. % Score	IBI % Score	IBI Disturbance Category	Modified IBI %Score	Modified IBI Disturbance Category
Rapid River	77.2	81.3	Mildly Impacted	83.52	Mildly Impacted
Cedarville	70.2	80.5	Mildly Impacted	86.11	Mildly Impacted
Hill Island	81.6	78.2	Mildly Impacted	72.26	Moderately Impacted
Ogontz Bay	85.8	78.2	Mildly Impacted	76.64	Mildly Impacted
Tahquamenon	95.1	77.9	Mildly Impacted		
Ojibwa Bay	100.0	77.9	Mildly Impacted		
Garden Bay	78.1	76.8	Mildly Impacted	76.64	Mildly Impacted
Mismer Bay	83.7	76.1	Mildly Impacted		
Pentwater River	60.1	75.3	Mildly Impacted		
Hessel Bay	73.3	74.6	Mildly Impacted	74.45	Moderately Impacted
Mackinaw Bay	74.7	74.3	Mildly Impacted	73.08	Moderately Impacted
Shepard Island	83.0	72.7	Moderately Impacted	69.78	Moderately Impacted
Big Fishdam	97.6	72.2	Moderately Impacted	66.48	Moderately Impacted
Pt.St. Ignace	88.9	72.2	Moderately Impacted	61.31	Moderately Impacted
Search Bay	82.8	71.4	Mildly Impacted		
Wigwam Bay	62.9	71.1	Moderately Impacted	70.88	Moderately Impacted
Lightfoot Bay	85.6	70.1	Mildly Impacted		
Lincoln River	61.1	70.1	Mildly Impacted		
Moscoe Channel	85.7	69.7	Moderately Impacted	72.26	Moderately Impacted
Escanaba	70.9	69.0	Moderately Impacted	54.74	Moderately Degraded
Whitefish Bay (N)	75.0	68.8	Moderately Impacted		
Nahma	79.3	67.6	Moderately Impacted		
Prentiss Bay	83.0	66.3	Moderately Impacted		
Epoufette Bay	90.7	66.2	Moderately Impacted		
Ludington Park	60.3	66.2	Moderately Impacted	64.33	Moderately Impacted
Hahn Marsh		64.44	Moderately Impacted		
Lee Brown Marsh		64.44	Moderately Impacted		
Whitefish Bay (S)	70.2	58.4	Moderately Impacted		
Booth's Harbour		58.44	Moderately Impacted		
Port Rowan		58.44	Moderately Impacted		
Pinnconning	55.9	57.7	Moderately Impacted	56.93	Moderately Degraded
Almeda Beach	42.9	57.4	Moderately Impacted		
Nayanquing	50.4	56.3	Moderately Impacted		
Pine River	75.0	55.8	Moderately Impacted		
Wildfowl Bay	45.7	55.8	Moderately Impacted	54.17	Moderately Degraded
Robinson Cove		55.84	Moderately Impacted		
Thomas Rd. Coastal	47.4	55.1	Moderately Degraded		
Portage River	83.0	51.6	Moderately Degraded		
Squaw Bay	62.0	50.6	Moderately Degraded		
Vanderbilt Park	38.3	45.1	Moderately Degraded	48.18	Moderately Degraded
Bradleyville Rd	40.7	40.8	Moderately Degraded	40.88	Moderately Degraded

Table 8.

Site	Veg. Zone	Odonata TR	Odonata %RA	Crust.+Moll. TR	Family TR	Gastropoda %RA	Sphaeriidae %RA	Ephem.+Trich TR	Crust.+Moll. %RA	Isopoda %RA
Cedarville	Inner Scirpus	5	5	7	7	7	5	1	5	7
Rapid River	Outer Scirpus	5	7	7	12	7	1		5	
	Inner Scirpus	5	5	7	7	7	1	3	5	3
	Wet Meadow	3	5	3	5	3	1			
Garden Bay	Outer Scirpus	1	1	7	8	7	1		5	
	Inner Scirpus	5	7	5	7	7	1	3	5	7
Ogontz Bay	Outer Scirpus	5	7	3	6	7	1		5	
	Inner Scirpus	5	7	5	7	7	5	3	3	3
Hessel Bay	Outer Scirpus		5	7	10	7	1		5	
	Inner Scirpus	5	5	5	7	7	1	3	5	1
Mackinaw Bay	Outer Scirpus	5	5	7	10	7	1		5	
	Inner Scirpus	5	5	5	7	7	1	3	5	0
	Wet Meadow	3	3	3	3	5	1			
Moscoe Channel	Outer Scirpus	5	3	3	6	7	1		3	
	Inner Scirpus	5	7	5	7	7	1	3	5	5
Hill Island	Outer Scirpus	5	5	5	6	7	1		5	
	Inner Scirpus	5	5	7	5	7	1	3	5	3
Wigwam Bay	Outer Scirpus	5	7	3	10	5	1		5	
	Inner Scirpus	5	5	3	3	5	1	3	5	0
	Wet Meadow	3	5	3	3	3	1			

Table 8. Continued

Site	Veg. Zone	Shannon Diversity	Evenness	Simpson Diversity	Total IBI Score	IBI Class	Total Possible	%total
Cedarville	Inner Scirpus	5	5	3	62	Mildly Impacted	72	86.11
Rapid River	Outer Scirpus	5	5	5	59			
	Inner Scirpus	5	5	5	58			
	Wet Meadow	5	5	5	35			
					152	Mildly Impacted	182	83.52
Garden Bay	Outer Scirpus	5	5	5	45			
	Inner Scirpus	5	5	3	60			
					105	Mildly Impacted	137	76.64
Ogontz Bay	Outer Scirpus	3	5	3	45			
	Inner Scirpus	5	5	5	60			
					105	Mildly Impacted	137	76.64
Hessel Bay	Outer Scirpus	5	5	3	48			
	Inner Scirpus	5	5	5	54			
					102	Moderately Impacted	137	74.45
Mackinaw Bay	Outer Scirpus	3	5	3	51			
	Inner Scirpus	5	5	5	53			
	Wet Meadow	3	5	3	29			
					133	Moderately Impacted	182	73.08
Moscoe Channel	Outer Scirpus	3	5	3	39			
	Inner Scirpus	5	5	5	60			
					99	Moderately Impacted	137	72.26
Hill Island	Outer Scirpus	3	5	3	45			
	Inner Scirpus	5	5	3	54			
					99	Moderately Impacted	137	72.26
Wigwam Bay	Outer Scirpus	5	5	5	51			
	Inner Scirpus	5	5	5	45			
	Wet Meadow	5	5	5	33			
					129	Moderately Impacted	182	70.88

Table 8. Continued

Site	Veg. Zone	Odonata TR	Odonata %RA	Crust.+Moll. TR	Family TR	Gastropoda %RA	Sphaeriidae %RA	Ephem.+Trich TR	Crust.+Moll. %RA	Isopoda %RA
Shepard Island	Outer Scirpus	1	1		10	7	1		5	
	Inner Scirpus	5	5	7	7	7	5	3	5	3
	Wet Meadow	3	3	3	3	5	1			
Big Fishdam	Outer Scirpus	1	1	3	6	7	5		3	
	Inner Scirpus	5	3	5	5	7	5	3	5	0
	Wet Meadow	3	3	3	3	5	1			
Ludington Park	As Inner Scirpus	7	7	1	10	7	1		3	
	As Outer Scirpus	7	7	1	5	7	1	3	3	0
Pt.St. Ignace	Outer Scirpus	1	1	5	6	7	5		5	
	Inner Scirpus	5	3	5	3	7	1	3	3	0
Pinnconning	Outer Scirpus	1	1	3	6	5	1		5	
	Inner Scirpus	5	7	3	5	5	1	3	3	0
Wildfowl Bay	Inner Scirpus	5	7	3	3	3	1	3	3	0
Escanaba	Outer Scirpus	1	1	3	6	1			1	
	Inner Scirpus	5	7	5	3	7	5	3	5	0
Allen Rd	Inner Scirpus	5	7	1	3	1	1	3	1	0
Jones Rd	Typha (calculated as Inner Scirpus)	5	7	1	3	1	1	3	5	0
Vanderbilt Park	Outer Scirpus	1	1	3	6	3	1		3	
	Inner Scirpus	3	3	5	5	7	1	3	3	0
Bradleyville Rd	Outer Scirpus	1	1	1	6	1	1		3	
	Inner Scirpus	5	3	3	3	1	1	3	3	0

Table 8. Continued

Site	Veg. Zone	Shannon Diversity	Evenness	Simpson Diversity	Total IBI Score	IBI Class	Total Possible	%total
Shepard Island	Outer Scirpus	5	5	5	40			
	Inner Scirpus	5	5	3	60			
	Wet Meadow	3	3	3	27			
					127	Moderately Impacted	182	69.78
Big Fishdam	Outer Scirpus	3	3	3	35			
	Inner Scirpus	5	5	5	53			
	Wet Meadow	5	5	5	33			
					121	Moderately Impacted	182	66.48
Ludington Park	As Inner Scirpus	3	3	3	45	Moderately Impacted	72	62.50
	As Outer Scirpus	3	3	3	43	Moderately Impacted	65	66.15
Pt.St. Ignace	Outer Scirpus	3	5	3	41			
	Inner Scirpus	5	5	3	43			
					84	Moderately Impacted	137	61.31
Pinnconning	Outer Scirpus	3	5	3	33			
	Inner Scirpus	5	5	3	45			
					78	Moderately Degraded	137	56.93
Wildfowl Bay	Inner Scirpus	3	5	3	39	Moderately Degraded	72	54.17
Escanaba	Outer Scirpus	3	3	1	20			
	Inner Scirpus	5	5	5	55			
					75	Moderately Degraded	137	54.74
Allen Rd	Inner Scirpus	5	5	5	37	Moderately Degraded	72	51.39
Jones Rd	Typha (calculated as Inner Scirpus)	3	5	3	37	Moderately Degraded	72	51.39
Vanderbuilt Park	Outer Scirpus	3	5	3	29			
	Inner Scirpus	3	3	1	37			
					66	Moderately Degraded	137	48.18
Bradleyville Rd	Outer Scirpus	3	3	1	21			
	Inner Scirpus	3	5	5	35			
					56	Moderately Degraded	137	40.88

Table 9a.

DCA Dimension	%Dev	%Ag	%NonForest	%NonWet/ Mead	Sp. Cond.	Turb.	NO_3-N	NO_3-N Diff	NH_4-N	NH_4-N Diff	SRP-P	SRP-P Diff	PC1 Score	Disturbance Rank Sum	Disturbance Class
DCAs with data at LOTU															
L38AD1		0.642	0.517												Agriculture
L30AD1		0.432	0.525									0.391			Agriculture
L30AD2								0.383			0.395	0.378			Nutrients
L30AD3		0.449				-0.395			-0.423	-0.396					Nutrients
L89MD1		0.616	0.558												Agriculture
L89MD2	0.455				0.368	0.562									Urbanization
L73MD1		0.579	0.502												Agriculture
L73MD3	,507				0.233	0.414				0.404					Urbanization
L35EMD1		-0.584	0.517												Agriculture
L35EMD3	0.475				0.423	0.742			0.475	0.580			0.424		Urbanization
DCAs with data at Family															
F46AD1		-0.586	-0.553												Agriculture
F46AD2	0.428				0.398	0.623			0.382	0.457			0.404		Urbanization
F35AD2									0.402		-0.478	-0.482			Nutrients
F27AD1							-0.554	-0.523			-0.588	-0.550			Nutrients
F27AD3		-0.497													Agriculture

Table 9b.

		Low disturbance end of gradient					High disturbance end of gradient				
DCAs with LOTU data	**Disturbance Class**										
L38AD1	Agriculture	Ort	Fos	Sig	Coi	Tan	Ish	Bez	Can	Cog	Mev
L30AD1	Agriculture	Sip	Gam	Cae	Anj	Ena	Gyp	Sty	Hya	Bit	Pla
L30AD2	Nutrients	Pal	Tri	Sty	Cla	Lac	Phg	Hyu	Neo	Pla	Bit
L30AD3	Nutrients	Gyp	Tan	Hyc	Cal	Tay	Amn	Val	Tri	Lac	Phg
L89MD1	Agriculture	Spu	Ber	Odo	Phy	Fos	Trc	Mev	Can	Bae	Ery
L89MD2	Urbanization	Lir	Clo	Hym	Lep	Cam	Val	Pel	Ler	Amn	Sig
L73MD1	Agriculture	Cop	Ort	Cer	Tro	Lir	Ana	Tre	Bez	Cog	Gyn
L73MD3	Urbanization	Hym	Lep	Lid	Hex	Nec	Cam	Lir	Clo	Not	Sig
L35EMD1	Agriculture	Nec	Gam	Coi	Anj	Ort	Mev	Can	Bez	Tre	Tay
L35EMD3	Urbanization	Bel	Hyu	Ena	Cae	Nec	Not	Coi	Phg	Neo	Aga
DCAs with Family data											
F46AD1	Agriculture	Col	Chy	Cam	Sip	Nau	Cer	Lib	Coe	Hya	Gyn
F46AD2	Urbanization	Smi	Sip	Nau	Chi	Chy	Cla	Not	Hym	Dyt	Cor
F35AD2	Nutrients	Hyp	Lin	Cor	Dre	Hep	Tri	Neo	Hir	Pla	Nep
F27AD1	Nutrients	Hyd	Lym	Aes	Cla	Cor	Neo	Tri	Let	Pla	Nep
F27AD3	Agriculture	Lin	Phy	Str	Tri	Not	Bel	Bae	Ger	Let	Hyr
Families that responded to disturbance found at five or more sites:	Agriculture	Phy, Not					Cer, Lib, Coe, Hya, Bel, Bae, Ger, Let, Hyr				
	Urbanization	Chi					Not, Dyt, Cor				
	Nutrients	Hyd, Lym, Aes, Cor					Neo, Hir, Pla, Nep				

Table 10.

Candidate Metrics	Dist. Grad.	%Dev	%Ag	%For^{-1}	%Wet/Mead^{-1}	Turb. (NTU)	NO_3-N (mg L^{-1})	(NO_3 dif)	NH_4-N
Crustacea + Mollusca genera	0.429			-0.394	-0.427				
Genera Richness	0.410		-0.412						
%Gastropoda									
%Odonata (-)			0.389						
%Sphaeriidae	0.419		-0.381						
Ephemeroptera+Trichopera genera									
%Crustacea +Mollusca				-0.436	-0.464			0.389	
Family Richness									-0.478
Evenness								-0.427	
Shannon								-0.423	
%Isopoda									
%Amphipoda		-0.400				-0.392	0.388		
Diptera Richness				0.374					
%Diptera									
Ephemeroptera taxa									
%Chironomidae									
Gastropoda Richness									
%Oligochaeta									
%NonFiltering Detritivores									
%Filterers									
%Predators									
%Shredders									
Hydracarina abundance									
%Scrapers									
%Herbivores									
%Tanytarsini									

Table 11.

Taxa	Disturbance Parameter	Correlation Coefficient
Planorbidae	SRP	0.656
Gammarus	PC1	0.539
Belostomatidae	%Agriculture	-0.518
Belostomatidae	Nitrate-N	-0.518
Belostomatidae	SRP	-0.639

Table 12.

Metric	Response to listed disturbance	Disturbance Class
%Planorbidae	positive	Nutrients
%Gammarus	positive	Nutrients and Agriculture
%Odonata	positive	Agriculture
%Ceratopogonidae	positive	Agriculture
%Libellulidae	positive	Agriculture
%Coenagrionidae	positive	Agriculture
%Hyallela azteca	positive	Agriculture
%Belostomatidae	positive	Agriculture
%Gerridae	**positive**	**Agriculture**
%Leptoceridae	positive	Agriculture
%Hydracarina	positive	Agriculture
%Notonectidae	positive	Urbanization
%Dytiscidae	positive	Urbanization
%Corixidae	positive	Urbanization
%Neopleidae	positive	Nutrients
%Hirudinea	positive	Nutrients
%Planorbidae	positive	Nutrients
%Nepidae	positive	Nutrients
%Belostomatidae	negative	Agriculture, Nutrients
Crustacea+Mollusca Richness	**negative**	**Overall Disturbance Gradient, Urbanization**
Genera Richness	**negative**	**Overall Disturbance Gradient, Agriculture**
%Crustacea+Mollusca	**negative**	**Agriculture, Urbanization, Nutrients**
Family Richness	negative	Nutrients
Evenness	**negative**	**Nutrients**
Shannon Diversity	**negative**	**Nutrients**
%Amphipoda	negative	Urbanization, Turbidity
Diptera Genera Richness	negative	NonForest
%Physidae	negative	Agriculture
%Notonectidae	negative	Agriculture
%Chironomidae	negative	Urbanization
%Hydrophilidae	**negative**	**Nutrients**
%Lymnaeidae	**negative**	**Nutrients**
%Aeshnidae	negative	Nutrients
%Spaeriidae	**negative**	**Overall Disturbance Gradient, Agriculture**

Table 13.

	%Planorbidae	*%Gammarus*	%Odonata	%Ceratopo-gonidae	%Libellulidae	%Coenagrion-idae	*%Hyallela azteca*	**%Gerridae**	%Leptocer-idae	%Hydracarina	%Dytiscidae
Site											
ALM	5	5	1	1	5	1	1	5	5	5	5
ALR	5	5	1	1	1	1	5	3	5	3	5
ARC	5	3	5	5	5	1	5	5	5	5	3
BAY	1	5	3	5	5	3	3	5	1	5	5
FRE	1	5	3	3	5	1	3	3	5	1	3
GRR	5	1	1	5	5	1	5	5	5	1	3
HAY	3	1	3	5	5	3	5	5	1	3	1
HII	3	5	1	3	1	3	1	5	5	1	3
HUY	1	5	3	5	5	3	1	5	5	1	3
JOR	5	5	3	3	5	3	1	5	5	3	5
LBC	5	5	5	3	5	1	5	5	5	5	1
LIN	3	3	5	1	5	1	3	5	5	1	1
LYN	3	3	3	5	5	3	5	5	5	3	3
MUR	5	3	3	5	5	3	3	5	5	5	3
NAY	5	5	1	1	3	1	3	5	5	5	5
PAR	1	5	3	5	1	1	1	5	5	3	3
PIR	1	1	5	5	5	1	5	5	5	5	5
PMR	5	3	5	5	5	1	3	5	5	3	1
POB	5	3	5	3	5	1	1	5	5	1	5
PRE	3	3	3	5	3	3	5	5	1	1	5
PWR	3	3	3	3	5	1	3	5	5	5	3
Rap	5	1	1	3	5	3	5	5	5	3	5
ROB	3	5	3	5	5	3	1	5	5	3	5
SOU	1	3	3	3	5	3	5	5	3	3	5
TAH	5	1	5	5	5	1	5	5	5	5	5
TOB	3	3	3	3	5	3	5	5	5	5	3
WFB	1	5	3	5	5	1	5	5	5	3	5
WHR	1	1	1	3	5	1	5	5	5	5	5
1 points	>2.5	>25	>9.5	>1.5	>1	>10	>25	>2	>2	>2	>3
3 points	>0.5-2.5	>5-25	>2.5-9.5	>0.2-1.5	>0.5-1	>2-10	>13-25	>1-2	>1-2	>0.5-2	>0.5-3
5 points	0-0.5	0-5	0-2.5	0-0.2	0-0.5	0-2	0-13	0-1	0-1	0-0.5	0-0.5
7 points											

Table 13., Continued

	%Corixidae	%Neopleidae	%Hirudinea	%Planorbidae	%Nepidae	**Crustacea+ Mollusca Richness**	**Genera Richness**	**%Crustacea +Mollusca**	Family Richness	**Evenness**
Site										
ALM	5	5	5	5	5	1	1	3	1	1
ALR	5	5	5	5	5	1	3	1	3	3
ARC	5	5	5	5	5	5	3	1	1	1
BAY	5	3	3	1	3	7	3	5	3	3
FRE	3	5	5	1	5	5	5	3	3	5
GRR	1	5	5	5	5	3	3	3	3	5
HAY	5	3	5	5	5	3	3	3	3	1
HII	5	1	5	3	5	3	5	3	5	3
HUY	5	5	3	1	5	7	7	5	5	3
JOR	5	5	5	5	5	1	3	3	1	1
LBC	1	3	3	5	5	3	3	3	1	1
LIN	1	3	5	3	5	5	7	3	5	3
LYN	5	1	3	3	5	5	5	3	5	3
MUR	5	5	5	5	5	7	3	5	3	1
NAY	3	5	5	5	5	1	3	1	1	1
PAR	5	5	3	1	5	7	7	5	5	1
PIR	5	5	1	1	5	7	3	5	3	1
PMR	1	5	3	5	5	5	5	3	1	3
POB	5	5	5	5	5	3	1	3	1	1
PRE	5	5	3	3	5	7	5	5	3	3
PWR	1	3	5	5	5	7	5	5	3	3
Rap	5	5	1	5	1	7	7	5	5	3
ROB	5	5	5	5	5	7	5	5	3	1
SOU	5	5	3	1	5	7	7	3	5	3
TAH	1	5	5	5	5	7	3	5	1	3
TOB	5	3	5	3	5	7	3	5	3	3
WFB	1	5	5	1	5	5	5	5	3	5
WHR	1	5	3	1	5	7	7	5	3	3
1 points	>5	>10	>1	>2.5	>2	0-2	0-10	0-25	0-13	0-0.4
3 points	>1-5	>2.5-10	>0.5-1	>1-2.5	>1-2	>2-4	>10-18	>25-60	>13-18	>0.4-0.5
5 points	0-1	0-2.5	0-0.5	0-1	0-1	>4-6	>18-21	>60	>18	>0.5
7 points						>6	>21			

Table 13., Continued

	Shannon Diversity	Diptera Genera Richness	%Physidae	%Chironom-idae	**%Hydrophil-idae**	**%Lymnae-idae**	%Aeshnidae	**%Spaeriidae**	Sum of all 30 metrics	Sum of 9 metrics retained or the final IBI
Site										
ALM	1	1	1	1	1	1	1	1	79	15
ALR	5	5	1	5	1	1	1	1	91	19
ARC	1	5	3	5	3	5	5	1	111	25
BAY	5	1	5	5	3	3	1	1	101	35
FRE	5	5	3	5	1	1	5	1	99	29
GRR	5	5	3	5	3	1	5	1	103	29
HAY	1	1	3	1	1	1	1	1	81	19
HII	5	5	3	3	1	1	1	1	89	27
HUY	5	5	5	3	1	1	1	3	107	37
JOR	3	5	1	3	1	1	1	1	93	19
LBC	3	5	5	3	3	1	5	1	99	23
LIN	5	3	1	1	3	1	3	1	91	33
LYN	5	1	1	3	1	3	3	1	99	31
MUR	3	1	3	1	1	1	3	1	103	27
NAY	1	1	1	1	1	1	3	1	79	15
PAR	3	3	3	1	3	1	1	1	93	33
PIR	1	3	5	1	1	1	3	1	95	25
PMR	5	3	3	3	3	3	3	1	101	33
POB	1	3	3	5	1	1	1	1	89	17
PRE	5	5	1	3	1	1	1	5	103	37
PWR	5	3	5	1	1	3	5	1	105	35
Rap	5	5	3	3	1	5	1	1	109	39
ROB	3	5	5	1	1	1	1	1	107	29
SOU	5	5	5	5	1	1	1	1	107	33
TAH	3	3	3	3	1	1	1	7	109	35
TOB	3	5	3	1	1	1	3	1	103	29
WFB	5	5	5	3	5	5	5	7	123	47
WHR	5	3	3	1	1	5	5	1	101	39
1 points	0-0.8	0-1	0-1	0-2	0-1	0-0.3	0-0.5	0-1		
3 points	>0.8-0.9	>1-2.5	>1-10	>2-8	>1-5	>0.3-1	>0.5-1.5	>1-1.5		
5 points	>0.9	>2.5	>10	>8	>5	>1	>1.5	>1.5-2		
7 points								>2		

Table 14. Typha IBI Worksheet

1. Percent Gerridae:

>2	>1-2	0-1
score = 1	score = 3	score = 5

2. Crustacea + Mollusca Richness:

0-2	>2-4	>4-6	>6
score = 1	score = 3	score = 5	score = 7

3. Genera Richness:

0-10	>10-18	>18-21	>21
score = 1	score = 3	score = 5	score = 7

4. Percent Crustacea + Mollusca:

0-25	>25-60	>60
score = 1	score = 3	score = 5

5. Evenness:

0-0.4	>0.4-0.5	>0.5
score = 1	score = 3	score = 5

6. Shannon Diversity:

0-0.8	>0.8-0.9	>0.9
score = 1	score = 3	score = 5

7. Percent Hydrophilidae:

0-1	>1-5	>5
score = 1	score = 3	score = 5

8. Percent Lymnaeidae:

0-0.3	>0.3-1	>1
score = 1	score = 3	score = 5

9. Percent Spaeriidae:

0-1	>1-1.5	>1.5-2	>2
score = 1	score = 3	score = 5	score = 7