Pinto & Smith, 2023. Impacts of sedimentation and dam failure on the macroinvertebrate community in a tropical stream. Limnetica 42-1, 2023: 19-36

SUPPLEMENTARY INFORMATION

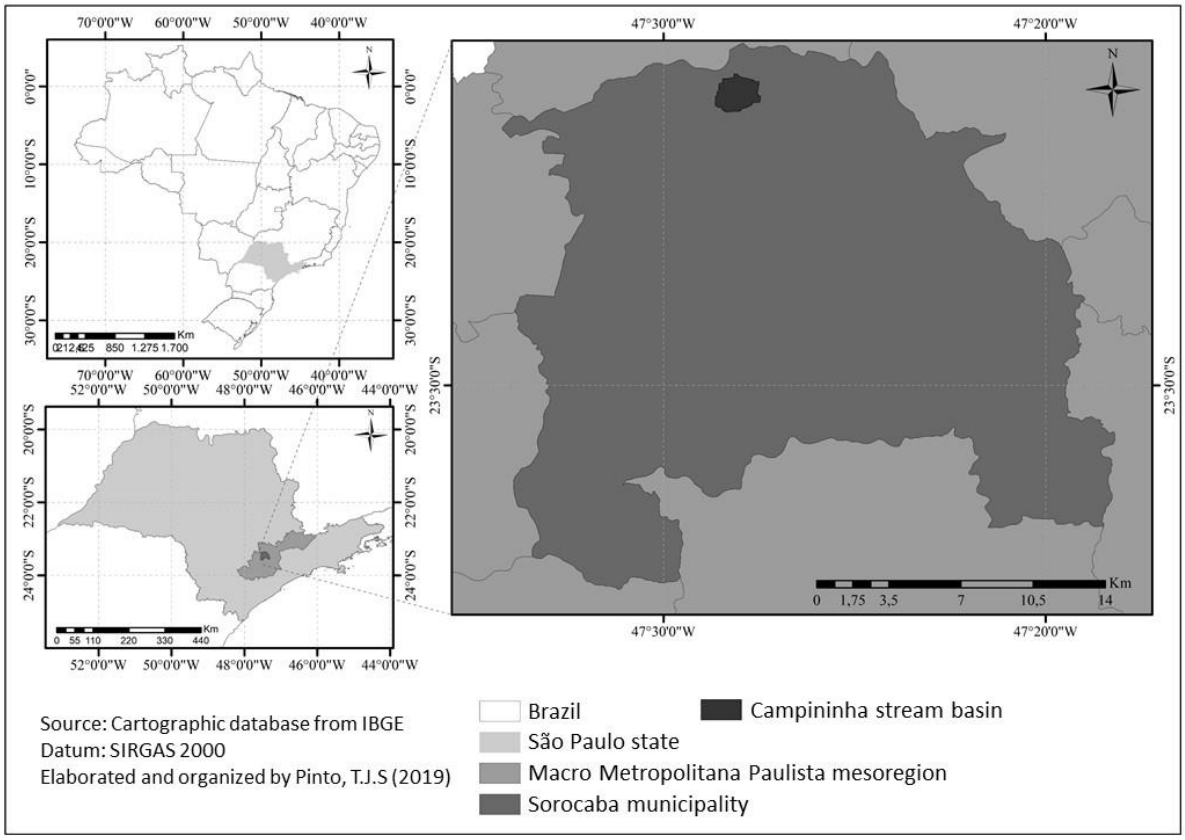

Figure S1 – Campininha stream basin localization map at the Sorocaba municipality (São Paulo State, Brazil). – *Mapa de localização da bacia do riacho da Campininha, no município de Sorocaba (Estado de São Paulo, Brasil).*

Figure S2 - Campininha stream in the periods before and after the dam rupture, evidencing (a) and (b) the reservoir with erosion in the banks; (c) reservoir area and (d) stream stretch, post dam rupture. **-** *Riacho da Campininha nos períodos antes e após o rompimento da barragem, evidenciando em (a) e (b) o reservatório com erosão nas margens; (c) área do reservatório e (d) um trecho do riacho após a ruptura da barragem.* **Source:** Adapted from Moreira (2016)

Figure S3 - Campininha stream evidencing (a) and (b) the sampling point P2 with riparian vegetation and silting, and (c) and (d) the P3 with siltation and grass in banks. **–** *Riacho da Campininha, evidenciando em (a) e (b) o ponto amostral P2 com vegetação ripária e assoreamento das margens e em (c) e (d) o P3 com assoreamento e capim nas margens*. **Source:** Adapted from Moreira (2016)

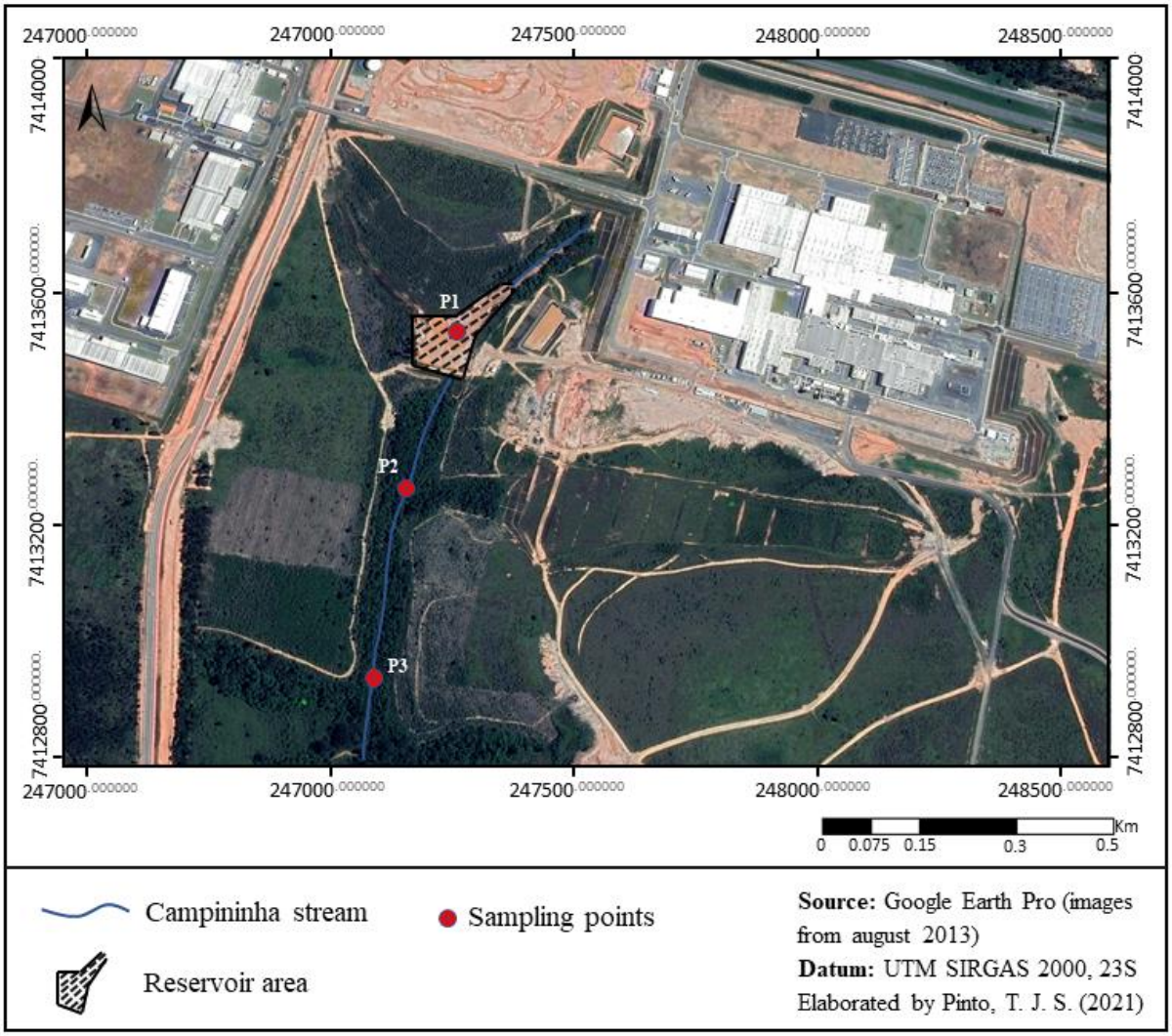

Figure S4 – Campininha stream localization map evidencing the sampling points and the reservoir area. – *Mapa de localização do riacho da Campininha, evidenciando os pontos amostrais e a área de reservatório.*

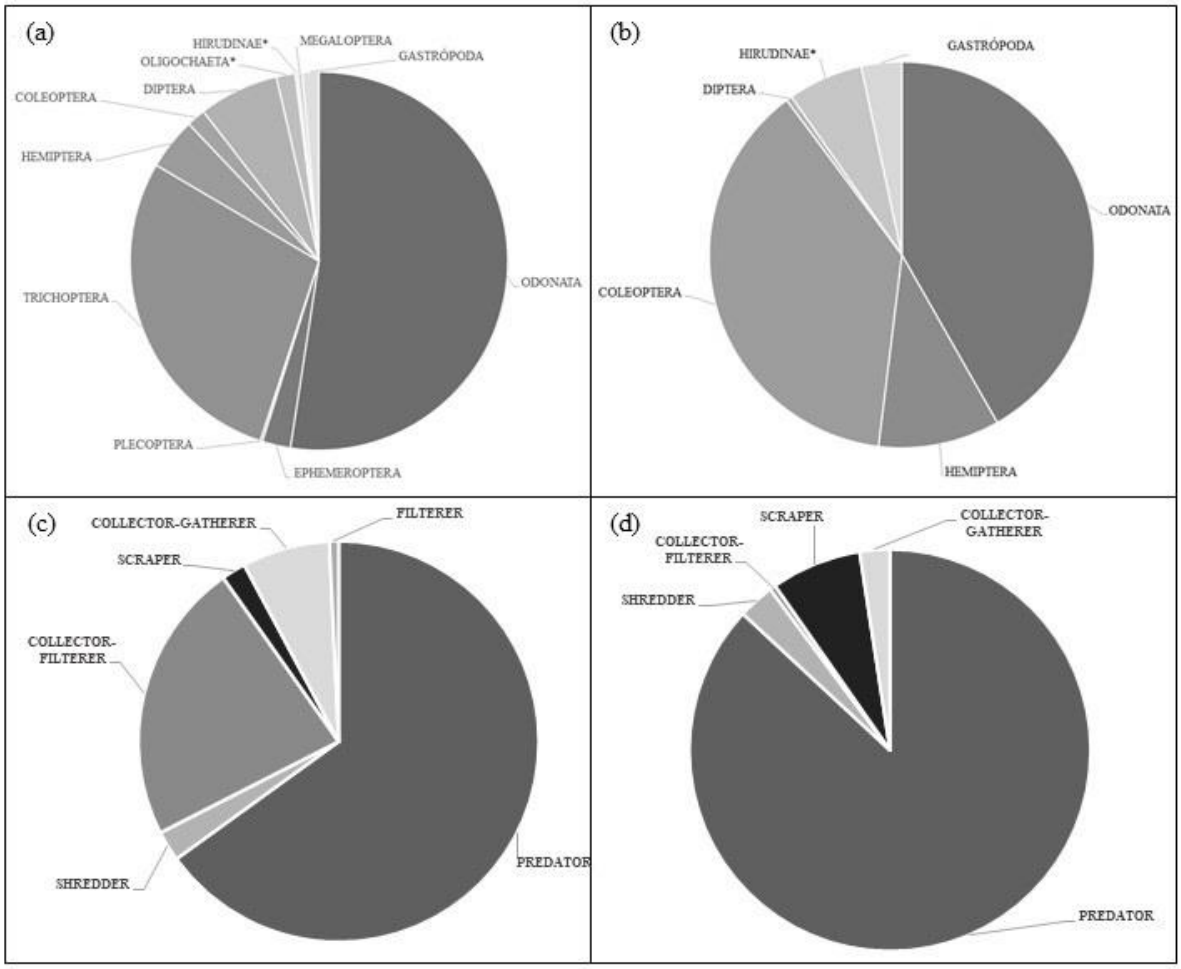

Figure S5 – Orders distribution for the pre- (a) and post-rupture (b) periods and for the functional feeding groups in the periods before- (c) and post-rupture (d) of the dam. – *Distribuição das ordens para os períodos de pré- (a) e pós-rompimento (b) e para os grupos funcionais alimentares nos períodos anterior (c) e após (d) o rompimento da barragem.* *Oligochaeta and Hirudinea correspond to subclasses.

Table S1 – Water parameter (mean ± SD) in the pre-rupture period (n = 4). For this period, the P1 was located at the reservoir, and P2 and P3 were downstream. **–** *Parâmetros da água (média ± DP) no período de pré-ruptura (n = 4). Para esse período, o P1 estava localizado no reservatório e P2 e P3 a sua jusante.*

Parameter	P1				P2				P3			
	2010	2011	2012	2013	2010	2011	2012	2013	2010	2011	2012	2013
pH	6.88 ± 0.03	7.05 ± 0.27	7.67 ± 1.23	7.03 ± 0.35	6.84 ± 0.33	7.02 ± 0.43	7.28 ± 0.72	7.03 ± 0.47	7.04 ± 0.48	7.15 ± 0.51	7.69 ± 0.89	7.10 ± 0.36
OD (mg/L^{-1})	7.45 ± 0.07	6.27 ± 1.42	5.73 ± 1.14	4.10 ± 0.57	8.00 ± 0.28	6.50 ± 0.90	4.35 ± 0.51	4.55 ± 0.78	7.90 ± 0.42	6.61 ± 1.65	5.40 ± 0.43	3.90 ± 0.14
Water-color (µH)	2783 ± 2001	376 ± 501	3227 ± 2203	197 ± 85	1694 ± 1503	589 ± 407	2326 ± 2425	74 ± 24	1068 ± 895	632 ± 715	2106 ± 2267	72 ± 18
Turbidity (NTU)	559 ± 556	702 ± 270	439 ± 199	149 ± 95	504 ± 606	291 ± 50	291 ± 195	74 ± 54	207 ± 220	194 ± 56	239 ± 195	53 ± 25

Table S2 - Water parameter (mean ± SD) in the pre- (n = 16) and post-rupture (n = 5) periods. For the pre-rupture period the P1 was located at reservoir and post-rupture P1 was located at the stream. – *Parâmetros da água (média ± DP) nos períodos de pré- (n = 16) e pós-ruptura (n = 5). Para o período de pré-ruptura o P1 estava localizado no reservatório e após a ruptura o P1 estava localizado no riacho.*

Period	Pre-rupture			Post-rupture		
	P1	**P2**	**P3**	**P1**	**P2**	**P3**
pH	7.14 ± 0.66	7.03 ± 0.46	7.21 ± 0.58	6.44 ± 0.75	6.51 ± 0.54	6.81 ± 0.34
OD (mg L^{-1})	6.28 ± 1.70	6.03 ± 1.69	6.19 ± 1.70	5.54 ± 0.99	5.81 ± 0.70	5.38 ± 0.42
Watercolor (µH)	1399.10 ± 1785.72	1019.20 ± 1484.46	902.60 ± 1340.58	892 ± 1738.15	1274 ± 1219.95	1230 ± 1351.70
Turbidity (NTU)	405.58 ± 319.05	236.18 ± 233.68	158.18 ± 132.33	30.24 ± 9.69	253.60 ± 331.65	248.62 ± 272.88

Table S3 – Distribution of the orders and families for the macroinvertebrate fauna in pre- (T1 until T4) and post-rupture periods (T5 and T6). Where T1 = 2010, T2 = 2011, T3 = 2012, T4 = 2013, T5 = 2014, T6 = 2015, n = 4. – *Distribuição das ordens e famílias da fauna de macroinvertebrados nos períodos de pré- (T1 à T4) e pós-ruptura (T5 e T6). Sendo T1 = 2010, T2 = 2011, T3 = 2012, T4 = 2013, T5 = 2014, T6 = 2015, n = 4.*

Order	Family	P1						P2						P3					
		T1	T2	T3	T4	T5	T6	T1	T2	T3	T4	T5	T6	T1	T2	T3	T4	T5	T6
Odonata	Coenagrionidae	4	-	14	23	17	16	3	4	1	-	2	5	-	4	-	1	7	5
	Calopterygidae	-	-	-	-	-	-	-	-	9	6	2	-	1	-	-	-	-	10
	Libellulidae	3	-	2	59	6	5	-	3	3	5	-	-	-	2	4	2	2	3
	Aeshnidae	-	-	1	-	2	-	-	-	-	-	-	-	1	2	-	-	-	-
	Gomphidae	2	5	2	4	4	-	1	-	2	2	-	-	30	6	3	3	-	-
	Corduliidae	3	-	-	-	-	-	2	-	-	-	-	-	3	-	-	-	-	-
Hemiptera	Protoneuridae	-	1	1	-	-	-	-	-	3	-	-	-	-	-	5	-	-	-
	Belostomatidae	6	-	4	5	3	2	-	-	2	-	3	2	-	-	-	3	-	2
	Notonectidae	-	-	-	-	1	-	-	-	-	1	-	-	-	-	-	-	-	-
	Corixidae	1	-	-	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Coleoptera	Elmidae	-	-	-	-	4	1	-	-	-	-	-	-	-	-	-	-	1	-
	Girinidae	-	-	-	-	1	7	-	-	-	-	-	-	-	-	-	-	1	-
	Dytiscidae	-	-	-	-	3	37	-	-	-	1	2	10	-	-	-	-	-	6
	Hydrophilidae	-	4	-	-	-	4	-	1	-	-	-	-	-	-	1	1	-	1
Diptera	Chironomidae	4	1	-	-	-	-	-	4	-	-	-	-	1	1	-	-	-	-
	Tipulidae	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
	Culicidae	1	-	-	1	1	-	1	-	-	1	-	-	-	-	-	-	-	-
	Ceratopogonidae	2	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-
	Tabanidae	2	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Simullidae	-	1	-	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-
Megaloptera	Corydalidae	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ephemeroptera	Baetidae	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
	Caenidae	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-

	Ephemeridae	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Plecoptera	Gripopterygidae	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
	Odontoceridae	-	-	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trichoptera	Hydropsychidae	57	1	-	-	-	-	17	12	-	-	-	-	1	1	-	-	-	-
	Leptoceridae	2	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-
Gastropoda	Physidae	-	-	-	7	7	-	-	-	-	-	-	-	-	-	-	-	-	-
	Oligochaeta*	6	-	1	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-
	Hirudinae*	1	-	-	-	13	-	-	-	-	-	-	-	-	-	-	-	-	-

T1 = 2010, T2 = 2011, T3 = 2012, T4 = 2013, T5 = 2014, T6 = 2015

*Subclass

Table S4: Values of biological indexes (mean ± SD) at pre- (n = 16) and post-rupture (n = 5) periods of the dam at Campininha stream with a description of the expected and observed effects. – *Valores dos índices biológicos (média ± DP) nos períodos de pré e pós rompimento da barragem no riacho da Campininha, com a descrição dos efeitos esperados e observados.*

	Pre-rupture			Post-rupture			Expected effect[+]			Observed effect		
	P1*	**P2**	**P3**	**P1**	**P2**	**P3**	**P1**	**P2**	**P3**	**P1**	**P2**	**P3**
Richness	3.46 ± 3.18	2.62 ± 2.43	2.46 ± 1.61	6.25 ± 4.57	2 ± 1.82	2.5 ± 3.0	↓	↓	↓	↑	↓	↑
Dominance	0.37 ± 0.29	0.51 ± 0.34	0.34 ± 0.23	0.18 ± 0.14	0.43 ± 0.42	0.17 ± 0.22	↓	↓	↓	↓	↓	↓
Shannon diversity	0.78 ± 0.68	0.61 ± 0.56	0.73 ± 0.49	1.29 ± 0.91	0.57 ± 0.68	0.65 ± 0.78	↓	↓	↓	↑	↓	↓
Equitability	0.56 ± 0.37	0.73 ± 0.36	0.66 ± 0.40	0.52 ± 0.35	0.70 ± 0.47	0.38 ± 0.44	↓	↓	↓	↓	↓	↓
EPT	0.16 ± 0.31	0.15 ± 0.32	0.02 ± 0.06	0	0	0	↓	↓	↓	↓	↓	↓
BMWP	14.15 ± 12.3	12 ± 10	10 ± 6.7	27 ± 19	11.25 ± 10.8	13.50 ± 16.3	↓	↓	↓	↑	↑	↑
Density	204.27 ± 231.90	76.92 ± 88.59	68.38 ± 91.83	394.44 ± 326.66	72.22 ± 84.38	105.56 ± 141.86	↓↑	↓↑	↓↑	↑	↓	↑
EPT/Chidae	0.001 ± 0.004	0	0	0	0	0	↓	↓	↓	↓	○	○
Chdae/Diptera	0.08 ± 0.19	0.08 ± 0.28	0.12 ± 0.30	0	0	0	↑	↑	↑	↓	↓	↓
%Coleoptera	2.56 ± 9.24	2.06 ± 5.04	4.49 ± 11.08	22.73 ± 31.05	21.85 ± 28.09	11.03 ± 13.12	↓	↓	↓	↑	↑	↑
%Trichoptera	15.98 ± 30.38	13.90 ± 31.06	1.78 ± 5.54	0	0	0	↓↑	↓↑	↓↑	↓	↓	↓
%Odonata	41 ± 37.54	50.50 ± 41.63	55.66 ± 39.64	28 ± 21.18	21. 64 ± 27.43	37.12 ± 43.31	↓↑	↓↑	↓↑	↓	↓	↓
%Diptera	4.49 ± 7.62	13.19 ± 29.57	6.02 ± 11.78	0.71 ± 1.43	0	0	↑	↑	↑	↓	↓	↓
%Gastropoda	1.46 ± 3.59	0	0	5 ± 10	0	0	↓↑	↓↑	↓↑	↑	○	○
%Chironomidae	1.50 ± 3.69	3.85 ± 13.87	2.82 ± 6.92	0	0	0	↑	↑	↑	↓	↓	↓
%Sensitive	5.31 ± 15.73	13.77 ± 29	0.26 ± 0.96	0	7.14 ± 14.28	9.26 ± 18.52	↓	↓	↓	↓	↓	↑
%Moderate	64.84 ± 42.35	65.29 ± 42.99	68.96 ± 40.96	59.53 ± 42.92	67.86 ± 47.20	40.74 ± 49.41	↓↑	↓↑	↓↑	↓	↑	↓

%Tolerant	6.77 ± 11.38	5.56 ± 14.04	7.69 ± 12.48	15.47 ± 19.33	0	0	↑	↑	↑	↑	↓	↓
%Shredder	4.70 ± 13.77	2.09 ± 5.73	0	3.20 ± 5.52	0	2.27 ± 4.54	↓	↓	↓	↓	↓	↑
%Collector-gatherer	6.43 ± 13.32	5.36 ± 17.28	9.23 ± 12.68	1.39 ± 2.78	0	0.92 ± 1.85	↓↑	↓↑	↓↑	↓	↓	↓
%Predator	51.66 ± 41.01	55.74 ± 45.84	64.95 ± 38.34	58.98 ± 41.22	75 ± 50	46.80 ± 54.09	↓↑	↓↑	↓↑	↑	↑	↓
%Filterer	0.64 ± 2.31	7.69 ± 27.73	0.96 ± 3.47	0	0	0	↓	↓	↓	↓	↓	↓
%Scraper	1.68 ± 3.58	0	0	10.71 ± 12.86	0	0	↓	↓	↓	↑	○	○
% Collector-filterer	11.81 ± 29.41	13.74 ± 31.47	1.78 ± 5.54	0.71 ± 1.43	0	0	↓↑	↓↑	↓↑	↓	↓	↓

***** The P1. at pre-rupture period. was located at the dam site and post-rupture the point was located on the lotic system (stream);

[+] Expected effect for the index based on the impacts assessed in Campininha stream and the expected responses by (Baptista et al., 2013; Couceiro et al., 2012; Helson & Williams, 2013; Oliveira et al., 2011b) to tropical freshwater ecosystems.

↓↑ Varied effect; ↓ Decrease; ↑ Increase; ○ no-effect occurred