

**Knowledge and Management of Aquatic Ecosystems
Supplementary Material Appendix S1**

**Do alpine macroinvertebrates recover differently in lakes and rivers
after alien fish eradication?**

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Table S1 Faunal assemblage of aquatic macroinvertebrates inhabiting Lake Dres (Western Italian Alps), its inflowing river (R1 and R1') and its outflowing river (R2 and R2') classified into Functional Feeding Groups (FFG) and Ecological Groups (EG). Community data are offered on frequency of occurrence in the samples (F%) and relative abundances (A%). R1' and R2' were sampled once in August 2016 (only A% is therefore provided); R1 and R2 were sampled 11 and Lake Dres 12 times in 2013-2017.

Classification scheme	OTU names and abbreviations		FFG	EG	R1'	R1		Lake Dres		R2		R2'
					A%	F%	A%	F%	A%	F%	A%	A%
ARTHROPODA												
Class: Insecta												
Ord.: Plecoptera	Gen. <i>Chloroperla</i>	plechl	PRE	NB	1.2	58.8	2.3	13.9	0.1	2.9	<0.1	0.3
	Gen. <i>Leuctra</i>	pleleu	SHR	NB	10.7	79.4	6.5	27.8	0.2	47.1	2.9	5.0
	Gen. <i>Nemoura</i>	plenem	SHR	NB	9.4	73.5	4.0	55.5	2.0	44.1	1.9	1.3
	Gen. <i>Nemurella</i>	plenml	SHR	NB	-	5.9	0.1	33.3	2.1	20.1	0.2	-
	Gen. <i>Protonemoura</i>	plepro	SHR	NB	11.2	55.9	4.3	11.1	0.1	58.8	5.3	1.0
	Gen. <i>Isoperla</i>	pleiso	PRE	NB	1.5	32.4	0.6	2.8	0.1	35.3	2.5	0.3
	Gen. <i>Perlodes</i>	pleper	PRE	NB	-	41.2	1.7	5.6	0.1	14.7	0.3	-
	Gen. <i>Dictyogenus</i>	pledic	PRE	NB	0.3	23.5	0.4	-	-	2.9	0.0	-
Ord.: Ephemeroptera	Gen. <i>Baetis</i>	ephbae	GAT	NB	9.5	82.4	8.1	-	-	61.8	2.4	38.0
	Gen. <i>Ecdyonurus</i>	ephecd	SCR	NB	19.1	100	19.8	19.4	0.1	32.3	0.9	3.3
	Gen. <i>Epeorus</i>	ephepe	SCR	NB	-	11.8	0.6	-	-	-	-	-
	Gen. <i>Rhithrogena</i>	ephrho	SCR	NB	6.9	64.7	16.5	-	-	20.6	0.2	1.3
Ord.: Trichoptera	Fam. Limnephilidae	trilim	SHR	NB	12.1	61.7	1.4	58.3	7.6	2.9	0.0	0.3
	Fam. Philopotamidae	triphi	FIL	NB	0.1	2.9	<0.1	2.8	0.1	14.7	0.4	-
	Fam. Rhyacophilidae	trirhy	PRE	NB	-	14.7	0.1	2.8	<0.1	67.6	3.6	-
	Fam. Sericostomatidae	triser	SHR	NB	2.5	23.5	0.8	-	-	2.9	0.0	0.3
Ord.: Coleoptera	Fam. Dytiscidae	coldyt	PRE	NB	-	2.9	<0.1	25.0	0.1	2.9	0.0	-
	Fam. Dytiscidae larve	coldyl	PRE	NB	-	-	-	41.7	1.1	8.8	0.0	-
	Fam. Elmidae/Elminthidae	colelm	SCR	NB	-	2.9	<0.1	-	-	-	-	-
	Fam. Hydraenidae	colhyd	SCR	NB	-	-	-	-	-	5.9	<0.01	-
Ord.: Odonata	Gen. <i>Aeschna</i>	odoaes	PRE	NB	-	-	-	5.6	<0.1	-	-	-
Ord.: Diptera	Fam. Athericidae	dipath	PRE	NB	1.0	14.7	0.1	-	-	20.6	0.3	0.7
	Fam. Blephariceridae	dipble	SCR	NB	-	2.9	0.1	-	-	-	-	1.7
	Fam. Ceratopogonidae	dipcer	PRE	NB	-	2.9	<0.1	-	-	5.9	0.1	11.2
	Fam. Chironomidae	dipchi	GAT	B	11.8	94.1	16.1	100	55.7	91.2	35.4	-
	Fam. Chironomidae pupae	dipchp	GAT	NB	-	20.6	0.7	36.1	1.0	38.2	2.5	-
	Fam. Limoniidae	diplim	PRE	B	-	11.8	0.2	19.4	0.1	11.8	3.7	0.7
	Fam. Psychodidae	dippsy	GAT	NB	-	-	-	-	-	8.8	0.5	-
	Fam. Simuliidae	dipsim	FIL	NB	-	50.0	13.6	-	-	26.5	1.5	32.0
	Fam. Stratiomyidae	dipstr	GAT	NB	-	2.9	<0.1	-	-	-	-	-
Ord.: Heteroptera	Fam. Corixidae	etecor	GAT	NB	-	2.9	<0.1	36.1	4.1	2.9	<0.1	-
Class: Arachnida												
Subclass: Acari												
	Hydracnida	hydrac	PRE	NB	0.7	14.7	0.1	55.6	2.4	11.1	0.7	-
MOLLUSCA												
Class: Gastropoda												
	Gen. <i>Lymnea</i>	gaslym	SCR	NB	-	-	-	5.6	<0.1	-	-	-
Class: Bivalvia												
	Gen. <i>Pisidium</i>	bivpis	FIL	B	-	-	-	80.5	17.3	-	-	-
PLATYHELMINTHES												
Ord.: Tricladida	Gen. <i>Crenobia</i>	tricre	PRE	NB	-	44.1	1.2	13.9	0.1	88.2	32.6	1.7
ANNELIDA												
Subclass: Hirudinea												
	Gen. <i>Helobdella</i>	iruhel	PRE	NB	-	-	-	-	-	-	-	-
Subclass: Oligochaeta												
	Fam. Enchytraeidae	olienc	GAT	B	-	11.8	0.1	-	-	20.6	0.5	-
	Fam. Haplotaxidae	olihap	GAT	B	-	2.9	<0.1	16.7	0.3	-	-	-
	Fam. Lumbricidae	olilub	GAT	B	-	-	-	5.6	<0.1	-	-	-
	Fam. Lumbriculidae	olilum	GAT	B	-	11.8	0.1	72.2	4.2	29.4	1.2	-
	Fam. Naididae	olinai	SCR	NB	-	-	-	2.8	<0.1	5.9	0.1	-
	Fam. Tubificidae	olitub	GAT	B	0.7	11.8	0.2	41.7	0.8	20.6	0.7	1.0

FFG-PRE: predators; FFG-SHR: shredders; FFG-GAT: gathering collectors; FFG-SCR: scrapers/grazers; FFG-FIL: filtering collectors; EG-NB: no-burrower macroinvertebrates; EG-B: burrower macroinvertebrates.

Table S2 Parameters for the macroinvertebrate length-mass equation: $W = a L^b$, where W is dry mass in mg, L is total body length in mm, and a and b are constants. L was the maximum length (usually the distance between the anterior part of the head and the posterior part of the last segment) without including caudal appendices; casebearing caddisflies were extracted from their case.

Classification scheme	OTU names	a	b	Reference
ARTHROPODA				
Class: Insecta				
Ord.: Plecoptera	Gen. <i>Chloroperla</i>	0.0065	2.724	Benke et al., 1999
	Gen. <i>Leuctra</i>	0.0028	2.719	Benke et al., 1999
	Gen. <i>Nemoura</i>	0.0056	2.762	Benke et al., 1999
	Gen. <i>Nemurella</i>	0.0056	2.762	Benke et al., 1999
	Gen. <i>Protonemoura</i>	0.0056	2.762	Benke et al., 1999
	Gen. <i>Isoperla</i>	0.0196	2.742	Benke et al., 1999
	Gen. <i>Perlodes</i>	0.0196	2.742	Benke et al., 1999
	Gen. <i>Dictyogenus</i>	0.0196	2.742	Benke et al., 1999
Ord.: Ephemeroptera	Gen. <i>Baetis</i>	0.0053	2.875	Benke et al., 1999
	Gen. <i>Ecdyonurus</i>	0.0108	2.754	Benke et al., 1999
	Gen. <i>Epeorus</i>	0.0108	2.754	Benke et al., 1999
	Gen. <i>Rhithrogena</i>	0.0108	2.754	Benke et al., 1999
Ord.: Trichoptera	Fam. Limnephilidae	0.0040	2.933	Benke et al., 1999
	Fam. Philopotamidae	0.0050	2.511	Benke et al., 1999
	Fam. Rhyacophilidae	0.0099	2.480	Benke et al., 1999
	Fam. Sericostomatidae	0.0074	2.741	Benke et al., 1999
Ord.: Coleoptera	Fam. Dytiscidae	0.0039	3.111	Benke et al., 1999
	Fam. Dytiscidae larve	0.0037	2.753	Benke et al., 1999
	Fam. Elmidae/Elminthidae	0.0084	2.879	Benke et al., 1999
	Fam. Hydraenidae	0.0084	2.879	Benke et al., 1999
Ord.: Odonata	Gen. <i>Aeschna</i>	0.0082	2.813	Benke et al., 1999
Ord.: Diptera	Fam. Athericidae	0.0040	2.586	Benke et al., 1999
	Fam. Blephariceridae	0.0067	3.292	Benke et al., 1999
	Fam. Ceratopogonidae	0.0025	2.469	Benke et al., 1999
	Fam. Chironomidae	0.0018	2.617	Benke et al., 1999
	Fam. Chironomidae pupae	0.0046	2.530	Methot et al., 2012
	Fam. Limoniidae	0.0054	2.546	Benke et al., 1999
	Fam. Psychodidae	0.0018	2.617	Benke et al., 1999
	Fam. Simuliidae	0.0020	3.011	Benke et al., 1999
	Fam. Stratyomidae	0.0054	2.546	Benke et al., 1999
Ord.: Heteroptera	Fam. Corixidae	0.0031	2.904	Benke et al., 1999
Class: Arachnida				
Subclass: Acari	Hydracnida			Baumgarten and Rothaupt, 2003
MOLLUSCA				
Class: Gastropoda	Gen. <i>Lymnea</i>	0.0776	2.900	Methot et al., 2012
Class: Bivalvia	Gen. <i>Pisidium</i>	0.0163	2.477	Benke et al., 1999-
PLATYHELMINTHES				
Ord.: Tricladida	Gen. <i>Crenobia</i>	0.0082	2.168	Benke et al., 1999
ANNELIDA				
Subclass: Hirudinea	Gen. <i>Helobdella</i>	-0.0029	1.752	Rivera-Usme et al., 2014
Subclass: Oligochaeta	Fam. Enchytraeidae	0.0001	3.250	Miserendino, 2001
	Fam. Haplotaxidae	0.0758	0.740	Miserendino, 2001
	Fam. Lumbricidae	0.0001	3.250	Miserendino, 2001
	Fam. Lumbriculidae	0.0001	3.250	Miserendino, 2001
	Fam. Naididae	0.0758	0.740	Miserendino, 2001
	Fam. Tubificidae	0.0758	0.740	Miserendino, 2001

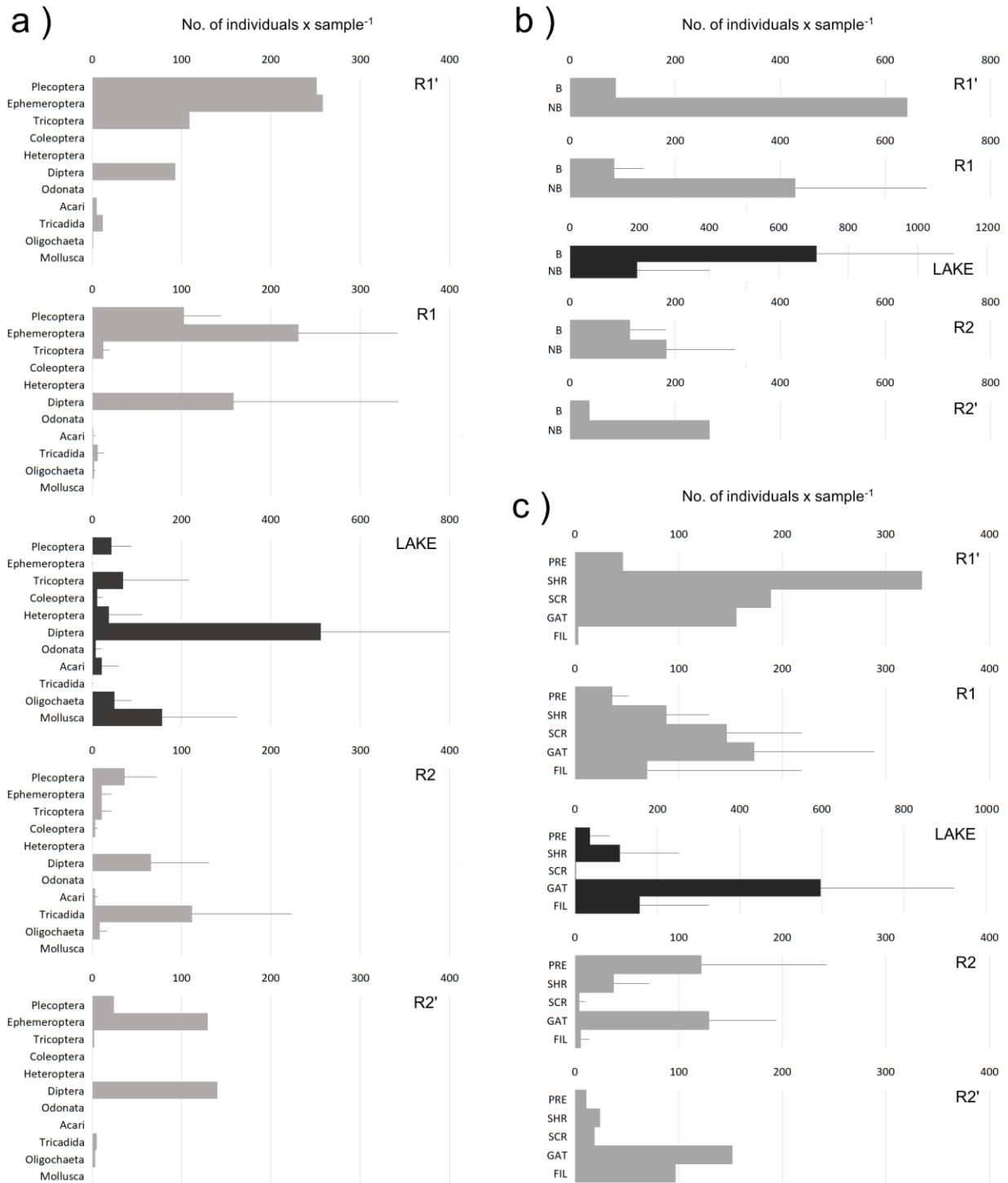


Fig. S1 Macroinvertebrate communities collected at the sampling sites R1', R1, Lake Dres, R2, and R2' in the Gran Paradiso National Park (Western Italian Alps): panel a): coarse taxonomic composition; Panel b): ecological groups (B: borrowers; NB: non-borrowers); panel c): functional feeding groups (PRE: predators; SHR: shredders; SCR: scrapers of grazers; GAT: gathering collectors; FIL: filtering collectors). Mean \pm SD abundances are provided for repeated samples in R1 (N=11), R2 (N=11) and Lake Dres (N=12). Note that macroinvertebrate densities from riverine and lacustrine habitats are not comparable due to the use of different sampling methods.

Table S3 Generalized Linear Model outputs ($\beta \pm SE$ and associated p-values) describing the effects of i) time elapsed from the beginning of a fish eradication action (TIME, in years), ii) seasonality (DAY, days elapsed from the 1st of June), and iii) microhabitat (MICROHABITAT, based on sampled substrates) on macroinvertebrate diversity and on the abundance of macroinvertebrate functional feeding groups (FFG) and ecological groups (EG) in Lake Dres, its inlet – R1, and outlet – R2.

Models	Intercept	TIME	DAY	MICROHABITAT							
				San-Bou	Gra-Bou	Peb-Bou	Mos-Bou	San-Gra	Peb-Gra	Mos-Gra	Mos-Peb
Richness											
R1 – Inlet	8.81±1.36 <0.001	0.30±0.37 0.42	0.014±0.014 0.30	-	-1.41±1.34 0.30	2.55±1.31 0.06	-2.14±2.48 0.39	-	3.96±1.34 <0.01	-0.73±2.49 0.77	-4.69±2.48 0.07
Lake	7.44±0.97 <0.001	0.80±0.26 <0.01	0.001±0.009 0.94	0.00±0.90 1.00	-3.75±0.90 <0.001	-	-	-3.75±0.09 <0.001	-	-	-
R2 – Outlet	11.43±1.67 <0.001	-0.20±0.45 0.65	-0.015±0.016 0.35	-	0.80±1.57 0.62	-0.90±1.52 0.56	2.46±2.79 0.39	-	-0.90±1.52 0.56	2.46±2.79 0.39	2.46±2.79 0.39
Shannon – H											
R1 – Inlet	1.71±0.15 <0.001	0.00±0.04 0.94	0.001±0.002 0.62	-	-0.06±0.14 0.68	0.21±0.14 0.15	0.01±0.27 0.96	-	0.27±0.14 0.07	0.07±0.27 0.78	-0.19±0.27 0.47
Lake	0.69±0.13 <0.001	0.12±0.03 <0.01	0.002±0.001 0.05	-0.24±0.12 <0.05	0.19±0.12 0.12	-	-	0.43±0.12 <0.001	-	-	-
R2 – Outlet	1.76±0.21 <0.001	0.01±0.05 0.83	-0.004±0.002 <0.05	-	-0.01±0.19 0.98	0.05±0.19 0.78	0.46±0.34 0.18	-	0.05±0.19 0.78	0.46±0.34 0.19	0.46±0.34 0.19
Simpson											
R1 – Inlet	4.96±0.77 <0.001	-0.15±0.21 0.46	-0.005±0.008 0.52	-	-0.30±0.76 0.70	0.63±0.74 0.40	-0.08±1.40 0.95	-	0.93±0.76 0.23	0.21±1.41 0.88	-0.71±1.40 0.61
Lake	1.44±0.31 <0.001	0.21±0.08 <0.05	0.006±0.003 0.06	-0.32±0.29 0.28	0.54±0.29 0.07	-	-	-0.86±0.29 <0.01	-	-	-
R2 – Outlet	4.77±0.68 <0.001	0.03±0.18 0.86	-0.015±0.006 <0.05	-	-0.18±0.63 0.78	0.22±0.62 0.73	1.42±1.13 0.22	-	0.22±0.62 0.73	1.42±1.13 0.22	1.42±0.13 0.22
FFG – PRE											
R1 – Inlet	-2.33±0.77 <0.01	0.20±0.18 0.28	0.000±0.008 0.95	-	2.56±0.83 <0.01	-0.52±0.67 0.45	2.32±1.81 0.21	-	-0.52±0.67 0.44	2.82±1.81 0.21	2.84±1.79 0.12
Lake	-0.90±0.89 0.32	0.45±0.15 <0.01	0.016±0.006 <0.05	-1.75±0.65 <0.05	-0.73±0.44 0.11	-	-	-1.02±0.70 0.15	-	-	-
R2 – Outlet	-4.79±1.22 <0.001	0.14±0.24 0.58	0.010±0.009 0.28	-	5.57±1.28 <0.001	4.34±0.93 <0.001	6.79±0.94 <0.001	-	-1.24±1.26 0.33	1.21±1.29 0.35	2.45±0.75 <0.01
FFG – SHR											
R1 – Inlet	-0.32±0.43 0.46	0.11±0.13 0.40	-0.005±0.005 0.30	-	1.46±0.63 <0.05	-1.26±0.40 <0.01	1.69±1.13 0.15	-	-2.72±0.63 <0.001	0.23±1.22 0.85	2.95±1.14 <0.05
Lake	2.47±0.64 <0.001	0.39±0.15 <0.05	0.006±0.005 0.28	-2.35±1.07 <0.05	0.27±0.42 0.52	-	-	-2.62±1.06 <0.05	-	-	-
R2 – Outlet	-3.19±0.73 <0.001	-0.49±0.22 <0.05	-0.02±0.01 <0.05	-	7.00±1.12 <0.001	4.14±0.64 <0.001	5.52±0.87 <0.001	-	-2.86±1.05 <0.05	-1.47±1.24 0.25	1.38±0.78 0.09
FFG – GAT											
R1 – Inlet	-0.04±0.63 0.95	0.10±0.17 0.55	0.001±0.007 0.88	-	2.04±0.73 <0.01	-1.32±0.57 <0.05	0.79±2.83 0.78	-	-3.37±0.72 <0.001	-1.25±2.85 0.66	2.11±2.84 0.46
Lake Dres	5.31±0.35 <0.001	-0.01±0.09 0.89	0.006±0.003 0.07	0.62±0.32 0.06	-0.04±0.37 0.89	-	-	0.67±0.33 <0.05	-	-	-
R2 – Outlet	-2.51±0.79 <0.01	-0.30±0.21 0.16	-0.005±0.008 0.59	-	6.00±1.13 <0.001	3.65±0.68 <0.001	5.45±0.89 <0.001	-	-2.35±1.11 <0.05	-0.55±1.27 0.67	1.79±0.85 <0.05
FFG – SCR											
R1 – Inlet	-0.92±0.60 0.14	0.14±0.14 0.32	0.000±0.006 0.99	-	2.28±0.76 <0.01	-0.21±0.54 0.69	2.46±1.14 0.09	-	-2.50±0.66 <0.001	0.18±1.46 0.91	2.67±1.38 0.06
Lake Dres	-0.51±0.97 0.61	0.14±0.28 0.63	-0.004±0.009 0.69	-1.39±1.23 0.27	-0.28±0.84 0.73	-	-	-1.10±1.27 0.40	-	-	-
R2 – Outlet	-6.91±1.51 <0.001	0.000±0.307 1.00	-0.01±0.01 0.27	-	5.89±2.31 <0.05	5.03±1.21 <0.001	7.42±1.26 <0.001	-	-0.86±2.21 0.70	1.53±2.25 0.50	2.39±0.80 <0.01
FFG – FIL											
R1 – Inlet	-0.03±0.65 0.96	0.33±0.20 0.11	-0.008±0.008 0.34	-	-1.56±2.53 0.54	-4.35±1.35 <0.01	-1.34±4.60 0.77	-	-2.79±2.84 0.33	0.22±5.23 0.97	3.01±4.79 0.53
Lake Dres	5.75±0.28 <0.001	-0.47±0.11 <0.001	0.000±0.003 0.89	3.53±0.84 <0.001	0.00±1.18 1.00	-	-	3.53±0.084 <0.001	-	-	-
R2 – Outlet	-4.83±2.10 <0.05	-1.02±0.82 0.22	-0.03±0.02 0.27	-	-8.44±7474 1.00	4.79±2.05 <0.05	6.90±2.16 <0.01	-	13.23±7474 1.00	15.35±7474 1.00	2.11±1.54 0.18
EG – NB											
R1 – Inlet	0.98±0.43 <0.05	0.19±0.12 0.12	-0.003±0.005 0.59	-	1.39±0.61 <0.05	-1.29±0.38 <0.01	1.19±1.40 0.40	-	-2.68±0.61 <0.001	-0.20±1.47 0.89	2.48±1.41 0.09
Lake Dres	0.61±0.67 0.37	0.50±0.11 <0.001	0.010±0.004 <0.05	-1.88±0.55 <0.01	0.03±0.28 0.90	-	-	-1.91±0.55 <0.01	-	-	-
R2 – Outlet	-3.26±0.91 <0.01	-0.06±0.20 0.78	0.002±0.007 0.84	-	5.73±1.13 <0.001	4.12±0.73 <0.001	6.33±0.80 <0.001	-	-1.61±1.11 0.16	0.60±1.17 0.61	2.21±0.68 <0.01
EG – B											
R1 – Inlet	-0.75±0.68 0.28	-0.01±0.18 0.95	0.003±0.008 0.68	-	2.44±0.74 <0.01	-1.27±0.62 0.05	1.78±2.16 0.42	-	-3.71±0.70 <0.001	-0.66±2.18 0.76	3.05±2.17 0.17
Lake Dres	5.00±0.38 <0.001	-0.15±0.09 0.10	0.004±0.003 0.19	-	-1.19±0.33 <0.01	-	-	0.06±0.41 0.88	-	-	-
R2 – Outlet	-2.74±0.84 <0.01	-0.29±0.22 0.19	-0.004±0.009 0.65	-	6.09±1.18 <0.001	3.75±0.73 <0.001	5.67±0.91 <0.001	-	-2.35±1.14 <0.05	-0.42±1.28 0.75	1.93±0.85 <0.05

FFG-PRE: predators; FFG-SHR: shredders; FFG-GAT: gathering collectors; FFG-SCR: scrapers or grazers; FFG-FIL: filtering collectors; EG-NF: non-fossorial macroinvertebrates; EG-F: fossorial macroinvertebrates; San: mud/sand; Bou: boulders; Gra: gravel; Peb: pebbles; Mos: aquatic mosses.

Table S4 Multiple Regression Model outputs ($\beta \pm SE$ and associated p-values) describing the effects of i) time elapsed from the beginning of a fish eradication action (TIME, in years), ii) seasonality (DAY, days elapsed from the 1st of June), and iii) microhabitat (MICROHABITAT, based on sampled substrates) on the biomass of macroinvertebrate functional feeding groups (FFG) and ecological groups (EG) in Lake Dres, its inlet – R1, and outlet – R2.

Models	Intercept	TIME	DAY	MICROHABITAT							
				San-Bou	Gra-Bou	Peb-Bou	Mos-Bou	San-Gra	Peb-Gra	Mos-Gra	Mos-Peb
FFG – PRE biomass											
R1 – Inlet	-0.99±0.61 0.12	0.01±0.16 0.95	-0.001±0.006 0.88	-	2.21±0.60 <0.05	-0.42±0.59 0.48	2.71±1.11 <0.05	-	-2.63±0.60 <0.001	0.50±1.12 0.66	3.13±1.11 <0.01
Lake	1.76±0.45 <0.001	0.45±0.11 <0.001	0.002±0.004 0.61	-2.06±0.42 <0.001	-0.32±0.42 0.45	-	-	1.71±0.42 <0.001	-	-	-
R2 – Outlet	-3.17±0.79 <0.001	-0.22±0.22 0.33	0.003±0.008 0.73	-	4.73±0.96 <0.001	3.48±0.74 <0.001	4.41±0.79 <0.001	-	-1.25±0.99 0.22	-0.31±1.04 0.76	0.930±0.80 0.26
FFG – SHR biomass											
R1 – Inlet	-0.35±0.53 0.51	-0.02±0.14 0.41	-0.004±0.006 0.41	-	1.15±0.53 <0.05	-1.47±0.51 <0.01	2.65±0.97 <0.05	-	-2.62±0.53 <0.001	1.50±0.98 0.14	4.12±0.9 <0.001
Lake	1.64±0.60 <0.05	0.73±0.16 <0.001	0.010±0.006 0.07	-2.27±0.56 <0.001	-0.39±0.56 0.49	-	-	1.89±0.56 <0.01	-	-	-
R2 – Outlet	-2.96±0.57 <0.001	-0.26±0.16 0.11	-0.017±0.006 <0.01	-	4.78±0.70 <0.001	3.41±0.54 <0.001	4.90±0.57 <0.001	-	-1.37±0.72 0.07	0.12±0.75 0.87	1.50±0.58 <0.05
FFG – GAT biomass											
R1 – Inlet	-0.39±0.47 0.41	-0.18±0.13 0.16	0.003±0.005 0.60	-	1.30±0.46 <0.05	-1.07±0.45 <0.01	0.39±0.86 0.66	-	-2.36±0.46 <0.001	-0.91±0.86 0.30	1.45±0.85 0.10
Lake Dres	3.27±0.54 <0.001	0.07±0.14 0.64	0.010±0.005 0.06	-0.04±0.50 0.93	-0.58±0.50 0.25	-	-	-0.54±0.50 0.29	-	-	-
R2 – Outlet	-3.31±0.63 <0.001	-0.39±0.17 <0.05	-0.002±0.006 0.70	±	4.99±0.76 <0.001	3.15±0.59 <0.001	4.47±0.62 <0.001	±	-1.85±0.78 <0.05	-0.52±0.82 0.53	1.32±0.64 <0.05
FFG – SCR biomass											
R1 – Inlet	0.69±0.51 0.19	-0.21±0.14 0.12	-0.002±0.005 0.12	±	1.36±0.51 <0.05	-0.29±0.49 0.56	2.48±0.93 <0.05	-	-1.65±0.51 <0.01	1.12±0.94 0.24	2.77±0.93 <0.01
Lake Dres	±	±	±	±	±	±	±	±	±	±	±
R2 – Outlet	-4.73±0.64 <0.001	-0.24±0.18 0.18	-0.003±0.006 0.68	-	5.26±0.78 <0.001	3.19±0.60 <0.001	4.52±0.64 <0.001	-	-2.07±0.80 <0.05	-0.74±0.84 0.38	1.33±0.65 0.05
FFG – FIL biomass											
R1 – Inlet	-1.77±0.55 <0.01	0.01±0.15 0.96	-0.007±0.006 0.21	-	1.20±0.54 <0.05	-2.53±0.53 <0.001	0.94±1.00 0.36	-	-3.73±0.54 <0.001	-0.27±1.00 0.79	3.47±1.00 <0.01
Lake Dres	0.39±0.41 0.35	0.00±0.11 0.98	0.003±0.108 0.41	2.07±0.38 <0.001	0.16±0.38 0.68	-	-	1.91±0.38 <0.001	-	-	-
R2 – Outlet	-5.10±0.50 <0.001	-0.30±0.14 <0.05	0.000±0.005 0.98	-	4.99±0.61 <0.001	3.03±0.47 <0.001	4.78±0.50 <0.001	-	-1.96±0.62 <0.01	-0.21±0.65 0.75	1.76±0.51 <0.01
EG – NB biomass											
R1 – Inlet	1.60±0.51 <0.01	-0.13±0.14 0.35	-0.003±0.005 0.58	-	1.17±0.50 <0.05	-0.76±0.49 0.13	2.10±0.92 <0.05	-	-1.94±0.50 <0.001	0.93±0.92 0.32	8.87±0.92 <0.01
Lake Dres	2.71±0.57 <0.001	0.53±0.15 <0.01	0.009±0.005 0.08	-1.79±0.53 <0.01	-0.39±0.53 0.46	-	-	1.40±0.53 <0.05	-	-	-
R2 – Outlet	-1.96±0.71 <0.05	-0.28±0.20 0.17	-0.007±0.007 0.36	-	4.68±0.87 <0.001	3.49±0.67 <0.001	4.49±0.71 <0.001	-	-1.19±0.89 0.19	-0.19±0.93 0.84	1.01±0.73 0.18
EG – B biomass											
R1 – Inlet	-2.05±0.48 <0.001	-0.22±0.13 0.09	-0.003±0.005 0.52	-	2.66±0.47 <0.001	-1.11±0.46 <0.05	2.18±0.87 <0.05	-	-3.77±0.47 <0.001	-0.48±0.87 0.59	3.29±0.87 <0.001
Lake Dres	3.29±0.51 <0.001	0.01±0.13 0.93	0.006±0.004 0.19	0.51±0.47 0.29	-0.42±0.47 0.37	-	-	-0.93±0.47 0.06	-	-	-
R2 – Outlet	-4.02±0.56 <0.001	-0.31±0.16 0.06	0.002±0.006 0.73	-	4.99±0.69 <0.001	3.25±0.53 <0.001	4.48±0.56 <0.001	-	-1.73±0.70 <0.05	-0.51±0.74 0.50	1.23±0.57 <0.05

FFG-PRE: predators; FFG-SHR: shredders; FFG-GAT: gathering collectors; FFG-SCR: scrapers or grazers; FFG-FIL: filtering collectors; EG-NF: non-fossorial macroinvertebrates; EG-F: fossorial macroinvertebrates; San: mud/sand; Bou: boulders; Gra: gravel; Peb: pebbles; Mos: aquatic mosses.

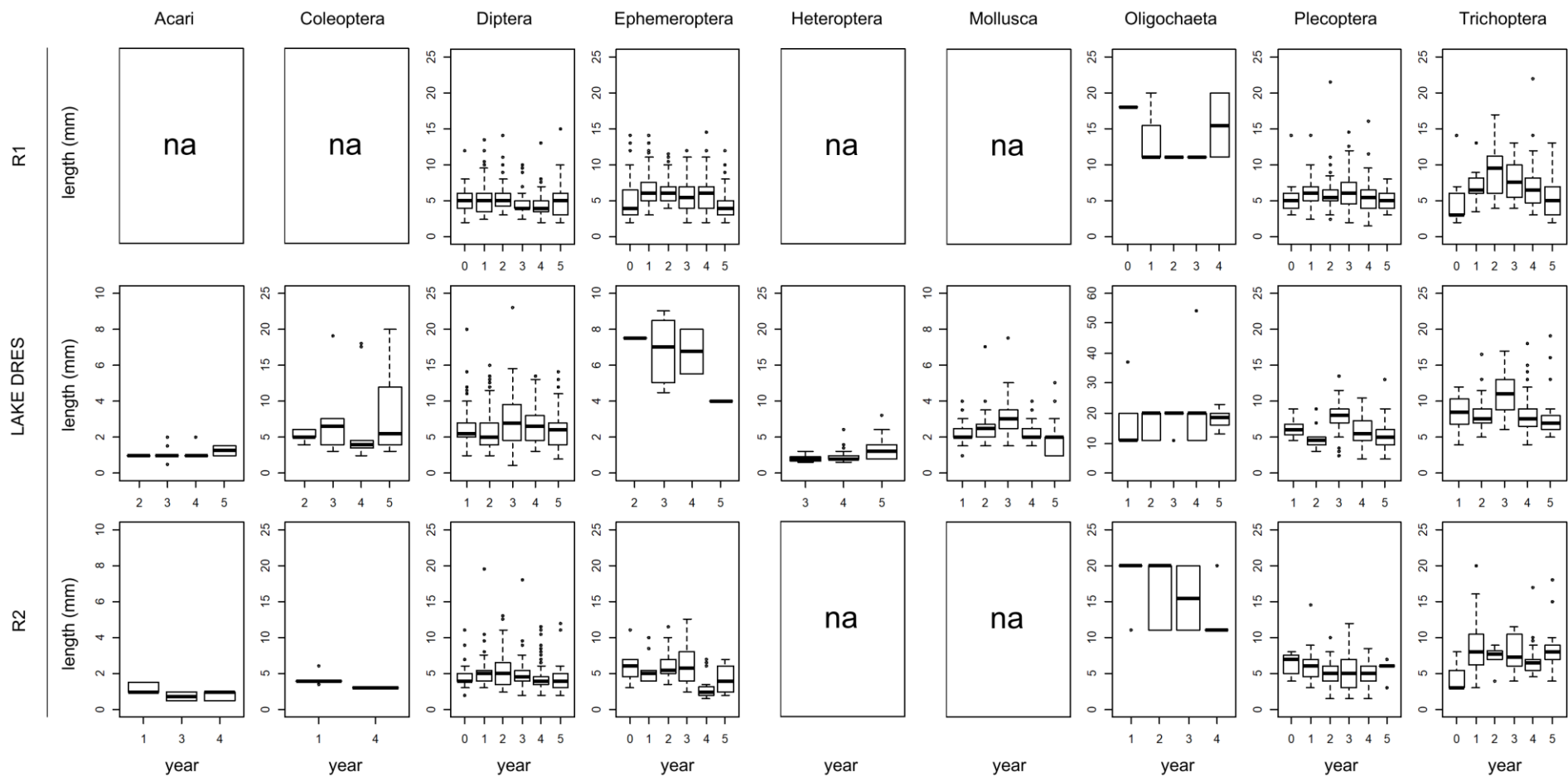


Fig. S2 Changes in the body size distribution of the main macroinvertebrate taxonomic groups recorded along with an alien fish eradication campaign (2013-2017) in Lake Dres and its inflowing (R1) and outflowing rivers (R2). Year 0 is 2010 and years 1-5 are 2013-2017.

Table S5 Diet of brook trout inhabiting Lake Dres and its tributaries. Frequencies of occurrence (F%) and relative abundances (A%) of each prey item are provided separately for brook trout belonging to three size classes. Class 1: maximum length < 10 cm; Class 2: 10 cm ≤ maximum length < 20 cm; class 3: maximum length ≥ 20 cm; l: larvae; i: imagines; p: pupae; N: number of analyzed stomachs per size class. Data extracted from Tiberti et al. (2016).

	Lake Dres						Tributaries						
	Class 1		Class 2		Class 3		Class 1		Class 2		Class 3		
	F%	A%	F%	A%	F%	A%	F%	A%	F%	A%	F%	A%	
	N=	71	47	56	46	87	39	38	9	28	28	21	22
Terrestrial arthropods		53.5	4.8	67.9	2.3	86.2	12.3	86.8	2.2	53.6	28.8	90.3	29.1
Zooplankton		57.7	31.0	19.6	77.1	5.7	63.6	2.6	-	-	-	-	-
Vertebrates^a		-	-	1.8	-	3.4	<0.1	-	-	-	-	40.8	1.6
Aquatic invertebrates													
Plecoptera l		19.7	0.6	16.1	0.3	20.7	0.2	60.5	4.7	57.1	25.2	76.2	10.8
Ephemeroptera l		-	-	5.4	<0.1	3.4	0.1	28.9	0.8	10.7	1.1	33.4	2.9
Trichoptera l		5.6	0.2	21.4	0.1	17.2	0.4	13.2	-	53.6	20.3	95.4	49.8
Coleoptera i		-	-	1.8	<0.1	2.3	<0.1	2.6	0.2	3.6	0.2	-	-
Coleoptera l		-	-	-	-	-	-	2.6	-	-	0.2	4.7	0.1
Odonata l, <i>Aeschna</i>		-	-	8.9	0.1	4.6	0.2	-	-	-	-	-	-
Diptera l ^b		38.0	46.2	35.7	5.5	12.6	1.7	44.7	80.1	14.3	10.8	14.2	2.9
Diptera p ^b		56.3	1.8	55.4	14.4	34.5	19.6	50.0	3.2	46.4	13.5	42.8	2.5
Heteroptera, Corixidae		1.4	-	5.4	<0.1	12.6	0.2	2.6	-	-	-	4.7	0.1
Bivalvia, <i>Pisidium</i>		9.9	-	1.8	0.1	-	0.4	7.9	-	-	-	-	-
Gasteropoda, <i>Lymnea</i>		-	-	14.3	0.1	11.5	-	-	-	-	-	-	-
Hydracnida		-	0.5	1.8	<0.1	-	-	-	1.6	-	-	-	-
Oligochaeta		1.4	0.1	3.6	<0.1	1.1	1.2	-	-	-	-	-	-
Undetermined rest		29.6	14.9	3.6	<0.1	1.1	0.1	10.5	7.2	-	-	4.7	0.2

^a common frog *Rana temporaria* or brook trout *Salvelinus fontinalis*; ^b almost exclusively Chironomidae.

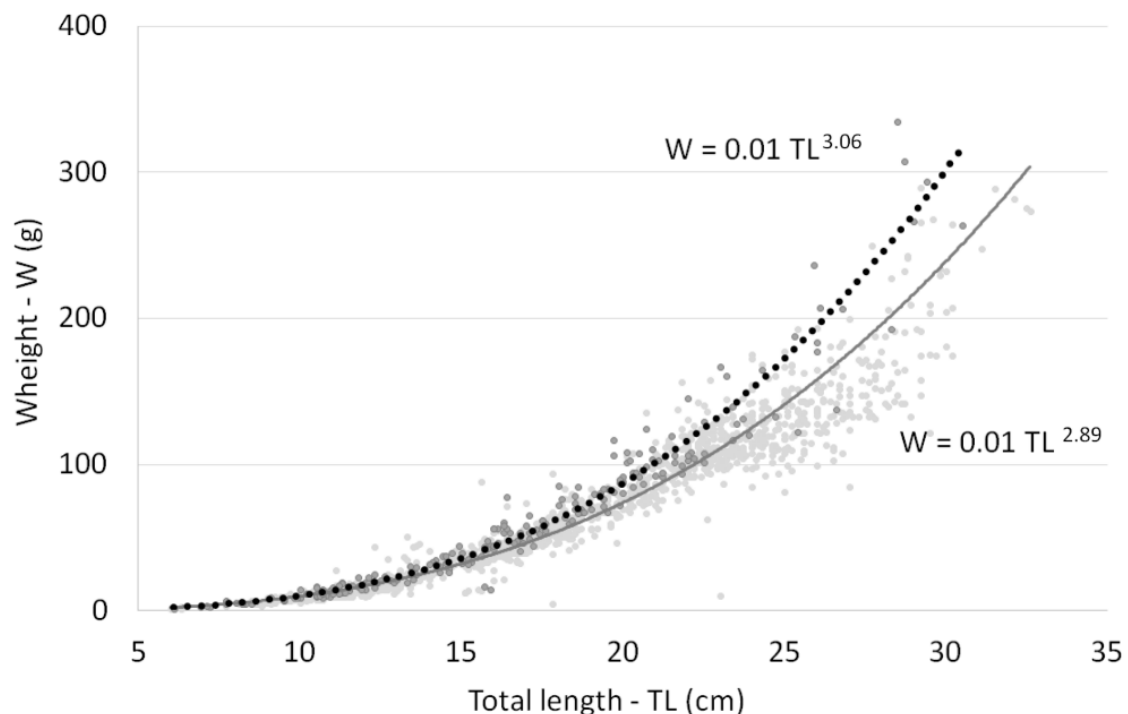


Fig. S3 Standard weight equations for brook trout living in Lake Dres (light grey dots and solid line) and surrounding streams (dark grey dots and dotted line), Gran Paradiso National Park, Western Italian Alps.

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