

Online Resource

Supplementary Tables

Biogeochemical water type influences community composition, species richness, and biomass in megadiverse Amazonian fish assemblages

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Table S1. Physico-chemical parameters for the blackwater, clearwater, and whitewater waters of the Santarém region, divided by habitat type and season.

Water type	Habitat	Season	Temperature (°C)			pH			DO (mg·L ⁻¹)		
			Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean
Blackwater	Floodplain lake	Low	29.3	31.2	30.2	4.3	5.6	4.8	2.7	8.3	5.7
		High	29.6	30.8	30.3	4.8	6.4	5.5	3.9	4.7	4.3
	River margin	Low	29.0	32.5	30.5	4.8	6.2	5.7	4.7	11.5	8.1
		High	29.2	30.6	30.1	5.0	6.0	5.5	4.5	9.1	5.5
Clearwater	Floodplain lake	Low	29.7	31.7	30.5	4.3	7.2	5.9	4.2	12.0	8.9
		High	29.3	30.6	30.0	5.4	7.0	6.1	3.0	4.5	4.0
	River margin	Low	29.1	30.7	30.1	6.3	7.3	6.8	5.2	11.3	8.6
		High	29.3	31.0	29.9	5.6	7.4	6.2	4.2	5.4	4.7
Whitewater	Floodplain lake	Low	28.6	32.0	30.0	6.9	7.8	7.2	0.7	9.2	5.0
		High	28.7	34.4	30.2	5.5	7.7	6.7	0.4	2.7	1.5
	River margin	Low	29.3	31.2	30.1	7.0	7.4	7.1	3.4	9.3	6.5
		High	28.0	30.4	29.1	5.7	7.0	6.3	2.3	2.8	2.6

Water type	Habitat	Season	Conductivity (μS·cm ⁻¹)			Turbidity (NTU)		
			Min.	Max.	Mean	Min.	Max.	Mean
Blackwater	Floodplain lake	Low	7.0	9.6	8.1	0.3	2.1	1.2
		High	7.5	9.8	8.5	1.3	2.0	1.6
	River margin	Low	7.5	11.2	9.1	0.1	7.6	2.7
		High	7.8	9.9	8.8	1.3	2.1	1.7
Clearwater	Floodplain lake	Low	4.4	13.4	10.0	3.6	13.5	6.6
		High	13.3	15.7	14.4	2.5	7.1	4.9
	River margin	Low	11.8	16.1	14.8	0.2	8.0	4.7
		High	13.8	16.1	14.8	2.0	9.6	6.0
Whitewater	Floodplain lake	Low	78.1	123.4	102.9	10.7	169.0	88.1
		High	53.5	81.5	60.3	13.1	45.6	31.2
	River margin	Low	46.7	64.5	54.3	27.9	305.0	129.3
		High	52.7	61.0	56.5	44.9	89.0	64.4

Table S2. Permutational multivariate analysis of variance (PERMANOVA) comparisons of physico-chemical water parameters between blackwater (BW), clearwater (CW), and whitewater (WW) systems of the Santarém region. All comparisons are significant at $\alpha = 0.001$. DF = degrees of freedom.

Comparison	River Margins (RM)			Floodplain lakes (FL)			Pooled RM and FL		
	Pseudo <i>F</i>	R	DF	Pseudo <i>F</i>	R	DF	Pseudo <i>F</i>	R	DF
Global (BW-CW=WW)	20.9	0.75	2, 33	24.1	0.77	2, 34	38.4	0.73	2, 68
BW-CW	5.4	0.45	1, 22	3.5	0.37	1, 22	7.2	0.36	1, 46
BW-WW	33.1	0.78	1, 21	43.9	0.81	1, 22	67.9	0.77	1, 45
CW-WW	22.3	0.71	1, 21	25.0	0.73	1, 22	42.0	0.69	1, 45

Table S3. List of sampled fish species¹. BW = blackwater. CW = clearwater. WW = whitewater. RM = river margin. FL = floodplain lake. cf. = conferre.

Taxon	River Margin (RM)			Floodplain lake (FL)			RM & FL			RM	FL
	BW	CW	WW	BW	CW	WW	BW	CW	WW		
Order Myliobatiformes											
Family Potamotrygonidae											
<i>Potamotrygon motoro</i> (Müller & Henle 1841)	0	0	0	0	1	2	0	1	2	0	3
<i>Potamotrygon orbignyi</i> (Castelnau 1855)	0	1	0	0	8	0	0	9	0	1	8
<i>Potamotrygon scobina</i> Garman 1913	0	1	0	0	0	0	0	1	0	1	0
Order Osteoglossiformes											
Family Osteoglossidae											
<i>Osteoglossum bicirrhosum</i> (Cuvier 1829)	0	0	1	0	0	2	0	0	3	1	2
Order Clupeiformes											
Family Clupeidae											
<i>Rhinosardinia amazonica</i> (Steindachner 1879)	0	0	0	0	0	1	0	0	1	0	1
Family Engraulidae											
<i>Amazonsprattus scintilla</i> Roberts 1984	1	0	0	0	0	0	1	0	0	1	0
<i>Anchovia surinamensis</i> (Bleeker 1865)	1160	92	9	33	101	3	1193	193	12	1261	137
<i>Anchoviella alleni</i> (Myers 1940)	2	1	4	1	0	0	3	1	4	7	1
<i>Anchoviella cf. cayennensis</i> (Puyo 1946)	0	0	0	0	3	0	0	3	0	0	3
<i>Anchoviella cf. lepidentostole</i> (Fowler 1911)	47	1	49	89	10	0	136	11	49	97	99
<i>Anchoviella guianensis</i> (Eigenmann 1912)	2	3	0	12	0	0	14	3	0	5	12
<i>Anchoviella juruasanga</i> Loeb 2012	11	2	0	0	0	2	11	2	2	13	2
<i>Anchoviella sp.</i>	11	0	0	0	0	0	11	0	0	11	0
<i>Lycengraulis batesii</i> (Günther 1868)	1	0	97	0	2	1	1	2	98	98	3
<i>Pterengraulis atherinoides</i> (Linnaeus 1766)	0	0	10	0	0	8	0	0	18	10	8
Family Pritigasteridae											
<i>Ilisha amazonica</i> (Miranda Ribeiro 1920)	0	3	2	0	0	2	0	3	4	5	2
<i>Pellona flavipinnis</i> (Valenciennes 1837)	1	4	27	0	2	40	1	6	67	32	42
Order Characiformes											
Family Erythrinidae											
<i>Hoplias malabaricus</i> (Bloch 1794)	5	0	0	5	1	28	10	1	28	5	34
Family Cynodontidae											
<i>Cynodon gibbus</i> (Spix & Agassiz 1829)	0	1	0	0	0	15	0	1	15	1	15
<i>Hydrolycus scomberoides</i> (Cuvier 1819)	0	0	6	0	0	21	0	0	27	6	21
<i>Rhaphiodon vulpinus</i> Spix & Agassiz 1829	0	1	19	0	0	24	0	1	43	20	24
Family Serrasalminidae											
<i>Catoprion mento</i> (Cuvier 1819)	0	1	0	3	0	0	3	1	0	1	3
<i>Colossoma macropomum</i> (Cuvier 1816)	0	0	0	0	1	0	0	1	0	0	1
<i>Metynnis hypsauchen</i> (Müller & Troschel 1844)	6	1	0	1	0	0	7	1	0	7	1
<i>Metynnis lippincottianus</i> (Cope 1870)	0	0	0	0	1	0	0	1	0	0	1
<i>Metynnis luna</i> Cope 1878	7	40	0	1	1	3	8	41	3	47	5
<i>Myloplus schomburgkii</i> (Jardine 1841)	0	1	0	0	0	0	0	1	0	1	0
<i>Myloplus sp.</i>	0	0	0	1	1	0	1	1	0	0	2
<i>Mylossoma aureum</i> (Spix & Agassiz 1829)	0	0	3	0	0	29	0	0	32	3	29
<i>Mylossoma duriventre</i> (Cuvier 1818)	0	0	2	0	0	25	0	0	27	2	25
<i>Pristobrycon striolatus</i> (Steindachner 1908)	0	0	0	0	0	1	0	0	1	0	1
<i>Pygocentrus nattereri</i> Kner 1858	0	0	2	0	0	13	0	0	15	2	13
<i>Pygopristis denticulata</i> (Cuvier 1819)	1	0	0	2	0	1	3	0	1	1	3
<i>Serrasalmus eigenmanni</i> Norman 1929	1	0	1	0	0	2	1	0	3	2	2
<i>Serrasalmus elongatus</i> Kner 1858	0	0	0	0	0	1	0	0	1	0	1
<i>Serrasalmus gouldingi</i> Fink & Machado-Allison 1992	7	1	0	1	0	0	8	1	0	8	1
<i>Serrasalmus maculatus</i> Kner 1858	1	2	3	0	0	54	1	2	57	6	54
<i>Serrasalmus manueli</i> (Fernández-Yépez & Ramírez 1967)	0	0	0	1	0	0	1	0	0	0	1
<i>Serrasalmus rhombeus</i> (Linnaeus 1766)	1	0	1	0	1	14	1	1	15	2	15

Taxon	River Margin (RM)			Floodplain lake (FL)			RM & FL			RM	FL
	BW	CW	WW	BW	CW	WW	BW	CW	WW		
Family Hemiodontidae											
<i>Anodus cf. elongatus</i> Agassiz 1829	0	0	1	0	5	3	0	5	4	1	8
<i>Argonectes robertsi</i> Langeani 1999	0	6	0	6	4	0	6	10	0	6	10
<i>Bivibranchia fowleri</i> (Steindachner 1908)	711	224	2	18	46	0	729	270	2	937	64
<i>Hemiodus atranalis</i> (Fowler 1940)	0	0	0	0	6	0	0	6	0	0	6
<i>Hemiodus gracilis</i> Günther 1864	111	7	0	131	2	0	242	9	0	118	133
<i>Hemiodus immaculatus</i> Kner 1858	25	11	0	19	54	0	44	65	0	36	73
<i>Hemiodus microlepis</i> (Kner 1858)	1	6	1	2	72	2	3	78	3	8	76
<i>Hemiodus unimaculatus</i> (Bloch 1794)	5	9	0	9	36	0	14	45	0	14	45
<i>Micromischodus sugillatus</i> Roberts 1971	4	0	0	12	2	0	16	2	0	4	14
Family Anostomidae											
<i>Anostomoides laticeps</i> (Eigenmann 1912)	0	0	0	0	1	0	0	1	0	0	1
<i>Laemolyta proxima</i> (Garman 1890)	0	19	1	1	61	13	1	80	14	20	75
<i>Laemolyta taeniata</i> (Kner 1858)	0	1	0	1	0	0	1	1	0	1	1
<i>Leporinus altipinnis</i> Borodin 1929	3	0	0	9	1	0	12	1	0	3	10
<i>Leporinus fasciatus</i> (Bloch 1794)	1	14	0	0	11	0	1	25	0	15	11
<i>Leporinus friderici</i> (Bloch 1794)	0	0	0	1	0	2	1	0	2	0	3
<i>Megaleporinus trifasciatus</i> (Steindachner 1876)	0	1	1	0	0	1	0	1	2	2	1
<i>Pseudanos gracilis</i> (Kner 1858)	2	0	0	0	0	0	2	0	0	2	0
<i>Pseudanos trimaculatus</i> (Kner 1858)	0	1	0	0	0	0	0	1	0	1	0
<i>Rhytidodus argenteofuscus</i> Kner 1858	0	1	6	0	4	2	0	5	8	7	6
<i>Rhytidodus microlepis</i> Kner 1858	0	0	6	0	0	6	0	0	12	6	6
<i>Schizodon fasciatus</i> Spix & Agassiz 1829	1	4	8	0	3	57	1	7	65	13	60
<i>Schizodon vittatus</i> (Valenciennes 1850)	7	7	0	0	0	2	7	7	2	14	2
Family Chilodontidae											
<i>Caenotropus labyrinthicus</i> (Kner 1858)	1	3	0	0	8	0	1	11	0	4	8
Family Curimatidae											
<i>Curimata ocellata</i> Eigenmann & Eigenmann 1889	0	0	0	0	0	1	0	0	1	0	1
<i>Curimata roseni</i> Vari 1989	1	24	2	0	26	1	1	50	3	27	27
<i>Curimata vittata</i> (Kner 1858)	0	0	0	19	5	14	19	5	14	0	38
<i>Curimatella alburnus</i> (Müller & Troschel 1844)	0	0	0	0	0	102	0	0	102	0	102
<i>Curimatella immaculata</i> (Fernández-Yépez 1948)	149	0	0	1	1	0	150	1	0	149	2
<i>Curimatella meyeri</i> (Steindachner 1882)	111	0	1	0	0	92	111	0	93	112	92
<i>Cyphocharax leucostictus</i> (Eigenmann & Eigenmann)	0	34	1	80	58	0	80	92	1	35	138
<i>Cyphocharax plumbeus</i> (Eigenmann & Eigenmann 1889)	0	0	6	0	0	27	0	0	33	6	27
<i>Cyphocharax spiluropsis</i> (Eigenmann & Eigenmann)	0	0	0	0	0	73	0	0	73	0	73
<i>Potamorhina altamazonica</i> (Cope 1878)	0	0	1	0	0	3	0	0	4	1	3
<i>Potamorhina latior</i> (Spix & Agassiz 1829)	0	0	0	0	0	25	0	0	25	0	25
<i>Potamorhina</i> sp.	15	0	1	4	0	0	19	0	1	16	4
<i>Pristigaster cayana</i> Cuvier 1829	0	1	0	0	0	6	0	1	6	1	6
<i>Psectrogaster amazonica</i> Eigenmann & Eigenmann 1889	0	0	2	0	0	11	0	0	13	2	11
<i>Psectrogaster rutiloides</i> (Kner 1858)	1	0	0	0	2	10	1	2	10	1	12
<i>Steindachnerina bimaculata</i> (Steindachner 1876)	0	2	1	0	12	486	0	14	487	3	498
Family Prochilodontidae											
<i>Prochilodus nigricans</i> Spix & Agassiz 1829	0	0	0	0	0	1	0	0	1	0	1
<i>Semaprochilodus insignis</i> (Jardine 1841)	0	0	0	0	1	0	0	1	0	0	1
<i>Semaprochilodus taeniurus</i> (Valenciennes 1821)	0	0	0	2	0	0	2	0	0	0	2
Family Lebiasinidae											
<i>Copella arnoldi</i> (Regan 1912)	0	0	0	0	0	2	0	0	2	0	2
<i>Nannostomus digrammus</i> (Fowler 1913)	0	0	0	40	0	0	40	0	0	0	40
<i>Nannostomus eques</i> Steindachner 1876	0	0	0	1	0	0	1	0	0	0	1
<i>Pyrrhulina cf. obermulleri</i> Myers 1926	0	0	0	0	0	2	0	0	2	0	2

Taxon	River Margin (RM)			Floodplain lake (FL)			RM & FL			RM	FL
	BW	CW	WW	BW	CW	WW	BW	CW	WW		
Family Ctenoluciidae											
<i>Boulengerella cuvieri</i> (Spix & Agassiz 1829)	12	14	1	0	1	2	12	15	3	27	3
<i>Boulengerella lucius</i> (Cuvier 1816)	2	0	0	1	0	0	3	0	0	2	1
<i>Boulengerella maculata</i> (Valenciennes 1850)	9	4	3	7	15	0	16	19	3	16	22
Family Tripotheidae											
<i>Agoniates halecinus</i> Müller & Troschel 1845	22	2	0	44	5	1	66	7	1	24	50
<i>Triporthus albus</i> Cope 1872	68	35	4	25	3	14	93	38	18	107	42
<i>Triporthus auritus</i> (Valenciennes 1850)	7	2	23	2	4	12	9	6	35	32	18
<i>Triporthus cf. angulatus</i> (Spix & Agassiz 1829)	1	2	35	0	3	155	1	5	190	38	158
Family Gasteropelecidae											
<i>Thoracocharax stellatus</i> (Kner 1858)	0	0	4	0	0	0	0	0	4	4	0
Family Bryconidae											
<i>Brycon melanopterus</i> (Cope 1872)	0	0	0	4	0	0	4	0	0	0	4
<i>Brycon "pesu" sp. A</i>	1	0	0	0	0	0	1	0	0	1	0
<i>Brycon "pesu" sp. B</i>	8	4	0	0	5	0	8	9	0	12	5
<i>Chalceus epakros</i> Zanata & Toledo-Piza 2004	0	13	0	0	14	0	0	27	0	13	14
<i>Chalceus erythrurus</i> (Cope 1870)	0	0	0	0	0	1	0	0	1	0	1
Family Iguanodectidae											
<i>Bryconops alburnoides</i> Kner 1858	47	19	0	14	16	3	61	35	3	66	33
<i>Bryconops caudomaculatus</i> (Günther 1864)	4	0	0	0	4	17	4	4	17	4	21
<i>Bryconops cf. melanurus</i> (Bloch 1794)	0	0	0	111	0	0	111	0	0	0	111
<i>Bryconops cf. transitoria</i> Steindachner 1915	126	57	2	111	1011	0	237	1068	2	185	1122
<i>Bryconops durbiniae</i> (Eigenmann 1908)	244	1	0	275	394	0	519	395	0	245	669
<i>Iguanodectes polylepis</i> Géry 199	0	0	0	3	2	2	3	2	2	0	7
Family Acestrorhynchidae											
<i>Acestrorhynchus abbreviatus</i> (Cope 1878)	1	0	3	0	0	80	1	0	83	4	80
<i>Acestrorhynchus falcirostris</i> (Cuvier 1819)	4	5	0	15	17	3	19	22	3	9	35
<i>Acestrorhynchus microlepis</i> (Jardine 1841)	120	54	0	17	42	1	137	96	1	174	60
<i>Acestrorhynchus minimus</i> Menezes 1969	16	0	0	37	73	0	53	73	0	16	110
<i>Lonchogenys ilisha</i> Myers 1927	11	0	0	0	0	0	11	0	0	11	0
Family Characidae											
<i>Aphyocharax alburnus</i> (Günther 1869)	0	0	4	0	0	6	0	0	10	4	6
<i>Aphyocharax avary</i> Fowler 1913	0	0	0	0	0	58	0	0	58	0	58
<i>Aphyocharax nattereri</i> (Steindachner 1882)	0	0	0	0	0	2	0	0	2	0	2
<i>Aphyodite grammica</i> Eigenmann 1912	0	0	0	0	134	298	0	134	298	0	432
<i>Astyanax guianensis</i> Eigenmann 1909	5	0	0	0	29	0	5	29	0	5	29
<i>Charax</i> sp.	0	0	0	0	0	24	0	0	24	0	24
<i>Cheirodon micropterus</i> Eigenmann 1907	0	0	0	0	7	75	0	7	75	0	82
<i>Creagrutus cracentis</i> Vari & Harold 2001	11	0	0	0	0	1	11	0	1	11	1
<i>Ctenobrycon spilurus</i> (Valenciennes 1850)	0	0	0	0	0	368	0	0	368	0	368
<i>Hemigrammus analis</i> Durbin 1909	0	1	0	0	7	0	0	8	0	1	7
<i>Hemigrammus diagonicus</i> Mendonça & Wosiacki 2011	0	0	0	0	0	485	0	0	485	0	485
<i>Hemigrammus durbiniae</i> Ota, Lima & Pavanelli 2015	0	0	0	0	0	1	0	0	1	0	1
<i>Hemigrammus hyanuary</i> Durbin 1918	0	0	0	0	9	0	0	9	0	0	9
<i>Hemigrammus levis</i> Durbin 1908	37	1	0	105	223	0	142	224	0	38	328
<i>Hemigrammus lunatus</i> Durbin 1918	0	0	0	0	0	361	0	0	361	0	361
<i>Hemigrammus</i> sp.	0	0	0	0	0	1	0	0	1	0	1
<i>Hemigrammus unilineatus</i> (Gill 1858)	0	0	0	0	0	4	0	0	4	0	4
<i>Hyphessobrycon copelandi</i> Durbin 1908	0	0	0	0	0	4	0	0	4	0	4
<i>Hyphessobrycon eques</i> (Steindachner 1882)	0	0	0	0	0	114	0	0	114	0	114
<i>Hyphessobrycon hasemani</i> Fowler 1913	0	0	0	44	0	0	44	0	0	0	44
<i>Jupiaba cf. essequibensis</i> (Eigenmann 1909)	68	9	0	0	0	0	68	9	0	77	0

Taxon	River Margin (RM)			Floodplain lake (FL)			RM & FL			RM	FL
	BW	CW	WW	BW	CW	WW	BW	CW	WW		
<i>Knodus heteresthes</i> (Eigenmann 1908)	90	520	62	0	20	0	90	540	62	672	20
<i>Microschemobrycon melanatus</i> (Eigenmann 1912)	1	0	0	0	0	0	1	0	0	1	0
<i>Microschemobrycon</i> sp.	0	1	0	0	652	0	0	653	0	1	652
<i>Moenkhausia celibela</i> Marinho & Langeani 2010	166	0	0	17	0	21	183	0	21	166	38
<i>Moenkhausia ceros</i> Eigenmann 1908	25	0	0	17	0	0	42	0	0	25	17
<i>Moenkhausia cf. jamesi</i> Eigenmann 1908	0	4	2	0	1	0	0	5	2	6	1
<i>Moenkhausia grandisquamis</i> (Müller & Troschel 1845)	0	1	0	0	3	0	0	4	0	1	3
<i>Moenkhausia intermedia</i> Eigenmann 1908	0	0	0	0	0	383	0	0	383	0	383
<i>Moenkhausia lata</i> Eigenmann 1908	86	62	10	0	2	0	86	64	10	158	2
<i>Moenkhausia lepidura</i> (Kner 1858)	15	8	4	422	30	33	437	38	37	27	485
<i>Moenkhausia megalops</i> (Eigenmann 1907)	0	2	0	0	0	0	0	2	0	2	0
<i>Moenkhausia oligolepis</i> (Günther 1864)	0	0	1	0	0	6	0	0	7	1	6
<i>Moenkhausia</i> sp.	0	0	0	0	0	4	0	0	4	0	4
<i>Odontostilbe fugitiva</i> Cope 1870	0	0	5	0	0	0	0	0	5	5	0
<i>Phenacogaster cf. retropinnus</i> Lucena & Malabarba	3	0	0	0	0	0	3	0	0	3	0
<i>Phenacogaster pectinatus</i> (Cope 1870)	4	0	0	0	0	0	4	0	0	4	0
<i>Prionobrama filigera</i> (Cope 1870)	0	0	12	0	0	679	0	0	691	12	679
<i>Roeboides affinis</i> (Günther 1868)	42	0	1	0	0	11	42	0	12	43	11
<i>Roeboides biserialis</i> (Garman 1890)	3	0	1	0	0	3	3	0	4	4	3
<i>Roeboides descalvadensis</i> Fowler 1932	0	0	0	0	2	1526	0	2	1526	0	1528
<i>Roeboides myersii</i> Gill 1870	0	0	6	0	1	44	0	1	50	6	45
<i>Stethaprion crenatum</i> Eigenmann 1916	0	0	0	0	0	1	0	0	1	0	1
<i>Tetragonopterus argenteus</i> Cuvier 1816	0	0	2	0	0	2	0	0	4	2	2
<i>Tetragonopterus chalceus</i> Spix & Agassiz 1829	1	12	0	0	0	0	1	12	0	13	0
Order Gymnotiformes											
Family Apterodontidae											
<i>Adontosternarchus balaenops</i> (Cope, 1878)	0	0	1	0	0	0	0	0	1	1	0
<i>Adontosternarchus clarkae</i> Mago-Leccia, Lundberg, Baskin, 1985	0	0	2	0	0	0	0	0	2	2	0
<i>Orthosternarchus tamandua</i> (Boulenger, 1898)	0	0	1	0	0	0	0	0	1	1	0
<i>Parapteronotus hasemani</i> (Ellis, 1913)	0	0	2	0	0	5	0	0	7	2	5
<i>Platyrosternarchus macrostoma</i> (Günther, 1870)	0	0	3	0	0	0	0	0	3	3	0
<i>Porotergus gimbeli</i> Ellis, 1912	0	0	1	0	0	0	0	0	1	1	0
<i>Sternarchella calhamazon</i> Lundberg, Cox Fernandes, Campos-da-Paz, 2013	0	0	4	0	0	0	0	0	4	4	0
<i>Sternarchella orthos</i> Mago-Leccia, 1994	0	0	26	0	0	0	0	0	26	26	0
<i>Sternarchella schotti</i> (Steindachner, 1868)	0	0	0	0	0	1	0	0	1	0	1
<i>Sternarchogiton nattereri</i> (Steindachner, 1868)	0	0	12	0	0	0	0	0	12	12	0
<i>Sternarchogiton porcinum</i> Eigenmann, Allen, 1942	0	0	2	0	0	0	0	0	2	2	0
<i>Sternarchogiton preto</i> de Santana, Crampton, 2007	0	0	1	0	0	0	0	0	1	1	0
<i>Sternarchorhamphus muelleri</i> (Steindachner, 1881)	0	0	1	0	0	0	0	0	1	1	0
<i>Sternarchorhynchus goeldii</i> de Santana, Vari, 2010	0	0	1	0	0	0	0	0	1	1	0
<i>Sternarchorhynchus retzeri</i> de Santana, Vari, 2010	0	0	1	0	0	0	0	0	1	1	0
Family Sternopygidae											
<i>Distocyclus conirostris</i> (Eigenmann, Allen, 1942)	1	0	0	0	1	0	1	1	0	1	1
<i>Eigenmannia limbata</i> (Schreiner, Miranda Ribeiro, Eigenmannia macrops (Boulenger, 1897)	0	0	1	0	1	150	0	1	151	1	151
<i>Eigenmannia sp.</i>	0	0	3	0	0	0	0	0	3	3	0
<i>Rhabdolichops electrogrammus</i> Lundberg, Mago-Leccia, 1986	0	0	3	0	0	0	0	0	3	3	0
<i>Rhabdolichops lundbergi</i> Correa, Crampton, Albert, Rhabdolichops sp.	0	0	3	0	0	0	0	0	3	3	0
<i>Rhabdolichops sp.</i>	0	0	5	0	0	0	0	0	5	5	0
<i>Rhabdolichops troscheli</i> (Kaup, 1856)	0	1	0	0	0	0	0	1	0	1	0
<i>Sternopygus macrurus</i> (Bloch, Schneider, 1801)	0	0	1	0	0	25	0	0	26	1	25
Family Hypopomidae											
<i>Brachyhypopomus pinnicaudatus</i> (Hopkins, Comfort, Bastian, Bass, 1990)	0	0	0	0	0	1	0	0	1	0	1

Taxon	River Margin (RM)			Floodplain lake (FL)			RM & FL			RM	FL
	BW	CW	WW	BW	CW	WW	BW	CW	WW		
Family Rhamphichthyidae											
<i>Rhamphichthys drepanium</i> Triques, 1999	0	0	0	0	0	7	0	0	7	0	7
<i>Rhamphichthys heleios</i> Carvalho, Albert, 2015	0	0	1	0	0	1	0	0	2	1	1
<i>Rhamphichthys lineatus</i> Castelnau, 1855	0	0	0	0	0	2	0	0	2	0	2
<i>Rhamphichthys marmoratus</i> Castelnau 1855	0	0	0	0	1	1	0	1	1	0	2
<i>Rhamphichthys rostratus</i> (Linnaeus, 1766)	0	0	1	0	0	2	0	0	3	1	2
<i>Steatogenys elegans</i> (Steindachner, 1880)	0	0	46	0	0	0	0	0	46	46	0
Order Siluriformes											
Family Trichomycteridae											
<i>Vandellia cirrhosa</i> Valenciennes 1846	0	2	1	0	0	0	0	2	1	3	0
Family Callichthyidae											
<i>Corydoras hastatus</i> Eigenmann & Eigenmann 1888	0	0	1	0	0	0	0	0	1	1	0
<i>Hoplosternum littorale</i> (Hancock 1828)	0	0	0	0	0	48	0	0	48	0	48
Family Loricariidae											
<i>Ancistrus cf. hoplogenus</i> (Günther 1864)	0	0	0	0	4	0	0	4	0	0	4
<i>Dekeyseria scaphirhynchus</i> (Kner 1854)	0	0	0	1	0	0	1	0	0	0	1
<i>Farlowella amazonum</i> (Günther 1864)	0	0	0	0	0	11	0	0	11	0	11
<i>Hemiodontichthys acipenserinus</i> (Kner 1853)	0	0	1	0	0	5	0	0	6	1	5
<i>Hypoptopoma incognitum</i> Aquino & Schaefer 2010	0	0	10	0	4	6	0	4	16	10	10
<i>Hypostomus cf. plecostomus</i> (Linnaeus 1758)	0	0	0	0	1	4	0	1	4	0	5
<i>Limatulichthys griseus</i> (Eigenmann 1909)	25	30	1	5	99	1	30	129	2	56	105
<i>Loricaria cf. cataphracta</i> Linnaeus 1758	0	0	13	0	1	0	0	1	13	13	1
<i>Loricariichthys acutus</i> (Valenciennes 1840)	0	1	3	0	7	80	0	8	83	4	87
<i>Loricariichthys nudirostris</i> (Kner 1853)	0	0	1	0	3	6	0	3	7	1	9
<i>Loricariichthys platymetopon</i> Isbrücker & Nijssen 1979	0	0	0	0	2	27	0	2	27	0	29
<i>Peckoltia vittata</i> (Steindachner 1881)	5	5	1	1	6	1	6	11	2	11	8
<i>Pseudohemiodon</i> sp.	0	0	1	0	0	0	0	0	1	1	0
<i>Pterygoplichthys gibbiceps</i> (Kner 1854)	0	0	0	0	0	1	0	0	1	0	1
<i>Pterygoplichthys pardalis</i> (Castelnau 1855)	0	0	0	0	1	3	0	1	3	0	4
<i>Pterygoplichthys punctatus</i> (Kner 1854)	0	0	0	0	0	4	0	0	4	0	4
<i>Rineloricaria</i> sp.	0	0	0	0	0	4	0	0	4	0	4
<i>Squaliforma horrida</i> (Kner 1854)	0	0	1	0	0	0	0	0	1	1	0
<i>Sturisoma cf. rostratum</i> (Spix & Agassiz 1829)	0	0	3	0	1	8	0	1	11	3	9
Family Cetopsidae											
<i>Cetopsis coecutiens</i> (Lichtenstein 1819)	0	6	0	0	0	0	0	6	0	6	0
Family Auchenipteridae											
<i>Ageneiosus inermis</i> (Linnaeus 1766)	0	0	1	0	0	6	0	0	7	1	6
<i>Ageneiosus</i> sp.	4	2	12	2	0	30	6	2	42	18	32
<i>Ageneiosus ucayalensis</i> Castelnau 1855	0	2	6	0	0	15	0	2	21	8	15
<i>Auchenipterichthys longimanus</i> (Günther 1864)	2	8	0	25	18	0	27	26	0	10	43
<i>Auchenipterus ambyiacus</i> Fowler 1915	0	0	6	0	0	6	0	0	12	6	6
<i>Auchenipterus cf. nuchalis</i> (Spix & Agassiz 1829)	1	2	6	0	2	0	1	4	6	9	2
<i>Centromochlus existimatus</i> Mees 1974	0	4	28	0	0	0	0	4	28	32	0
<i>Centromochlus heckelii</i> (De Filippi 1853)	0	0	6	0	0	1	0	0	7	6	1
<i>Tatia intermedia</i> (Steindachner 1877)	0	1	0	0	0	0	0	1	0	1	0
<i>Tatia melanoleuca</i> Vari & Calegari 2014	0	21	0	0	2	0	0	23	0	21	2
<i>Tatia nigra</i> Sarmento-Soares & Martins-Pinheiro 2008	0	0	0	3	0	0	3	0	0	0	3
<i>Tatia</i> sp.	0	2	2	0	0	0	0	2	2	4	0
<i>Trachelyichthys decaradiatus</i> Mees 1974	0	0	0	17	0	0	17	0	0	0	17
<i>Trachelyopterus galeatus</i> (Linnaeus 1766)	2	0	0	10	112	233	12	112	233	2	355
<i>Tympanopleura atronasus</i> (Eigenmann & Eigenmann	0	0	1	0	0	9	0	0	10	1	9
<i>Tympanopleura longipinna</i> Walsh, Ribeiro & Rapp Py-Daniel 2015	0	0	4	0	0	1	0	0	5	4	1
<i>Tympanopleura rondoni</i> (Miranda-Ribeiro 1914)	0	0	3	0	0	13	0	0	16	3	13

Taxon	River Margin (RM)			Floodplain lake (FL)			RM & FL			RM	FL
	BW	CW	WW	BW	CW	WW	BW	CW	WW		
Family Doradidae											
<i>Agamyxis pectinifrons</i> (Cope 1870)	0	0	0	0	0	2	0	0	2	0	2
<i>Anadoras grypus</i> (Cope 1872)	0	0	0	0	0	88	0	0	88	0	88
<i>Anduzedoras oxyrhynchus</i> (Valenciennes 1821)	0	0	1	0	0	0	0	0	1	1	0
<i>Astrodoras</i> sp.	0	0	0	0	0	1	0	0	1	0	1
<i>Hassar orestis</i> (Steindachner 1875)	20	35	1	0	14	0	20	49	1	56	14
<i>Hemidoras morei</i> (Steindachner 1881)	0	0	2	0	0	0	0	0	2	2	0
<i>Nemadoras elongatus</i> (Boulenger 1898)	0	0	1	0	0	0	0	0	1	1	0
<i>Opsodoras morei</i> (Steindachner 1881)	0	0	0	2	0	0	2	0	0	0	2
<i>Ossancora asterophysa</i> Birindelli & Sabaj Pérez 2011	0	0	0	0	0	23	0	0	23	0	23
<i>Oxydoras niger</i> (Valenciennes 1821)	0	0	0	0	0	7	0	0	7	0	7
<i>Platydoras armatulus</i> (Valenciennes 1840)	0	0	0	0	0	2	0	0	2	0	2
<i>Pterodoras</i> sp.	0	0	1	0	0	3	0	0	4	1	3
<i>Scorpiodoras heckelii</i> (Kner 1855)	8	0	0	4	0	0	12	0	0	8	4
<i>Trachydoras brevis</i> (Kner 1853)	0	0	0	0	0	1	0	0	1	0	1
<i>Trachydoras nattereri</i> (Steindachner 1881)	0	0	1	0	0	69	0	0	70	1	69
<i>Trachydoras</i> sp.	0	0	2	0	0	4	0	0	6	2	4
<i>Trachydoras steindachneri</i> (Perugia 1897)	0	0	5	0	0	1	0	0	6	5	1
Family Heptapteridae											
<i>Pimelodella</i> cf. <i>cristata</i> (Müller & Troschel 1849)	11	3	0	0	6	0	11	9	0	14	6
<i>Pimelodella</i> cf. <i>laticeps</i> Eigenmann 1917	0	0	2	0	5	230	0	5	232	2	235
<i>Pimelodella</i> sp. A	0	0	13	0	0	361	0	0	374	13	361
<i>Pimelodella</i> sp. B	0	0	2	0	0	0	0	0	2	2	0
Family Pimelodidae											
<i>Brachyplatystoma vaillantii</i> (Valenciennes 1840)	0	0	1	0	0	1	0	0	2	1	1
<i>Calophysus macropterus</i> (Lichtenstein 1819)	0	0	13	0	0	9	0	0	22	13	9
<i>Hemisorubim platyrhynchos</i> (Valenciennes 1840)	0	0	0	0	0	1	0	0	1	0	1
<i>Hypophthalmus edentatus</i> Spix and Agassiz 1829	0	0	0	0	0	2	0	0	2	0	2
<i>Hypophthalmus fimbriatus</i> Kner 1858	0	1	1	0	3	0	0	4	1	2	3
<i>Hypophthalmus marginatus</i> Valenciennes 1840	0	0	19	0	0	0	0	0	19	19	0
<i>Pimelodus blochii</i> Valenciennes 1840	11	0	18	0	0	54	11	0	72	29	54
<i>Pimelodus tetramerus</i> Ribeiro & Lucena 2006	21	27	2	0	44	6	21	71	8	50	50
<i>Platysilurus mucosus</i> (Vaillant 1880)	0	0	2	0	0	0	0	0	2	2	0
<i>Propimelodus</i> cf. <i>eigenmanni</i> (Van der Stigchel 1946)	0	0	52	0	0	0	0	0	52	52	0
<i>Pseudoplatystoma fasciatum</i> (Linnaeus 1766)	0	0	0	0	0	3	0	0	3	0	3
<i>Pseudoplatystoma punctifer</i> (Castelnau 1855)	0	0	0	0	0	2	0	0	2	0	2
<i>Pseudoplatystoma tigrinum</i> (Valenciennes 1840)	0	0	0	0	0	7	0	0	7	0	7
<i>Sorubim elongatus</i> Littmann, Burr, Schmidt & Isern	0	0	0	0	0	1	0	0	1	0	1
<i>Sorubim lima</i> (Bloch & Schneider 1801)	0	0	5	0	1	9	0	1	14	5	10
<i>Sorubim maniradii</i> Littmann, Burr & Buitrago-Suarez	0	2	0	0	0	2	0	2	2	2	2
<i>Sorubimichthys planiceps</i> (Spix & Agassiz 1829)	0	1	0	0	1	1	0	2	1	1	2
Order Gobiiformes											
Family Eleotridae											
<i>Leptophilypnion pusillus</i> Roberts 2013	0	0	0	1	0	0	1	0	0	0	1
<i>Microphilypnus ternetzi</i> Myers 1927	0	0	0	123	4	0	123	4	0	0	127
Order Synbranchiformes											
Family Synbranchidae											
<i>Synbranchus madeirae</i> Rosen & Rumney 1972	0	0	1	0	0	0	0	0	1	1	0
Order Pleuronectiformes											
Family Achiridae											
<i>Hypoclinemus mentalis</i> (Günther 1862)	0	3	1	0	27	0	0	30	1	4	27

Taxon	River Margin (RM)			Floodplain lake (FL)			RM & FL			RM	FL
	BW	CW	WW	BW	CW	WW	BW	CW	WW		
Order Cichliformes											
Family Cichlidae											
<i>Acarichthys heckelii</i> (Müller & Troschel 1849)	6	13	0	223	84	3	229	97	3	19	310
<i>Acaronia nassa</i> (Heckel 1840)	0	0	0	5	0	4	5	0	4	0	9
<i>Apistogramma cf. gephyra</i> Kullander 1980	0	0	0	1	0	0	1	0	0	0	1
<i>Apistogramma pertensis</i> (Haseman 1911)	0	0	0	3	6	0	3	6	0	0	9
<i>Apistogramma regani</i> Kullander 198	0	0	0	3	0	58	3	0	58	0	61
<i>Astronotus ocellatus</i> (Agassiz 1831)	0	0	0	0	0	2	0	0	2	0	2
<i>Biotoecus opercularis</i> (Steindachner 1875)	0	0	0	156	26	0	156	26	0	0	182
<i>Chaetobranchopsis orbicularis</i> (Steindachner 1875)	0	0	0	0	0	14	0	0	14	0	14
<i>Cichla monoculus</i> Spix & Agassiz 1831	0	0	0	0	20	12	0	20	12	0	32
<i>Cichla pinima</i> Kullander & Ferreira 2006	23	28	0	7	25	0	30	53	0	51	32
<i>Cichlasoma amazonarum</i> Kullander 1983	0	0	0	0	0	1	0	0	1	0	1
<i>Crenicichla acutirostris</i> Günther 1862	1	0	0	1	1	0	2	1	0	1	2
<i>Crenicichla cf. inpa</i> Ploeg 1991	0	0	0	0	0	4	0	0	4	0	4
<i>Crenicichla johanna</i> Heckel 1840	0	0	0	0	1	0	0	1	0	0	1
<i>Crenicichla macropthalma</i> Heckel 1840	2	1	0	0	0	0	2	1	0	3	0
<i>Crenicichla marmorata</i> Pellegrin 1904	0	0	0	1	0	0	1	0	0	0	1
<i>Crenicichla multispinosa</i> (Pellegrin 1903)	0	0	0	0	1	0	0	1	0	0	1
<i>Crenicichla regani</i> Ploeg 1989	0	1	0	2	0	0	2	1	0	1	2
<i>Crenicichla reticulata</i> (Heckel 1840)	0	4	2	0	0	3	0	4	5	6	3
<i>Crenicichla sp.</i>	0	0	0	3	2	0	3	2	0	0	5
<i>Geophagus altifrons</i> Heckel 1840	188	57	16	30	224	5	218	281	21	261	259
<i>Geophagus sp.</i>	0	2	0	2	102	12	2	104	12	2	116
<i>Hypselecara temporalis</i> (Günther 1862)	0	0	0	1	0	2	1	0	2	0	3
<i>Laetacara curviceps</i> (Ahl 1923)	0	0	0	26	2	4	26	2	4	0	32
<i>Mesonauta festivus</i> (Heckel 1840)	21	0	0	10	0	199	31	0	199	21	209
<i>Mesonauta insignis</i> (Heckel 1840)	0	0	0	16	1	95	16	1	95	0	112
<i>Pterophyllum scalare</i> (Schultze 1823)	0	0	0	0	0	33	0	0	33	0	33
<i>Satanoperca acuticeps</i> (Heckel 1840)	1	0	0	12	4	1	13	4	1	1	17
<i>Satanoperca daemon</i> (Heckel 1840)	0	0	0	5	0	0	5	0	0	0	5
<i>Satanoperca jurupari</i> (Heckel 1840)	0	0	1	0	3	58	0	3	59	1	61
<i>Taeniacara candidi</i> Myers 1935	0	0	0	0	2	0	0	2	0	0	2
Order Cyprinodontiformes											
Family Fluviphylacidae											
<i>Fluviphylax cf. simplex</i> Costa 1996	0	0	0	10	0	0	10	0	0	0	10
Family Poeciliidae											
<i>Pamphorichthys scalpridens</i> (Garman 1895)	6	0	0	23	0	15	29	0	15	6	38
Order Beloniformes											
Family Hemiramphidae											
<i>Hyporhamphus brederi</i> (Fernández-Yépez 1948)	1	1	2	0	0	0	1	1	2	4	0
Family Belonidae											
<i>Potamorhaphis guianensis</i> (Jardine 1843)	0	0	1	0	0	5	0	0	6	1	5
<i>Pseudotylorus angusticeps</i> (Günther 1866)	0	1	0	0	0	0	0	1	0	1	0
<i>Pseudotylorus microps</i> (Günther 1866)	0	7	6	1	0	0	1	7	6	13	1
Order Tetraodontiformes											
Family Tetraodontidae											
<i>Colomesus asellus</i> (Müller & Troschel 1849)	17	50	12	0	1	0	17	51	12	79	1
Order Perciformes											
Family Sciaenidae											
<i>Pachypops fourcroyi</i> (Lacepède 1802)	26	33	13	0	5	2	26	38	15	72	7
<i>Pachypops pigmaeus</i> Casatti 2002	0	2	0	0	0	0	0	2	0	2	0
<i>Plagioscion auratus</i> (Castelnau 1855)	0	3	4	0	0	27	0	3	31	7	27
<i>Plagioscion squamosissimus</i> (Heckel 1840)	21	13	12	7	2	77	28	15	89	46	86
Order Ceratodontiformes											
Family Lepidosirenidae											
<i>Lepidosiren paradoxa</i> Fitzinger 1837	0	0	0	0	0	1	0	0	1	0	1

¹ Taxonomy follows: Eschmeyer WN, Van de Laan, R., Fricke R. 2019. Eschmeyer's catalog of fishes. <http://researcharchive.calacademy.org/research/ichthyology/catalog/fishcatmain.asp> (Electronic version: accessed 01 October 2019); Fricke R, Eschmeyer WN, Fong JD. 2019. Species by family/sub-family In Eschmeyer's Catalog of fishes. <http://researcharchive.calacademy.org/research/ichthyology/catalog/SpeciesByFamily.asp> (Electronic version accessed 01 October 2019).

Table S4. Permutational multivariate analysis of variance (PERMANOVA) comparisons of fish assemblage structure between blackwater (BW), clearwater (CW), and whitewater (WW) systems of the Santarém region. All comparisons are significant at $\alpha = 0.001$. DF = degrees of freedom.

Comparison	River Margins (RM)			Floodplain lakes (FL)			Pooled RM and FL		
	Pseudo <i>F</i>	R	DF	Pseudo <i>F</i>	R	DF	Pseudo <i>F</i>	R	DF
Global (BW-CW=WW)	4.5	0.47	2, 33	5.0	0.48	2, 34	7.4	0.41	2, 68
BW-CW	2.4	0.31	1, 22	2.6	0.32	1, 22	3.8	0.27	1, 46
BW-WW	5.0	0.44	1, 21	6.2	0.47	1, 22	8.5	0.4	1, 45
CW-WW	5.9	0.47	1, 21	6.2	0.47	1, 22	9.8	0.42	1, 45

Table S5. Results of generalized linear mixed models (GLMMs) for the effect of water type (BW = blackwater, CW = clearwater, WW = whitewater) and habitat type (river margin, floodplain lake) on fish biomass, abundance, and richness. For each response variable we repeat the GLMM with the exclusion/inclusion of outlier sample events, and with the following data filtering procedures: For *biomass*: exclusion of large individuals (those with a mass exceeding 3 standard deviations of the mean fish mass for all our combined samples). For abundance and richness: exclusion of rare species (species represented by < 4 individuals in all our combined samples), exclusion of dominant species (the top 10% most numerically abundant species, in all our combined samples), exclusion of both rare and dominant species. Results are divided into: a. Type-3 Wald’s test. b. Number of fish and sample event numbers for each water type/habitat combination. c. Marginal and conditional R² values. d. Tukey post-hoc comparisons of disparities between all water type/habitat combinations. Here only significant disparities at $\alpha = 0.05$ are shown. e. Least square means and 95% confidence intervals. f. Original means.

a.				Wald’s tests (bold = significant at alpha = 0.05)								
				Water type (WT)			Habitat type (HT)			WT:HT interaction		
Response	Outlier sample events	Data filtering	Figure	Chi-sq	d.f	<i>p</i>	Chi-sq	d.f.	<i>p</i>	Chi-sq	d.f.	<i>p</i>
Biomass	Excluded	None	Fig. 5b	57.5	2	3.3E-13	3.321	1	0.07	28.3	2	7.0E-07
Biomass	Included	None	-	21.1	2	2.6E-05	1.143	1	0.28	10.9	2	4.3E-03
Biomass	Excluded	Large individuals removed	-	29.9	2	3.2E-07	0.660	1	0.41	23.8	2	6.6E-06
Abundance	Excluded	None	Fig. 5c	22.4	2	1.4E-05	0.003	1	0.96	20.2	2	2.7E-07
Abundance	Included	None	-	9.9	2	7.3E-03	0.221	1	0.64	18.4	2	1.0E-04
Abundance	Excluded	Rare species excluded	-	2.3	2	1.2E-05	0.001	1	0.97	3.2	2	1.1E-07
Abundance	Excluded	Dominant species excluded	-	26.2	2	2.0E-06	0.415	1	0.52	20.8	2	3.1E-05
Abundance	Excluded	Rare and dominant species excluded	-	36.4	2	1.3E-08	0.792	1	0.37	28.7	2	5.9E-07
Richness	Excluded	None	Fig. 5a	32.1	2	1.1E-07	1.130	1	0.29	14.9	2	5.9E-04
Richness	Included	None	-	23.3	2	8.6E-06	0.850	1	0.36	11.0	2	4.0E-03
Richness	Excluded	Rare species excluded	-	43.1	2	4.4E-10	2.387	1	0.12	23.4	2	8.4E-06
Richness	Excluded	Dominant species excluded	-	40.4	2	1.7E-09	0.718	1	0.40	11.0	2	4.2E-03
Richness	Excluded	Rare and dominant species excluded	-	48.2	2	3.4E-11	1.217	1	0.27	16.2	2	3.0E-04

b.				n. fish / n. sample events						
Response	Outlier sample events	Data filtering	n fish	BW RM	BW FL	CW RM	CW FL	WW RM	WW FL	TOTAL
Biomass	Excluded	None	20070	12	11	12	10	11	12	68
Biomass	Included	None	22398	12	12	12	12	11	12	71
Biomass	Excluded	Large individuals removed	18449	11	11	11	10	10	12	65
Abundance	Excluded	None	13904	11	12	12	10	9	11	65
Abundance	Included	None	22398	12	12	12	12	11	12	71
Abundance	Excluded	Rare species excluded	13772	11	12	12	10	9	11	65
Abundance	Excluded	Dominant species excluded	5192	12	11	10	11	9	12	65
Abundance	Excluded	Rare and dominant species excluded	5063	12	11	10	11	9	12	65
Richness	Excluded	None	21344	12	12	10	12	10	12	68
Richness	Included	None	22398	12	12	12	12	11	12	71
Richness	Excluded	Rare species excluded	21197	12	12	10	12	10	12	68
Richness	Excluded	Dominant species excluded	5879	12	11	10	11	9	12	65
Richness	Excluded	Rare and dominant species excluded	5881	12	11	11	12	10	12	68

c.			R ² values	
Response	Outlier sample events	Data filtering	Marginal R ²	Conditional R ²
Biomass	Excluded	None	0.429	0.573
Biomass	Included	None	0.284	0.489
Biomass	Excluded	Large individuals removed	0.428	0.618
Abundance	Excluded	None	0.136	0.803
Abundance	Included	None	0.085	0.796
Abundance	Excluded	Rare species excluded	0.141	0.807
Abundance	Excluded	Dominant species excluded	0.22	0.73
Abundance	Excluded	Rare and dominant species excluded	0.224	0.734
Richness	Excluded	None	0.216	0.681
Richness	Included	None	0.188	0.709
Richness	Excluded	Rare species excluded	0.222	0.673
Richness	Excluded	Dominant species excluded	0.293	0.613
Richness	Excluded	Rare and dominant species excluded	0.292	0.6

d.			Tukey post-hoc comparisons (bold = significant at alpha = 0.05)					
Response	Outlier sample events	Data filtering	BWF-BWR		BWF-CWF		BWF-CWR	
				<i>p</i>		<i>p</i>		<i>p</i>
Biomass	Excluded	None	BWF-BWR	0.4512	BWF-CWF	1	BWF-CWR	0.9459
Biomass	Included	None	BWF-BWR	0.8937	BWF-CWF	0.8462	BWF-CWR	0.9988
Biomass	Excluded	Large individuals removed	BWF-BWR	0.9654	BWF-CWF	0.9493	BWF-CWR	0.9332
Abundance	Excluded	None	BWF-BWR	1	BWF-CWF	0.3768	BWF-CWR	0.9961
Abundance	Included	None	BWF-BWR	0.9972	BWF-CWF	0.9998	BWF-CWR	1
Abundance	Excluded	Rare species excluded	BWF-BWR	1	BWF-CWF	0.35	BWF-CWR	0.9965
Abundance	Excluded	Dominant species excluded	BWF-BWR	0.9656	BWF-CWF	0.9999	BWF-CWR	0.9953
Abundance	Excluded	Rare and dominant species excluded	BWF-BWR	0.949	BWF-CWF	0.9999	BWF-CWR	0.9968
Richness	Excluded	None	BWF-BWR	0.8961	BWF-CWF	0.8951	BWF-CWR	0.9096
Richness	Included	None	BWF-BWR	0.9411	BWF-CWF	0.9414	BWF-CWR	0.7567
Richness	Excluded	Rare species excluded	BWF-BWR	0.6349	BWF-CWF	0.6984	BWF-CWR	0.7428
Richness	Excluded	Dominant species excluded	BWF-BWR	0.9584	BWF-CWF	0.8748	BWF-CWR	0.9234
Richness	Excluded	Rare and dominant species excluded	BWF-BWR	0.8801	BWF-CWF	0.7847	BWF-CWR	0.8079

BWF-WWF	<i>p</i>	BWF-WWR	<i>p</i>	BWR-CWF	<i>p</i>	BWR-CWR	<i>p</i>	BWR-WWF	<i>p</i>	BWR-WWR	<i>p</i>
BWF<WWF	<.0001	BWF-WWR	0.7118	BWR-CWF	0.5677	BWR-CWR	0.9309	BWR-WWF	<.0001	BWR-WWR	0.9991
BWF<WWF	0.0001	BWF-WWR	0.9643	BWR-CWF	1	BWR-CWR	0.9847	BWR-WWF	0.0092	BWR-WWR	0.9999
BWF<WWF	<.0001	BWF-WWR	0.9974	BWR-CWF	1	BWR-CWR	1	BWR-WWF	0.0003	BWR-WWR	0.8017
BWF<WWF	0.0309	BWF>WWR	0.0173	BWR-CWF	0.435	BWR-CWR	0.9979	BWR-WWF	0.0326	BWR>WWR	0.0238
BWF<WWF	0.0484	BWF-WWR	0.1668	BWR-CWF	1	BWR-CWR	0.9892	BWR-WWF	0.1466	BWR-WWR	0.0539
BWF<WWF	0.0319	BWF>WWR	0.0096	BWR-CWF	0.3922	BWR-CWR	0.9976	BWR-WWF	0.0363	BWR>WWR	0.0124
BWF<WWF	<.0001	BWF-WWR	0.8117	BWR-CWF	0.8962	BWR-CWR	0.7857	BWR-WWF	0.0002	BWR-WWR	0.3254
BWF<WWF	<.0001	BWF-WWR	0.721	BWR-CWF	0.8673	BWR-CWR	0.7678	BWR-WWF	0.0003	BWR-WWR	0.208
BWF<WWF	<.0001	BWF-WWR	0.9454	BWR-CWF	1	BWR-CWR	1	BWR-WWF	0.0003	BWR-WWR	1
BWF<WWF	0.0001	BWF-WWR	0.9076	BWR-CWF	1	BWR-CWR	0.9981	BWR-WWF	0.004	BWR-WWR	1
BWF<WWF	<.0001	BWF-WWR	0.9664	BWR-CWF	1	BWR-CWR	1	BWR-WWF	<.0001	BWR-WWR	0.986
BWF<WWF	<.0001	BWF-WWR	0.3769	BWR-CWF	0.9998	BWR-CWR	1	BWR-WWF	<.0001	BWR-WWR	0.8648
BWF<WWF	<.0001	BWF-WWR	0.4704	BWR-CWF	1	BWR-CWR	1	BWR-WWF	<.0001	BWR-WWR	0.9741

CWF-CWR	<i>p</i>	CWF-WWF	<i>p</i>	CWF-WWR	<i>p</i>	CWR-WWF	<i>p</i>	CWR-WWR	<i>p</i>	WWR-WWF	<i>p</i>
CWF-CWR	0.9775	CWF<WWF	<.0001	CWF-WWR	0.8053	CWR<WWF	<.0001	CWR-WWR	0.9933	WWR<WWF	<.0001
CWF-CWR	0.9657	CWF<WWF	0.0236	CWF-WWR	0.999	CWR<WWF	0.0007	CWR-WWR	0.998	WWR<WWF	0.0056
CWF-CWR	1	CWF<WWF	0.0004	CWF-WWR	0.7734	CWR<WWF	0.0005	CWR-WWR	0.7323	WWR<WWF	<.0001
CWF-CWR	0.6852	CWF<WWF	<.0001	CWF-WWR	0.7795	CWR<WWF	0.0081	CWR-WWR	0.0647	WWR<WWF	<.0001
CWF-CWR	0.9983	CWF<WWF	0.1234	CWF-WWR	0.1201	CWR<WWF	0.0372	CWR-WWR	0.2401	WWR<WWF	<.0001
CWF-CWR	0.6491	CWF<WWF	<.0001	CWF-WWR	0.7006	CWR<WWF	0.0088	CWR-WWR	0.0379	WWR<WWF	<.0001
CWF-CWR	0.9997	CWF<WWF	<.0001	CWF-WWR	0.9058	CWR<WWF	<.0001	CWR-WWR	0.9775	WWR<WWF	<.0001
CWF-CWR	0.9999	CWF<WWF	<.0001	CWF-WWR	0.8348	CWR<WWF	<.0001	CWR-WWR	0.9383	WWR<WWF	<.0001
CWF-CWR	1	CWF<WWF	0.0003	CWF-WWR	1	CWR<WWF	0.0011	CWR-WWR	1	WWR<WWF	0.0006
CWF-CWR	0.998	CWF<WWF	0.004	CWF-WWR	1	CWR<WWF	0.0191	CWR-WWR	0.9997	WWR<WWF	0.0097
CWF-CWR	1	CWF<WWF	<.0001	CWF-WWR	0.9932	CWR<WWF	0.0002	CWR-WWR	0.9939	WWR<WWF	<.0001
CWF-CWR	1	CWF<WWF	<.0001	CWF-WWR	0.9505	CWR<WWF	0.0002	CWR-WWR	0.9562	WWR<WWF	0.0038
CWF-CWR	1	CWF<WWF	<.0001	CWF-WWR	0.9931	CWR<WWF	<.0001	CWR-WWR	0.994	WWR<WWF	0.0002

e.

			Least square (ls) means and lowe (L) and upper (U) 95% confidence intervals								
			BW RM			BW FL			CW RM		
Response	Outlier sample events	Data filtering	ls mean	L 95%	U 95%	ls mean	L 95%	U 95%	ls mean	L 95%	U 95%
Biomass	Excluded	None	8.04	7.52	8.57	7.6	7.07	8.14	7.82	7.29	8.34
Biomass	Included	None	8.03	7.4	8.67	7.67	7.04	8.31	7.81	7.17	8.44
Biomass	Excluded	Large individuals removed	7.35	6.7	8.01	7.11	6.46	7.75	7.39	6.74	8.04
Abundance	Excluded	None	4.74	3.74	5.73	4.75	3.76	5.74	4.62	3.63	5.61
Abundance	Included	None	4.9	3.74	6.05	4.75	3.6	5.9	4.7	3.55	5.86
Abundance	Excluded	Rare species excluded	4.73	3.73	5.73	4.73	3.74	5.73	4.61	3.61	5.6
Abundance	Excluded	Dominant species excluded	4	3.35	4.66	3.82	3.15	4.48	3.69	3.02	4.37
Abundance	Excluded	Rare and dominant species excluded	3.99	3.33	4.65	3.79	3.12	4.45	3.67	2.99	4.35
Richness	Excluded	None	2.92	2.49	3.34	2.73	2.3	3.16	2.92	2.48	3.36
Richness	Included	None	2.91	2.45	3.37	2.72	2.25	3.19	3	2.53	3.46
Richness	Excluded	Rare species excluded	2.88	2.49	3.27	2.64	2.24	3.04	2.87	2.46	3.28
Richness	Excluded	Dominant species excluded	2.62	2.25	3	2.47	2.08	2.85	2.66	2.26	3.07
Richness	Excluded	Rare and dominant species excluded	2.57	2.23	2.92	2.39	2.03	2.75	2.61	2.25	2.96

CW FL			WW RM			WW FL		
ls mean	L 95%	U 95%	ls mean	L 95%	U 95%	ls mean	L 95%	U 95%
7.64	7.09	8.18	7.95	7.42	8.49	9.21	8.68	9.73
8.09	7.43	8.75	7.96	7.31	8.61	9.18	8.55	9.82
7.37	6.72	8.03	6.97	6.31	7.63	8.62	7.98	9.26
4.21	3.2	5.22	3.8	2.78	4.83	5.54	4.55	6.54
4.84	3.68	6	4.02	2.86	5.18	5.62	4.47	6.77
4.18	3.17	5.2	3.74	2.71	4.77	5.53	4.53	6.53
3.76	3.1	4.43	3.5	2.81	4.19	4.94	4.28	5.59
3.73	3.07	4.4	3.43	2.74	4.12	4.91	4.25	5.56
2.92	2.49	3.34	2.9	2.46	3.34	3.63	3.22	4.05
2.91	2.45	3.37	2.94	2.46	3.41	3.62	3.17	4.08
2.86	2.47	3.26	2.77	2.36	3.18	3.54	3.16	3.92
2.67	2.3	3.05	2.84	2.45	3.23	3.49	3.13	3.85
2.61	2.26	2.95	2.7	2.34	3.06	3.38	3.05	3.71

f.			Original means						
			unit	BW RM	BW FL	CW RM	CW FL	WW RM	WW FL
Biomass	Excluded	None	grams	3813.9	1973.4	2609.4	2363.1	3177.6	11378.6
Biomass	Included	None	grams	3813.9	2333.6	2609.4	4409.3	3177.6	11378.6
Biomass	Excluded	Large individuals removed	grams	1950.3	1194.7	1553.8	1860.1	1094.9	7737.4
Abundance	Excluded	None	n	223.3	209.9	144.9	97.4	38.2	533.8
Abundance	Included	None	n	341.5	209.9	144.9	347.2	82.8	747.1
Abundance	Excluded	Rare species excluded	n	222.1	208.2	143.5	96.0	36.1	529.5
Abundance	Excluded	Dominant species excluded	n	78.5	54.5	35.9	58.1	31.9	197.1
Abundance	Excluded	Rare and dominant species excluded	n	77.3	52.8	35.0	56.8	29.8	192.6
Richness	Excluded	None	n	20.6	16.3	17.5	21.2	19.5	43.9
Richness	Included	None	n	20.6	16.3	21.1	21.2	22.8	43.9
Richness	Excluded	Rare species excluded	n	19.7	14.8	16.7	20.0	16.9	39.7
Richness	Excluded	Dominant species excluded	n	14.9	12.3	14.1	16.0	17.9	36.5
Richness	Excluded	Rare and dominant species excluded	n	14.0	11.5	13.5	14.8	15.3	32.3

