

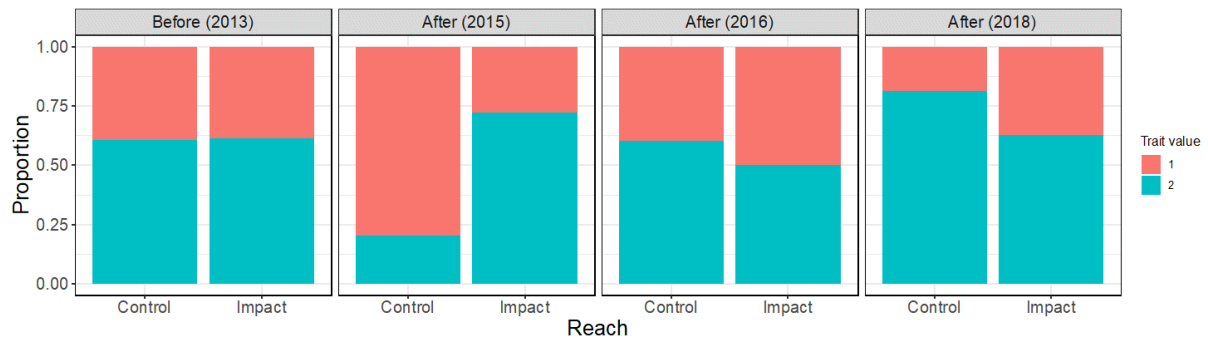


Figure S1 Relative abundance of hyporheic invertebrate movement traits in the control and impact (restored) reach pre and post restoration. Modalities: 1: Ability to burrow 2: non-burrowing.

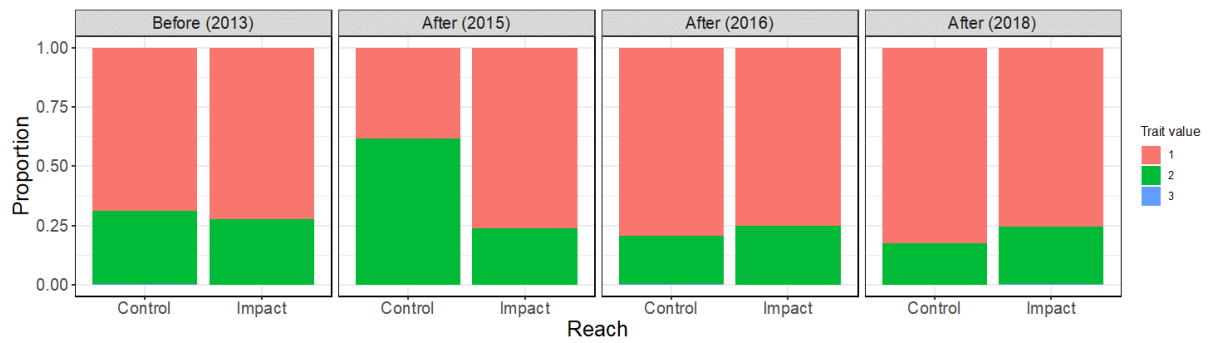


Figure S2 Relative abundance of hyporheic invertebrate respiration traits in the control and impact (restored) reach pre and post restoration. Modalities 1. tegument, 2. gills, 3. Other

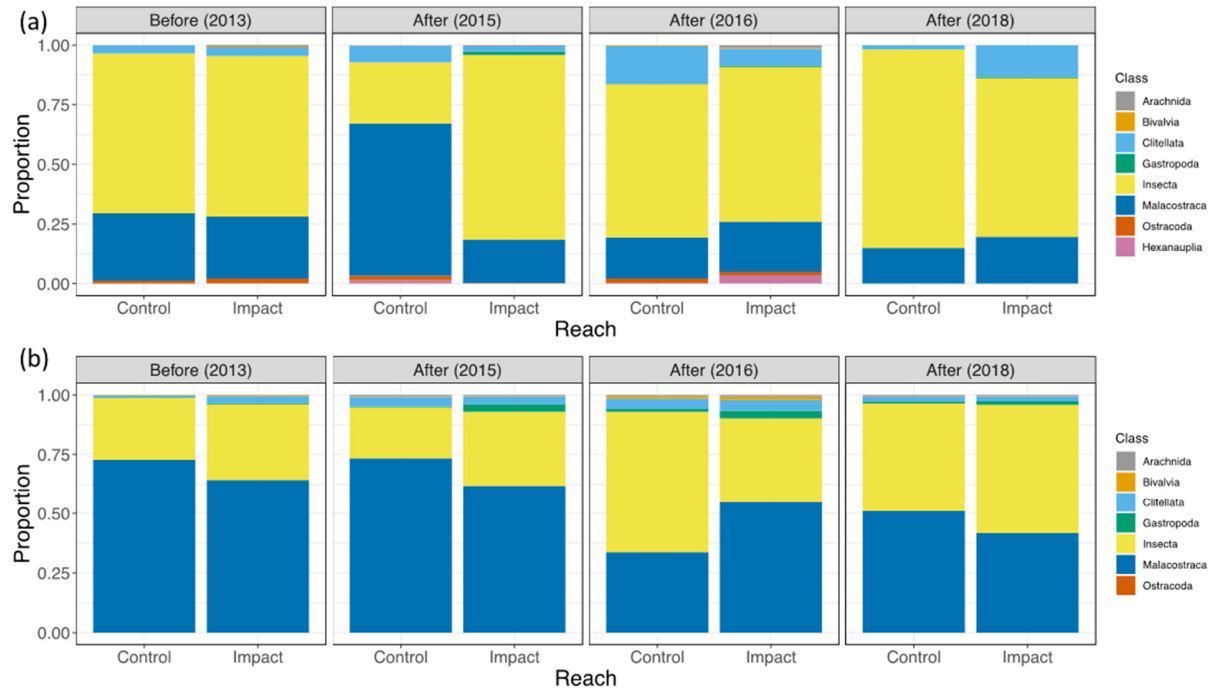


Figure S3 Relative abundance of hyporheic (a) and benthic (b) invertebrate groups in the control and impact (restored) reach pre and post restoration. To aid visualization of the data, invertebrate classes that make up a very low proportion of total abundance (Entognatha & Hydrozoa) were excluded, along with invertebrates not classified to class level (nematodes).

Table S1: Physical characteristics for the impact and control sites on the River Lambourn at each sampling time point from 2013 to 2018.

Treatment	Date	Average Width (m)	Average Depth (cm)	Sediment composition (% cover)				
				Cobbles (%)	Pebbles (%)	Gravels (%)	Sand (%)	Silt (%)
Impact	May 2013	11.0	75.0	0	30	40	20	10
Impact	September 2013	9.0	70.0	5	30	25	5	35
Impact	May 2014	13.0	45.0	0	50	20	20	10
Impact	October 2014	6.0	30.0	5	55	20	5	15
Impact	March 2015	11.0	60.0	25	30	25	12	8
Impact	September 2015	11.0	60.0	15	40	15	10	20
Impact	May 2016	10.0	50.0	20	45	10	5	20
Impact	October 2016	7.0	55.00	5	50	20	10	15
Impact	May 2017	10.0	55.0	25	40	15	10	10
Impact	November 2017	7.0	50.0	0	60	25	5	10
Impact	May 2018	12.0	65.0	10	55	20	5	10
Impact	October 2018	7.0	40.0	20	50	10	5	15
Control	May 2013	12.0	70.0	0	60	15	10	15
Control	September 2013	8.0	60.0	0	45	40	10	5
Control	May 2014	12.0	78.0	0	60	25	5	10
Control	October 2014	8.0	55.0	3	60	15	2	20
Control	March 2015	10.5	50.0	10	55	20	10	5
Control	September 2015	10.5	40.0	5	45	30	5	15
Control	May 2016	10.0	45.0	0	55	20	10	15
Control	October 2016	7.0	60.0	5	25	50	10	10
Control	May 2017	10.0	45.0	10	55	20	5	10
Control	November 2017	12.0	60.0	10	45	30	5	10
Control	May 2018	12.0	65.0	5	55	25	5	10
Control	October 2018	7.0	45.0	15	20	40	10	15

Table S2: Biological traits and modalities of aquatic invertebrates used in this study

TRAIT	MODALITIES
Maximum potential size	1. <0.5cm 2. >0.5cm
Movement	1. Able to burrow 2. Non-burrowing
Resistant stages	1. Present 2. Absent
Body shape	1. Cylindrical/ vermiform 2. Not cylindrical/ vermiform
Respiration	1. Tegument 2. Gills 3. Other
Habitat	1. Groundwater 2. Surface water

Table S3:

Taxon	Benthic zone								Hyporheic zone							
	Impact				Control				Impact				Control			
	2013	2015	2016	2018	2013	2015	2016	2018	2013	2015	2016	2018	2013	2015	2016	2018
Platyhelminthes																
Polycelis											X					X
Polycelis felina	X	X	X	X	X	X	X	X	X	X	X	X		X	X	
Polycelis nigra or tenuis		X							X		X				X	
Dendrocoelum lacteum	X	X		X	X	X							X		X	
Dugesia polychroa											X					
Microturbellaria											X			X	X	
Nematoda				X		X			X	X	X	X	X	X	X	X
Mollusca																
Radix balthica		X		X		X		X			X					
Planorbis									X		X					X
Valvata cristata		X		X				X	X							
Valvata piscinalis	X	X	X	X				X	X						X	
Bithynia tentaculata								X								
Physa fontinalis	X			X	X		X	X								
Lymnaea peregra				X		X		X								
Stagnicola palustris																
Stagnicola palustris/fuscus/corvus				X												
Anisus vortex	X	X	X	X	X	X	X	X								
Bathymophalus contortus	X			X	X	X	X	X								
Ancylus fluviatilis		X	X	X	X	X	X	X	X	X	X	X				
Acroloxus lacustris		X		X	X	X	X	X	X		X					
Pisidium	X	X	X	X	X	X	X	X	X		X				X	
Cnidaria																
Hydridae											X				X	
Annelida																
Oligochaeta	X	X	X	X	X	X	X	X			X	X		X	X	X
Lumbricidae					X						X				X	
Lumbriculidae									X	X	X			X	X	
Tubificidae									X	X	X		X	X	X	
Pisiccola geometra		X		X	X		X	X		X						
Theromyzon tessellatum	X							X								
Glossiphonia complanata	X	X	X	X	X	X	X	X			X					
Helobdella stagnalis	X	X	X	X	X	X	X	X	X		X	X				
Erpobdellidae				X				X								
Erpobdella octoculata	X	X	X	X	X	X	X	X	X		X			X		X
Arthropoda																
Hydracarina		X	X	X	X	X	X	X	X	X	X			X	X	
Ostracoda			X					X	X	X	X	X	X	X	X	X
Cyclopoida									X		X			X		
Eucyclops macruioides											X			X		
Eucyclops serrulatus									X					X		
Paracyclops fimbriatus									X		X				X	
Duiacyclops															X	
Bryocamptus											X					
Bryocamptus echinatus											X			X	X	
Bryocamptus minutus										X	X					
Bryocamptus pygmaeus											X					
Bryocamptus zschokkei											X			X		
Atheyella														X		
Pacifastacus leniusculus				X												
Asellus aquaticus	X	X	X	X	X	X	X	X	X		X	X	X		X	X
Asellus meridianus				X				X								
Proasellus meridianus																
Gammarus pulex/fossarum agg.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Niphargus aquilex								X	X		X		X	X	X	X
Alainites muticus				X												
Baetidae									X	X	X		X	X		X
Baetis											X	X			X	
Baetis rhodani				X	X			X	X	X	X		X	X	X	
Baetis vernus				X		X	X	X								
Baetis rhodani/atlandicus		X	X	X		X	X	X								
Baetis scambus/fuscatus	X	X	X	X	X		X									
Centroptilium luteolum								X								
Heptagenia sulphurea		X	X	X		X	X	X		X	X	X			X	
Paraleptophlebia submarginata	X			X	X			X								X
Leptophlebiae											X					
Ephemera								X								
Ephemera danica	X	X	X	X	X	X	X	X			X					
Serratella ignita	X	X	X	X	X	X	X	X	X		X				X	
Caenis rivulorum			X	X	X		X	X		X	X	X		X	X	X
Leuctra				X				X	X	X	X			X		X
Naididae											X				X	
Oreodytes sanmarkii	X	X			X	X		X			X	X				
Platambus maculatus		X	X	X	X	X	X	X								
Ilybius		X														
Helophorus brevipalpis								X								
Hydraena riparia				X												
Elmis aenea	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Esolus parallelepipedus																
Umnus volkmari		X				X					X					
Oulimnius tuberculatus		X														
Riolus subviolaceus		X		X												
Rhyacophila	X			X		X				X	X					
Rhyacophila dorsalis		X	X	X	X	X	X				X					
Agapetus	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X
Oxyethira			X	X		X		X								
Ithytrichia		X		X				X								
Lype				X												
Polycentropus flavomaculatus			X													
Hydropsyche							X		X							
Hydropsyche pellucidula		X														
Hydropsyche instabilis				X												
Hydropsyche siltalai		X	X	X	X			X								

