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Supplementary Materials

Anthropogenic Contaminants Shape the Fitness of the Endangered European Eel: A Machine Learning Approach

Bastien Bourillon [1,†], Eric Feunteun [1,2,*,†], Anthony Acou [3], Thomas Trancart [1], Nils Teichert [1], Claude Belpaire [4], Sylvie Dufour [5], Paco Bustamante [6,7], Kim Aarestrup [8], Alan Walker [9] and David Righton [9]

1 Laboratoire Biologie des Organismes et Ecosystèmes Aquatiques (BOREA), Muséum National d'Histoire Naturelle, UMR 8067 CNRS, Sorbonne Université, IRD 207, Université de Caen Normandie, Université des Antilles, Centre de Recherche et d'Enseignement sur les Systèmes Côtiers, station de biologie marine de Dinard, 38 rue du Port Blanc, 35800 Dinard, France
2 EPHE-PSL, Centre de Géoécologie Littorale, Boulevard de la mer, 35800 Dinard, France
3 UAR OFB-CNRS-MNHN PatriNat, station de biologie marine de Dinard, 38 rue du Port Blanc, 35800 Dinard, France
4 Research Institute for Nature and Forest (INBO), Dwersbos 28, 1630 Linkebeek, Belgium
5 Laboratoire Biologie des Organismes et Ecosystèmes Aquatiques (BOREA), Muséum National d'Histoire Naturelle, CNRS UMR 8067, Sorbonne Université, IRD 207, Université de Caen Normandie, Université des Antilles, 43 rue Cuvier, CEDEX 5, 75231 Paris, France
6 Littoral, Environnement et Sociétés (LIENSs), UMR 7266 CNRS, La Rochelle Université, 2 rue Olympe de Gouges, 17000 La Rochelle, France
7 Institut Universitaire de France (IUF), 1 rue Descartes, 75005 Paris, France
8 DTU AQUA, National Institute of Aquatic Resources, Section for Freshwater Fisheries Ecology, Technical University of Denmark, Vejlsøvej 39, 8600 Silkeborg, Denmark
9 Centre for Environment, Fisheries and Aquaculture Science, Pakefield Road, Lowestoft NR33 0HT, Suffolk, UK
* Correspondence: eric.feunteun@mnhn.fr
† These authors contributed equally to this work.

Table S1. Chemical contaminant concentrations and *A. crassus* abundance measured in the female silver eels sampled from each European catchment.

Contaminant Groups	Compounds	Catchments								
		swSTO	**deGUD**	**irCOR**	**ukWAR**	**beSCH**	**frFRE**	**frLOI**	**frBAG**	**TOTAL**
		***n* = 9**	***n* = 10**	***n* = 10**	***n* = 9**	***n* = 9**	***n* = 10**	***n* = 9**	***n* = 9**	***n* = 75**
Muscular POPs	BTBPE	$1.0x10^{-2}$ (0.0)	$1.4x10^{-2}$ ($9.0x10^{-3}$)	$1.1x10^{-2}$ ($4.5x10^{-3}$)	$3.5x10^{-2}$ ($5.5x10^{-2}$)	$2.4x10^{-2}$ ($1.3x10^{-2}$)	$3.3x10^{-2}$ ($3.1x10^{-2}$)	$1.6x10^{-2}$ ($1.8x10^{-2}$)	$2.8x10^{-2}$ ($3.1x10^{-2}$)	$2.1x10^{-2}$ ($2.7x10^{-2}$)
		$1.0x10^{-2}$; $1.0x10^{-2}$	$1.0x10^{-2}$; $3.4x10^{-2}$	$1.0x10^{-2}$; $2.4x10^{-2}$	$1.0x10^{-2}$; $1.8x10^{-1}$	$1.0x10^{-2}$; $4.0x10^{-2}$	$1.0x10^{-2}$; $9.2x10^{-2}$	$1.0x10^{-2}$; $6.5x10^{-2}$	$1.0x10^{-2}$; $1.0x10^{-1}$	$1.0x10^{-2}$; $1.8x10^{-1}$
	DDTs	$1.7x10^{+1}$ ($1.2x10^{+1}$)	$1.1x10^{+1}$ (6.3)	3.5 (2.5)	$5.0x10^{+1}$ ($1.9x10^{+1}$)	$1.1x10^{+2}$ ($7.3x10^{+1}$)	$1.2x10^{+1}$ (8.0)	$1.7x10^{+1}$ (7.7)	$6.3x10^{+1}$ ($2.5x10^{+1}$)	$3.4x10^{+1}$ ($4.3x10^{+1}$)
		6.9 ; $4.7x10^{+1}$	2.5 ; $2.3x10^{+1}$	$8.8x10^{-1}$; 8.4	$2.7x10^{+1}$; $9.2x10^{+1}$	$3.3x10^{+1}$; $2.2x10^{+2}$	2.3 ; $2.3x10^{+1}$	5.6 ; $2.8x10^{+1}$	$3.9x10^{+1}$; $1.0x10^{+2}$	$8.8x10^{-1}$; $2.2x10^{+2}$
	HBCDs	1.4 ($9.2x10^{-1}$)	$5.3x10^{-1}$ ($3.4x10^{-1}$)	2.5 (1.9)	$3.3x10^{+2}$ ($1.4x10^{+2}$)	$1.9x10^{+1}$ ($1.8x10^{+1}$)	1.3 ($9.8x10^{-1}$)	3.5 (1.7)	$1.7x10^{-1}$ ($4.2x10^{-2}$)	$4.3x10^{+1}$ ($1.2x10^{+2}$)
		$4.5x10^{-1}$; 3.6	$1.5x10^{-1}$; 1.3	$3.1x10^{-1}$; 5.7	$1.1x10^{+2}$; $6.3x10^{+2}$	$2.6x10^{-1}$; $4.6x10^{+1}$	$2.8x10^{-1}$; 3.3	1.0 ; 6.3	$1.5x10^{-1}$; $2.5x10^{-1}$	$1.5x10^{-1}$; $6.3x10^{+2}$
	HCB	1.3 ($5.3x10^{-1}$)	$4.5x10^{-1}$ ($3.5x10^{-1}$)	$5.6x10^{-1}$ ($2.4x10^{-1}$)	2.5 ($9.1x10^{-1}$)	5.9 ($1.2x10^{+1}$)	$3.6x10^{-1}$ ($1.8x10^{-1}$)	$9.5x10^{-1}$ ($7.3x10^{-1}$)	$2.8x10^{-1}$ ($3.5x10^{-1}$)	1.5 (4.4)
		$4.8x10^{-1}$; 2.2	$1.0x10^{-1}$; 1.2	$2.3x10^{-1}$; $9.4x10^{-1}$	1.2 ; 4.2	$2.5x10^{-1}$; $3.8x10^{+1}$	$1.0x10^{-1}$; $6.0x10^{-1}$	$2.3x10^{-1}$; 2.3	$1.0x10^{-1}$; 1.2	$1.0x10^{-1}$; $3.8x10^{+1}$
	PBDEs	1.4 ($6.5x10^{-1}$)	1.3 (1.2)	2.2 (1.6)	$4.0x10^{+1}$ ($1.9x10^{+1}$)	6.6 (5.5)	1.9 (1.6)	7.5 (4.8)	$3.8x10^{-1}$ ($1.7x10^{-1}$)	7.4 ($1.4x10^{+1}$)
		$7.2x10^{-1}$; 2.6	$2.9x10^{-1}$; 3.4	$5.4x10^{-1}$; 5.2	$1.3x10^{+1}$; $7.5x10^{+1}$	$6.9x10^{-1}$; $1.4x10^{+1}$	$2.6x10^{-1}$; 4.9	2.1 ; $1.5x10^{+1}$	$1.7x10^{-1}$; $7.4x10^{-1}$	$1.7x10^{-1}$; $7.5x10^{+1}$
	PCBs	$6.7x10^{+11}$ ($4.7x10^{+1}$)	$2.3x10^{+1}$ ($1.1x10^{+1}$)	8.6 (3.1)	$3.1x10^{+2}$ ($1.6x10^{+2}$)	$2.1x10^{+3}$ ($2.7x10^{+3}$)	$5.1x10^{+1}$ ($3.3x10^{+1}$)	$2.8x10^{+2}$ ($1.2x10^{+2}$)	$3.4x10^{+1}$ ($1.6x10^{+1}$)	$3.5x10^{+2}$ ($1.1x10^{+3}$)

		2.7x10^{+1} ; 1.7x10^{+2}	4.3 ; 4.0x10^{+1}	5.0 ; 1.4x10^{+1}	1.1x10^{+2} ; 5.8x10^{+2}	4.6x10^{+1} ; 8.1x10^{+3}	8.0 ; 1.0x10^{+2}	9.1x10^{+1} ; 4.9x10^{+2}	1.4x10^{+1} ; 5.5x10^{+1}	4.3 ; 8.1x10^{+3}
Gonadic TEs	As	4.4x10^{-1} (1.7x10^{-1}) 1.4x10^{-1} ; 6.6x10^{-1}	2.1x10^{-1} (1.1x10^{-1}) 7.9x10^{-2} ; 4.1x10^{-1}	2.0x10^{-1} (4.0x10^{-2}) 1.4x10^{-1} ; 2.6x10^{-1}	1.6x10^{-1} (9.2x10^{-2}) 2.4x10^{-2} ; 3.2x10^{-1}	1.6x10^{-1} (6.5x10^{-2}) 5.6x10^{-2} ; 2.6x10^{-1}	1.8x10^{-1} (6.2x10^{-2}) 8.4x10^{-2} ; 2.6x10^{-1}	1.4x10^{-1} (7.0x10^{-2}) 4.9x10^{-2} ; 2.8x10^{-1}	7.2x10^{-1} (2.3x10^{-1}) 3.1x10^{-1} ; 1.1	2.7x10^{-1} (2.2x10^{-1}) 2.4x10^{-2} ; 1.1
	Cd	2.6x10^{-2} (8.7x10^{-3}) 1.4x10^{-2} ; 3.9x10^{-2}	3.2x10^{-2} (3.2x10^{-2}) 8.3x10^{-3} ; 1.1x10^{-1}	6.8x10^{-2} (3.6x10^{-2}) 3.2x10^{-2} ; 1.4x10^{-1}	9.8x10^{-2} (8.5x10^{-2}) 1.6x10^{-2} ; 2.9x10^{-1}	1.5x10^{-1} (1.4x10^{-1}) 1.2x10^{-2} ; 3.2x10^{-1}	2.0x10^{-2} (2.2x10^{-2}) 6.6x10^{-3} ; 8.1x10^{-2}	2.6x10^{-2} (1.4x10^{-2}) 2.2x10^{-3} ; 5.1x10^{-2}	1.5x10^{-2} (1.5x10^{-2}) 4.2x10^{-3} ; 5.0x10^{-2}	5.4x10^{-2} (7.1x10^{-2}) 2.2x10^{-3} ; 3.2x10^{-1}
	Co	5.1x10^{-2} (2.3x10^{-2}) 2.2x10^{-2} ; 1.0x10^{-1}	6.8x10^{-2} (2.9x10^{-2}) 2.6x10^{-2} ; 1.2x10^{-1}	5.6x10^{-2} (1.7x10^{-2}) 3.3x10^{-2} ; 8.0x10^{-2}	1.8x10^{-1} (1.6x10^{-1}) 7.3x10^{-2} ; 5.8x10^{-1}	1.1x10^{-1} (5.1x10^{-2}) 3.8x10^{-2} ; 1.9x10^{-1}	1.3x10^{-1} (5.7x10^{-2}) 7.6x10^{-2} ; 2.2x10^{-1}	1.3x10^{-1} (2.6x10^{-2}) 9.5x10^{-2} ; 1.7x10^{-1}	9.1x10^{-2} (6.3x10^{-2}) 2.9x10^{-2} ; 2.1x10^{-1}	1.0x10^{-1} (7.7x10^{-2}) 2.2x10^{-2} ; 5.8x10^{-1}
	Cr	4.0x10^{-2} (3.0x10^{-2}) 2.4x10^{-2} ; 1.1x10^{-1}	1.4x10^{-1} (1.3x10^{-1}) 5.3x10^{-2} ; 4.8x10^{-1}	8.8x10^{-2} (2.8x10^{-2}) 6.1x10^{-2} ; 1.6x10^{-1}	7.4x10^{-2} (2.1x10^{-2}) 5.2x10^{-2} ; 1.1x10^{-1}	5.6x10^{-2} (2.0x10^{-2}) 2.4x10^{-2} ; 8.1x10^{-2}	7.1x10^{-2} (3.2x10^{-2}) 2.4x10^{-2} ; 1.2x10^{-1}	6.9x10^{-2} (3.4x10^{-2}) 2.4x10^{-2} ; 1.2x10^{-1}	1.7x10^{-1} (2.7x10^{-1}) 2.4x10^{-2} ; 8.9x10^{-1}	9.0x10^{-2} (1.1x10^{-1}) 2.4x10^{-2} ; 8.9x10^{-1}
	Cu	9.9x10^{-1} (4.2x10^{-1}) 4.6x10^{-1} ; 1.7	1.9 (8.0x10^{-1}) 8.5x10^{-1} ; 3.3	1.2 (4.2x10^{-1}) 5.5x10^{-1} ; 2.0	7.8x10^{-1} (7.7x10^{-2}) 6.9x10^{-1} ; 9.4x10^{-1}	8.3x10^{-1} (1.5x10^{-1}) 5.2x10^{-1} ; 1.1	7.9x10^{-1} (1.2x10^{-1}) 5.6x10^{-1} ; 9.4x10^{-1}	8.0x10^{-1} (1.6x10^{-1}) 5.6x10^{-1} ; 1.0	6.2x10^{-1} (1.3x10^{-1}) 4.3x10^{-1} ; 8.5x10^{-1}	1.0 (5.4x10^{-1}) 4.3x10^{-1} ; 3.3
	Fe	1.5x10^{+1} (4.2) 9.8 ; 2.4x10^{+1}	3.7x10^{+1} (8.9) 2.4x10^{+1} ; 5.0x10^{+1}	1.2x10^{+1} (2.8) 8.3 ; 1.6x10^{+1}	1.7x10^{+1} (7.6) 7.8 ; 3.0x10^{+1}	2.5x10^{+1} (8.2) 7.2 ; 3.5x10^{+1}	1.4x10^{+1} (4.2) 9.4 ; 2.1x10^{+1}	2.1x10^{+1} (7.2) 1.0x10^{+1} ; 3.2x10^{+1}	1.0x10^{+1} (3.5) 6.5 ; 1.7x10^{+1}	1.9x10^{+1} (1.0x10^{+1}) 6.5 ; 5.0x10^{+1}
	Hg	1.3x10^{-2} (5.1x10^{-3}) 3.4x10^{-3} ; 1.9x10^{-2}	1.8x10^{-2} (1.4x10^{-2}) 5.6x10^{-3} ; 4.7x10^{-2}	3.9x10^{-2} (1.8x10^{-2}) 1.4x10^{-2} ; 6.9x10^{-2}	2.7x10^{-2} (1.1x10^{-2}) 9.6x10^{-3} ; 4.4x10^{-2}	3.4x10^{-2} (5.1x10^{-2}) 2.2x10^{-3} ; 1.6x10^{-1}	3.4x10^{-2} (1.5x10^{-2}) 1.5x10^{-2} ; 6.7x10^{-2}	1.8x10^{-2} (6.1x10^{-3}) 9.4x10^{-3} ; 2.6x10^{-2}	2.3x10^{-2} (1.7x10^{-2}) 3.6x10^{-3} ; 4.6x10^{-2}	2.6x10^{-2} (2.2x10^{-2}) 2.2x10^{-3} ; 1.6x10^{-1}
	Mn	2.2x10^{-1} (5.2x10^{-2}) 1.4x10^{-1} ; 3.1x10^{-1}	4.9x10^{-1} (1.8x10^{-1}) 2.5x10^{-1} ; 7.9x10^{-1}	2.8x10^{-1} (8.2x10^{-2}) 1.5x10^{-1} ; 4.0x10^{-1}	3.1x10^{-1} (7.7x10^{-2}) 2.6x10^{-1} ; 5.0x10^{-1}	2.7x10^{-1} (6.0x10^{-2}) 1.4x10^{-1} ; 3.3x10^{-1}	3.7x10^{-1} (6.7x10^{-2}) 2.9x10^{-1} ; 4.7x10^{-1}	3.2x10^{-1} (1.1x10^{-1}) 1.9x10^{-1} ; 5.3x10^{-1}	2.8x10^{-1} (1.8x10^{-1}) 1.2x10^{-1} ; 7.2x10^{-1}	3.2x10^{-1} (1.3x10^{-1}) 1.2x10^{-1} ; 7.9x10^{-1}
	Ni	3.9x10^{-2} (4.7x10^{-2}) 7.9x10^{-3} ; 1.6x10^{-1}	2.0x10^{-1} (2.4x10^{-1}) 2.1x10^{-2} ; 7.1x10^{-1}	3.9x10^{-2} (2.2x10^{-2}) 1.5x10^{-2} ; 8.6x10^{-2}	1.4x10^{-1} (1.7x10^{-1}) 2.3x10^{-2} ; 5.3x10^{-1}	1.4x10^{-1} (2.7x10^{-1}) 1.2x10^{-2} ; 8.5x10^{-1}	1.5x10^{-1} (1.9x10^{-1}) 1.8x10^{-2} ; 6.5x10^{-1}	7.5x10^{-2} (8.1x10^{-2}) 1.3x10^{-2} ; 2.2x10^{-1}	8.3x10^{-2} (1.1x10^{-1}) 5.5x10^{-3} ; 2.8x10^{-1}	1.1x10^{-1} (1.6x10^{-1}) 5.5x10^{-3} ; 8.5x10^{-1}
	Pb	2.9x10^{-3} (1.5x10^{-3}) 2.2x10^{-3} ; 5.6x10^{-3}	9.6x10^{-3} (1.7x10^{-2}) 2.2x10^{-3} ; 5.6x10^{-2}	4.5x10^{-3} (4.0x10^{-3}) 2.2x10^{-3} ; 1.4x10^{-2}	1.5x10^{-2} (1.2x10^{-2}) 4.8x10^{-3} ; 4.0x10^{-2}	2.1x10^{-2} (1.2x10^{-2}) 6.4x10^{-3} ; 4.1x10^{-2}	3.3x10^{-2} (5.0x10^{-2}) 2.2x10^{-3} ; 1.7x10^{-1}	9.5x10^{-3} (1.8x10^{-2}) 2.2x10^{-3} ; 5.8x10^{-2}	4.0x10^{-3} (3.5x10^{-3}) 2.2x10^{-3} ; 1.2x10^{-2}	1.3x10^{-2} (2.3x10^{-2}) 2.2x10^{-3} ; 1.7x10^{-1}
	Se	5.5x10^{-1} (1.8x10^{-1}) 3.2x10^{-1} ; 7.9x10^{-1}	8.5x10^{-1} (3.3x10^{-1}) 3.3x10^{-1} ; 1.3	1.1 (1.9x10^{-1}) 8.3x10^{-1} ; 1.4	9.0x10^{-1} (3.0x10^{-1}) 4.3x10^{-1} ; 1.5	6.8x10^{-1} (3.3x10^{-1}) 2.1x10^{-1} ; 1.2	6.6x10^{-1} (1.7x10^{-1}) 4.5x10^{-1} ; 1.0	1.0 (8.4x10^{-1}) 3.3x10^{-1} ; 3.1	1.2 (5.8x10^{-1}) 4.0x10^{-1} ; 1.9	8.6x10^{-1} (4.5x10^{-1}) 2.1x10^{-1} ; 3.1
	Zn	4.9x10^{+1} (1.0x10^{+1}) 3.3x10^{+1} ; 6.2x10^{+1}	7.0x10^{+1} (1.1x10^{+1}) 4.8x10^{+1} ; 8.4x10^{+1}	7.0x10^{+1} (1.3x10^{+1}) 5.0x10^{+1} ; 9.3x10^{+1}	7.9x10^{+1} (1.1x10^{+1}) 6.2x10^{+1} ; 9.7x10^{+1}	1.0x10^{+2} (3.2x10^{+1}) 5.1x10^{+1} ; 1.6x10+2	9.2x10^{+1} (1.1x10^{+1}) 7.5x10^{+1} ; 1.1x10+2	8.1x10^{+1} (1.1x10^{+1}) 6.5x10^{+1} ; 9.3x10^{+1}	7.2x10^{+1} (2.0x10^{+1}) 4.8x10^{+1} ; 1.1x10+2	7.7x10^{+1} (2.2x10^{+1}) 3.3x10^{+1} ; 1.6x10+2
Hepatic TEs	As	1.2x10^{-1} (9.6x10^{-2}) 2.3x10^{-2} ; 2.7x10^{-1}	8.5x10^{-2} (1.2x10^{-1}) 2.3x10^{-2} ; 3.9x10^{-1}	1.3x10^{-1} (9.2x10^{-2}) 2.1x10^{-2} ; 2.9x10^{-1}	1.8x10^{-1} (1.9x10^{-1}) 2.3x10^{-2} ; 5.4x10^{-1}	4.5x10^{-2} (3.3x10^{-2}) 2.3x10^{-2} ; 1.0x10^{-1}	1.9x10^{-1} (4.5x10^{-1}) 2.3x10^{-2} ; 1.5	4.2x10^{-2} (2.5x10^{-2}) 2.1x10^{-3} ; 7.5x10^{-2}	4.4x10^{-1} (3.4x10^{-1}) 2.3x10^{-2} ; 1.0	1.5x10^{-1} (2.4x10^{-1}) 2.1x10^{-3} ; 1.5
	Cd	2.8x10^{-1} (3.9x10^{-1}) 6.5x10^{-2} ; 1.3	1.6x10^{-1} (1.6x10^{-1}) 3.6x10^{-2} ; 5.0x10^{-1}	6.2x10^{-1} (7.1x10^{-1}) 7.3x10^{-2} ; 2.5	2.5 (9.6x10^{-1}) 1.4 ; 4.0	2.3 (2.1) 9.1x10^{-2} ; 5.3	9.1x10^{-1} (9.4x10^{-1}) 2.6x10^{-1} ; 3.4	6.0x10^{-1} (4.0x10^{-1}) 1.4x10^{-1} ; 1.3	7.3x10^{-1} (8.0x10^{-1}) 2.0x10^{-1} ; 2.3	1.0 (1.2) 3.6x10^{-2} ; 5.3
	Co	5.8x10^{-2} (3.7x10^{-2}) 2.2x10^{-2} ; 1.1x10^{-1}	6.0x10^{-2} (3.7x10^{-2}) 2.7x10^{-2} ; 1.2x10^{-1}	5.0x10^{-2} (2.7x10^{-2}) 2.1x10^{-2} ; 1.2x10^{-1}	2.6x10^{-1} (2.5x10^{-1}) 7.8x10^{-2} ; 9.0x10^{-1}	8.4x10^{-2} (5.1x10^{-2}) 2.1x10^{-2} ; 1.8x10^{-1}	1.9x10^{-1} (1.2x10^{-1}) 1.0x10^{-1} ; 4.2x10^{-1}	1.8x10^{-1} (9.7x10^{-2}) 6.8x10^{-2} ; 3.9x10^{-1}	1.5x10^{-1} (1.2x10^{-1}) 3.1x10^{-2} ; 3.5x10^{-1}	1.3x10^{-1} (1.3x10^{-1}) 2.1x10^{-2} ; 9.0x10^{-1}

	Cr	$3.6x10^{-2}$ ($1.5x10^{-2}$) $2.3x10^{-2}$; $5.5x10^{-2}$	$4.6x10^{-2}$ ($1.6x10^{-2}$) $2.3x10^{-2}$; $6.4x10^{-2}$	$5.4x10^{-2}$ ($1.8x10^{-2}$) $2.3x10^{-2}$; $7.5x10^{-2}$	$6.5x10^{-2}$ ($2.7x10^{-2}$) $2.3x10^{-2}$; $1.2x10^{-1}$	$6.1x10^{-2}$ ($4.5x10^{-2}$) $2.3x10^{-2}$; $1.7x10^{-1}$	$4.0x10^{-2}$ ($1.8x10^{-2}$) $2.3x10^{-2}$; $6.5x10^{-2}$	$5.4x10^{-2}$ ($1.4x10^{-2}$) $2.3x10^{-2}$; $7.2x10^{-2}$	$5.8x10^{-2}$ ($2.3x10^{-2}$) $2.3x10^{-2}$; $8.5x10^{-2}$	$5.2x10^{-2}$ ($2.5x10^{-2}$) $2.3x10^{-2}$; $1.7x10^{-1}$
	Cu	$2.3x10^{+1}$ (8.8) $1.3x10^{+1}$; $3.9x10^{+1}$	$3.5x10^{+1}$ ($1.9x10^{+1}$) $1.1x10^{+1}$; $6.7x10^{+1}$	$3.9x10^{+1}$ ($2.1x10^{+1}$) 2.9 ; $7.5x10^{+1}$	$5.2x10^{+1}$ ($3.1x10^{+1}$) $2.9x10^{+1}$; $1.3x10^{+2}$	$3.8x10^{+1}$ ($2.4x10^{+1}$) 6.2 ; $7.6x10^{+1}$	$4.1x10^{+1}$ ($2.0x10^{+1}$) 7.2 ; $6.3x10^{+1}$	$5.0x10^{+1}$ ($1.6x10^{+1}$) $2.4x10^{+1}$; $6.8x10^{+1}$	$4.5x10^{+1}$ ($1.9x10^{+1}$) $1.8x10^{+1}$; $7.1x10^{+1}$	$4.0x10^{+1}$ ($2.1x10^{+1}$) 2.9 ; $1.3x10^{+2}$
	Fe	$2.2x10^{+2}$ ($9.1x10^{+1}$) $9.8x10^{+1}$; $3.6x10^{+2}$	$5.1x10^{+2}$ ($2.4x10^{+2}$) $1.5x10^{+2}$; $9.3x10^{+2}$	$3.2x10^{+2}$ ($2.0x10^{+2}$) $8.6x10^{+1}$; $6.9x10^{+2}$	$4.2x10^{+2}$ ($1.9x10^{+2}$) $1.6x10^{+2}$; $7.6x10^{+2}$	$7.1x10^{+2}$ ($4.0x10^{+2}$) $1.6x10^{+2}$; $1.4x10^{+3}$	$8.5x10^{+2}$ ($6.1x10^{+2}$) $3.0x10^{+2}$; $1.9x10^{+3}$	$6.3x10^{+2}$ ($3.1x10^{+2}$) $2.5x10^{+2}$; $1.2x10^{+3}$	$6.6x10^{+2}$ ($4.2x10^{+2}$) $6.2x10^{+1}$; $1.5x10^{+3}$	$5.4x10^{+2}$ ($3.9x10^{+2}$) $6.2x10^{+1}$; $1.9x10^{+3}$
	Hg	$8.1x10^{-2}$ ($3.8x10^{-2}$) $2.0x10^{-2}$; $1.3x10^{-1}$	$7.7x10^{-2}$ ($5.4x10^{-2}$) $2.0x10^{-2}$; $1.9x10^{-1}$	$2.1x10^{-1}$ ($1.3x10^{-1}$) $5.0x10^{-2}$; $4.4x10^{-1}$	$1.5x10^{-1}$ ($7.3x10^{-2}$) $6.8x10^{-2}$; $3.1x10^{-1}$	$2.3x10^{-1}$ ($2.7x10^{-1}$) $1.0x10^{-2}$; $8.3x10^{-1}$	$2.0x10^{-1}$ ($8.4x10^{-2}$) $7.0x10^{-2}$; $3.3x10^{-1}$	$1.5x10^{-1}$ ($5.8x10^{-2}$) $7.0x10^{-2}$; $2.4x10^{-1}$	$2.7x10^{-1}$ ($2.0x10^{-1}$) $2.5x10^{-2}$; $5.1x10^{-1}$	$1.7x10^{-1}$ ($1.4x10^{-1}$) $1.0x10^{-2}$; $8.3x10^{-1}$
	Mn	2.5 ($9.6x10^{-1}$) 1.5 ; 4.5	3.8 ($6.7x10^{-1}$) 2.4 ; 4.7	3.4 ($7.1x10^{-1}$) 2.6 ; 4.7	3.5 ($8.5x10^{-1}$) 1.6 ; 4.5	3.3 (1.3) 1.2 ; 4.9	4.5 ($6.6x10^{-1}$) 3.4 ; 5.4	3.6 ($6.3x10^{-1}$) 2.8 ; 4.6	5.5 (1.2) 4.3 ; 7.6	3.8 (1.2) 1.2 ; 7.6
	Ni	$4.1x10^{-2}$ ($4.4x10^{-2}$) $1.2x10^{-2}$; $1.5x10^{-1}$	$3.3x10^{-2}$ ($3.0x10^{-2}$) $6.9x10^{-3}$; $1.1x10^{-1}$	$3.3x10^{-2}$ ($2.0x10^{-2}$) $8.8x10^{-3}$; $7.8x10^{-2}$	$1.9x10^{-1}$ ($3.3x10^{-1}$) $3.2x10^{-2}$; 1.0	$3.8x10^{-2}$ ($2.0x10^{-2}$) $1.4x10^{-2}$; $7.6x10^{-2}$	$5.6x10^{-2}$ ($2.7x10^{-2}$) $2.4x10^{-2}$; $1.0x10^{-1}$	$3.2x10^{-2}$ ($1.1x10^{-2}$) $1.8x10^{-2}$; $5.4x10^{-2}$	$5.8x10^{-2}$ ($4.8x10^{-2}$) $8.6x10^{-3}$; $1.5x10^{-1}$	$5.9x10^{-2}$ ($1.2x10^{-1}$) $6.9x10^{-3}$; 1.0
	Pb	$3.9x10^{-2}$ ($4.3x10^{-2}$) $9.6x10^{-3}$; $1.5x10^{-1}$	$3.2x10^{-2}$ ($1.4x10^{-2}$) $1.4x10^{-2}$; $6.1x10^{-2}$	$5.1x10^{-2}$ ($3.9x10^{-2}$) $7.0x10^{-3}$; $1.5x10^{-1}$	$3.9x10^{-1}$ ($2.8x10^{-1}$) $1.4x10^{-1}$; $9.5x10^{-1}$	$6.9x10^{-1}$ ($3.5x10^{-1}$) $2.1x10^{-1}$; 1.2	$3.2x10^{-1}$ ($2.0x10^{-1}$) $7.9x10^{-2}$; $6.7x10^{-1}$	$1.3x10^{-1}$ ($8.5x10^{-2}$) $5.6x10^{-2}$; $3.5x10^{-1}$	$9.2x10^{-2}$ ($5.7x10^{-2}$) $1.2x10^{-2}$; $1.9x10^{-1}$	$2.2x10^{-1}$ ($2.8x10^{-1}$) $7.0x10^{-3}$; 1.2
	Se	6.2 (1.9) 3.5 ; 9.2	8.0 (2.6) 3.3 ; $1.3x10^{+1}$	$1.3x10^{+1}$ (2.6) 7.8 ; $1.6x10^{+1}$	$1.6x10^{+1}$ (4.4) 7.2 ; $2.3x10^{+1}$	$1.3x10^{+1}$ (7.2) 2.5 ; $2.6x10^{+1}$	$1.1x10^{+1}$ (4.9) 4.8 ; $1.9x10^{+1}$	$1.7x10^{+1}$ (7.4) $1.0x10^{+1}$; $3.4x10^{+1}$	$1.5x10^{+1}$ (3.1) $1.1x10^{+1}$; $2.0x10^{+1}$	$1.2x10^{+1}$ (5.7) 2.5 ; $3.4x10^{+1}$
	Zn	$9.1x10^{+1}$ ($2.1x10^{+1}$) $5.7x10^{+1}$; $1.3x10^{+2}$	$1.1x10^{+2}$ ($2.3x10^{+1}$) $6.7x10^{+1}$; $1.4x10^{+2}$	$1.3x10^{+2}$ ($3.5x10^{+1}$) $7.4x10^{+1}$; $2.0x10^{+2}$	$1.5x10^{+2}$ ($4.6x10^{+1}$) $9.8x10^{+1}$; $2.2x10^{+2}$	$1.1x10^{+2}$ ($3.7x10^{+1}$) $6.0x10^{+1}$; $1.6x10^{+2}$	$1.4x10^{+2}$ ($1.4x10^{+1}$) $1.2x10^{+2}$; $1.6x10^{+2}$	$1.5x10^{+2}$ ($1.9x10^{+1}$) $1.2x10^{+2}$; $1.8x10^{+2}$	$1.6x10^{+2}$ ($2.9x10^{+1}$) $9.8x10^{+1}$; $2.0x10^{+2}$	$1.3x10^{+2}$ ($3.6x10^{+1}$) $5.7x10^{+1}$; $2.2x10^{+2}$
Muscular TEs	As	$6.4x10^{-2}$ ($5.0x10^{-2}$) $2.3x10^{-2}$; $1.7x10^{-1}$	$3.3x10^{-2}$ ($3.1x10^{-2}$) $2.3x10^{-2}$; $1.2x10^{-1}$	$1.3x10^{-1}$ ($5.4x10^{-2}$) $2.3x10^{-2}$; $2.0x10^{-1}$	$2.2x10^{-1}$ ($6.7x10^{-2}$) $1.4x10^{-1}$; $3.7x10^{-1}$	$4.2x10^{-2}$ ($5.7x10^{-2}$) $2.3x10^{-2}$; $1.9x10^{-1}$	$1.1x10^{-1}$ ($4.9x10^{-2}$) $4.4x10^{-2}$; $2.0x10^{-1}$	$2.6x10^{-1}$ ($6.0x10^{-2}$) $2.2x10^{-1}$; $3.7x10^{-1}$	$6.0x10^{-1}$ ($4.4x10^{-1}$) $1.3x10^{-1}$; 1.6	$1.8x10^{-1}$ ($2.3x10^{-1}$) $2.3x10^{-2}$; 1.6
	Cd	$2.1x10^{-3}$ (0.0) $2.1x10^{-3}$; $2.1x10^{-3}$	$2.1x10^{-3}$ (0.0) $2.1x10^{-3}$; $2.1x10^{-3}$	$2.6x10^{-3}$ ($1.4x10^{-3}$) $2.1x10^{-3}$; $6.6x10^{-3}$	$2.7x10^{-3}$ ($1.3x10^{-3}$) $2.1x10^{-3}$; $5.6x10^{-3}$	$8.1x10^{-3}$ ($6.7x10^{-3}$) $2.1x10^{-3}$; $1.8x10^{-2}$	$2.8x10^{-3}$ ($2.2x10^{-3}$) $2.1x10^{-3}$; $9.0x10^{-3}$	$3.1x10^{-3}$ ($1.5x10^{-3}$) $2.1x10^{-3}$; $5.8x10^{-3}$	$2.9x10^{-3}$ ($2.3x10^{-3}$) $2.1x10^{-3}$; $8.9x10^{-3}$	$3.3x10^{-3}$ ($3.2x10^{-3}$) $2.1x10^{-3}$; $1.8x10^{-2}$
	Co	$4.2x10^{-3}$ ($2.4x10^{-3}$) $2.1x10^{-3}$; $8.5x10^{-3}$	$5.8x10^{-3}$ ($2.6x10^{-3}$) $2.1x10^{-3}$; $9.4x10^{-3}$	$6.2x10^{-3}$ ($1.2x10^{-3}$) $5.0x10^{-3}$; $8.7x10^{-3}$	$1.7x10^{-2}$ ($2.2x10^{-2}$) $5.5x10^{-3}$; $7.5x10^{-2}$	$8.6x10^{-3}$ ($4.4x10^{-3}$) $4.3x10^{-3}$; $1.8x10^{-2}$	$1.1x10^{-2}$ ($4.0x10^{-3}$) $7.6x10^{-3}$; $2.0x10^{-2}$	$1.3x10^{-2}$ ($4.2x10^{-3}$) $7.3x10^{-3}$; $2.0x10^{-2}$	$1.2x10^{-2}$ ($8.8x10^{-3}$) $2.1x10^{-3}$; $2.5x10^{-2}$	$9.7x10^{-3}$ ($9.2x10^{-3}$) $2.1x10^{-3}$; $7.5x10^{-2}$
	Cr	$2.3x10^{-2}$ (0.0) $2.3x10^{-2}$; $2.3x10^{-2}$	$2.3x10^{-2}$ (0.0) $2.3x10^{-2}$; $2.3x10^{-2}$	$4.2x10^{-2}$ ($2.6x10^{-2}$) $2.3x10^{-2}$; $8.5x10^{-2}$	$6.9x10^{-2}$ ($9.9x10^{-2}$) $2.3x10^{-2}$; $3.3x10^{-1}$	$3.9x10^{-2}$ ($1.9x10^{-2}$) $2.3x10^{-2}$; $7.0x10^{-2}$	$3.6x10^{-2}$ ($2.2x10^{-2}$) $2.3x10^{-2}$; $7.6x10^{-2}$	$2.3x10^{-2}$ (0.0) $2.3x10^{-2}$; $2.3x10^{-2}$	$3.3x10^{-2}$ ($1.5x10^{-2}$) $2.3x10^{-2}$; $6.0x10^{-2}$	$3.6x10^{-2}$ ($3.8x10^{-2}$) $2.3x10^{-2}$; $3.3x10^{-1}$
	Cu	$3.8x10^{-1}$ ($2.3x10^{-1}$) $1.2x10^{-1}$; $9.1x10^{-1}$	$3.6x10^{-1}$ ($1.3x10^{-1}$) $2.1x10^{-1}$; $5.4x10^{-1}$	$3.8x10^{-1}$ ($1.9x10^{-1}$) $2.2x10^{-1}$; $8.7x10^{-1}$	$4.2x10^{-1}$ ($8.0x10^{-2}$) $2.9x10^{-1}$; $5.6x10^{-1}$	$4.7x10^{-1}$ ($3.3x10^{-1}$) $2.8x10^{-1}$; 1.3	$4.8x10^{-1}$ ($2.3x10^{-1}$) $2.7x10^{-1}$; 1.1	$4.0x10^{-1}$ ($1.6x10^{-1}$) $2.2x10^{-1}$; $7.6x10^{-1}$	$5.4x10^{-1}$ ($1.6x10^{-1}$) $4.4x10^{-1}$; $9.6x10^{-1}$	$4.3x10^{-1}$ ($2.0x10^{-1}$) $1.2x10^{-1}$; 1.3
	Fe	4.5 (1.8) 2.6 ; 7.7	5.0 (1.2) 3.3 ; 6.6	3.6 ($9.1x10^{-1}$) 2.0 ; 4.7	4.2 (1.4) 2.5 ; 7.2	4.7 (2.2) 2.5 ; 8.6	4.8 ($9.9x10^{-1}$) 3.3 ; 6.6	4.6 (1.5) 2.3 ; 7.5	4.1 ($6.1x10^{-1}$) 2.9 ; 4.9	4.4 (1.4) 2.0 ; 8.6
	Hg	$1.4x10^{-1}$ ($4.8x10^{-2}$) $3.0x10^{-2}$; $1.9x10^{-1}$	$1.2x10^{-1}$ ($7.2x10^{-2}$) $3.8x10^{-2}$; $2.9x10^{-1}$	$3.2x10^{-1}$ ($1.4x10^{-1}$) $1.1x10^{-1}$; $6.1x10^{-1}$	$1.7x10^{-1}$ ($6.3x10^{-2}$) $7.3x10^{-2}$; $2.9x10^{-1}$	$2.0x10^{-1}$ ($1.9x10^{-1}$) $1.4x10^{-2}$; $5.2x10^{-1}$	$3.6x10^{-1}$ ($1.3x10^{-1}$) $1.9x10^{-1}$; $6.0x10^{-1}$	$2.2x10^{-1}$ ($9.2x10^{-2}$) $9.4x10^{-2}$; $3.5x10^{-1}$	$2.7x10^{-1}$ ($1.9x10^{-1}$) $3.7x10^{-2}$; $5.4x10^{-1}$	$2.3x10^{-1}$ ($1.5x10^{-1}$) $1.4x10^{-2}$; $6.1x10^{-1}$
	Mn	$2.0x10^{-1}$ ($1.2x10^{-1}$)	$3.2x10^{-1}$ ($3.1x10^{-1}$)	$3.6x10^{-1}$ ($2.5x10^{-1}$)	$1.6x10^{-1}$ ($5.7x10^{-2}$)	$2.3x10^{-1}$ ($1.8x10^{-1}$)	$2.3x10^{-1}$ ($8.7x10^{-2}$)	$2.0x10^{-1}$ ($9.2x10^{-2}$)	$2.7x10^{-1}$ ($1.5x10^{-1}$)	$2.5x10^{-1}$ ($1.8x10^{-1}$)

		$6.6x10^{-2}$; $4.3x10^{-1}$	$1.5x10^{-1}$; 1.2	$2.3x10^{-1}$; 1.1	$8.7x10^{-2}$; $2.7x10^{-1}$	$8.2x10^{-2}$; $6.6x10^{-1}$	$9.8x10^{-2}$; $3.8x10^{-1}$	$1.2x10^{-1}$; $3.8x10^{-1}$	$1.3x10^{-1}$; $5.5x10^{-1}$	$6.6x10^{-2}$; 1.2
	Ni	$1.9x10^{-2}$ ($9.9x10^{-3}$) $7.2x10^{-3}$; $3.4x10^{-2}$	$1.3x10^{-2}$ ($7.6x10^{-3}$) $4.2x10^{-3}$; $2.8x10^{-2}$	$5.3x10^{-2}$ ($8.7x10^{-2}$) $8.8x10^{-3}$; $2.4x10^{-1}$	$4.6x10^{-2}$ ($4.9x10^{-2}$) $7.3x10^{-3}$; $1.6x10^{-1}$	$4.1x10^{-2}$ ($3.5x10^{-2}$) $7.0x10^{-3}$; $1.1x10^{-1}$	$4.9x10^{-2}$ ($6.3x10^{-2}$) $1.3x10^{-2}$; $2.2x10^{-1}$	$3.2x10^{-2}$ ($2.7x10^{-2}$) $1.1x10^{-2}$; $8.6x10^{-2}$	$5.5x10^{-2}$ ($3.2x10^{-2}$) $1.4x10^{-2}$; $9.4x10^{-2}$	$3.8x10^{-2}$ ($4.7x10^{-2}$) $4.2x10^{-3}$; $2.4x10^{-1}$
	Pb	$3.5x10^{-3}$ ($1.6x10^{-3}$) $2.1x10^{-3}$; $5.4x10^{-3}$	$1.3x10^{-2}$ ($1.1x10^{-2}$) $4.1x10^{-3}$; $3.1x10^{-2}$	$3.3x10^{-3}$ ($1.7x10^{-3}$) $2.1x10^{-3}$; $6.0x10^{-3}$	$3.3x10^{-2}$ ($3.6x10^{-2}$) $1.1x10^{-2}$; $1.3x10^{-1}$	$2.8x10^{-2}$ ($1.5x10^{-2}$) $8.0x10^{-3}$; $5.2x10^{-2}$	$1.3x10^{-2}$ ($8.7x10^{-3}$) $5.9x10^{-3}$; $3.6x10^{-2}$	$1.5x10^{-2}$ ($1.5x10^{-2}$) $4.2x10^{-3}$; $5.4x10^{-2}$	$7.9x10^{-3}$ ($5.0x10^{-3}$) $2.1x10^{-3}$; $1.6x10^{-2}$	$1.4x10^{-2}$ ($1.8x10^{-2}$) $2.1x10^{-3}$; $1.3x10^{-1}$
	Se	$6.0x10^{-2}$ ($4.9x10^{-2}$) $2.3x10^{-2}$; $1.4x10^{-1}$	$3.7x10^{-1}$ ($2.0x10^{-1}$) $2.3x10^{-2}$; $5.9x10^{-1}$	$6.9x10^{-1}$ ($2.3x10^{-1}$) $3.2x10^{-1}$; 1.1	$2.7x10^{-1}$ ($1.1x10^{-1}$) $1.3x10^{-1}$; $4.7x10^{-1}$	$4.0x10^{-1}$ ($1.3x10^{-1}$) $2.5x10^{-1}$; $6.0x10^{-1}$	$2.0x10^{-1}$ ($5.5x10^{-2}$) $1.4x10^{-1}$; $3.3x10^{-1}$	$7.1x10^{-1}$ ($8.0x10^{-1}$) $1.2x10^{-1}$; 2.8	$4.2x10^{-1}$ ($1.9x10^{-1}$) $1.1x10^{-1}$; $6.4x10^{-1}$	$3.9x10^{-1}$ ($3.7x10^{-1}$) $2.3x10^{-2}$; 2.8
	Zn	$2.3x10^{+1}$ (2.1) $2.0x10^{+1}$; $2.6x10^{+1}$	$2.7x10^{+1}$ (4.3) $1.9x10^{+1}$; $3.2x10^{+1}$	$2.6x10^{+1}$ (2.4) $2.3x10^{+1}$; $3.1x10^{+1}$	$3.0x10^{+1}$ (7.9) $2.0x10^{+1}$; $4.2x10^{+1}$	$2.6x10^{+1}$ (4.6) $2.1x10^{+1}$; $3.3x10^{+1}$	$2.6x10^{+1}$ (4.7) $2.2x10^{+1}$; $3.7x10^{+1}$	$2.7x10^{+1}$ (4.0) $2.2x10^{+1}$; $3.4x10^{+1}$	$2.8x10^{+1}$ (4.8) $2.3x10^{+1}$; $3.6x10^{+1}$	$2.7x10^{+1}$ (4.7) $1.9x10^{+1}$; $4.2x10^{+1}$
Swimbladder parasites	*A.crassus*	1.6 (2.4)	6.5 (7.2)	8.9 (9.1)	2.4 (2.5)	8 ($1x10^{1}$)	$1.1x10^{1}$ (9.1)	5.7 (6.8)	$3.3x10^{-1}$ ($5x10^{-1}$)	5.6 (7.6)
	Abundance	0 ; 6	0 ; $2.5x10^{1}$	0 ; $3.1x10^{1}$	0 ; 7	0 ; $3.3x10^{1}$	0 ; $2.4x10^{1}$	0 ; $2.1x10^{1}$	0 ; 1	0 ; $3.3x10^{1}$

POP: persistent organic pollutants ($ng \cdot g^{-1}$ wet weight), TEs: trace elements ($\mu g \cdot g^{-1}$ dry weight), n: eel number. *A. crassus* Abundance: number of nematodes in swimbladders. The data show given for each contaminant show, on the first line, the mean (± standard deviation) and, on the second line, the minimum and maximum as "min ; max" for each catchment.

Table S2. Settings and total pseudo-variance outputs of GLP and GCP random forest models. Related to Figure 2 in the main text.

		GLP models							GCP models						
		Model calibration			All predictors		Significant predictors		Model calibration			All predictors		Significant predictors	
Traits	***n***	**ntree**	**mtry**	**node**	**N_{pred}**	**R^2**	**N_{pred}**	**R^2**	**ntree**	**mtry**	**node**	**N_{pred}**	**R^2**	**N_{pred}**	**R^2**
TL	75	400	1	8	5	13.9	5	13.9	500	14	25	42	45.1	9	38.8
TW	75	450	1	2	5	18.3	4	18.3	450	14	11	42	45.8	12	38.6
GR	75	300	1	7	5	24.8	5	24.8	250	14	23	42	29.6	9	24.8
AGE	75	600	1	11	5	23.1	5	23.1	300	14	21	42	30.5	4	24.4
K	75	250	5	4	5	30	5	30	350	14	4	42	28	14	26
P11KT	62	250	5	4	5	37.2	2	37.2	300	14	10	42	39.3	8	34.4
OI	75	550	1	5	5	39.6	5	39.6	500	14	13	42	43.5	9	34.8
DTI	75	450	1	9	5	9.3	5	9.3	450	14	8	42	22.4	5	14.8
GSI	75	300	1	2	5	9.9	3	9.9	250	2	19	42	20.9	8	11.3
LIPIDS	75	500	1	6	5	42.4	4	42.4	500	14	25	42	48.7	7	39.9
RP	75	250	1	9	5	35.3	5	35.3	450	14	25	42	54.4	9	45.3

GLP: geographic and local predictors; GCP: geographic, local and contamination predictors; n: number of eels in models; ntree: number of decision regression trees; mtry: number of predictors randomly selected at each node among whole predictors; node: maximum number of nodes; N_{pred}: number of total or significant predictors in models; R^2: total pseudo-variance (%).

Table S3. Design of bioaccumulation scenarios. Related to Figures 5 and 6 in the main text.

		Concentration threshold		Optimistic scenario		Pessimistic scenario		Bioaccumulation ratio shifts		
Contaminant groups	**Compounds**	**Q25%**	**Q75%**	**min - max**	**μ (SD)**	**min - max**	**μ (SD)**	**min**	**μ**	**max**
Muscular POPs	BTBPE	0.01	0.03	0.01 - 0.01	0.01 (0)	0.03 - 0.2	0.1 (0.04)	3	10	18
	HCB	0.3	1	0.1 - 0.3	0.2 (0.05)	2.0 - 40.0	20 (10)	9.3	110	360
	PCBs	20	200	5.0 - 7.0	10 (4)	300 - 8000	4000 (2000)	17	400	1700
	DDTs	8	50	1.0 - 7.0	4 (2)	50 - 200	100 (50)	7	32	230
	As	0.1	0.3	0.03 - 0.1	0.07 (0.03)	0.3 - 1	0.7 (0.2)	2.3	9.6	42

Gonadic TEs	Cd	0.01	0.05	0.002 - 0.01	0.008 (0.003)	0.05 - 0.3	0.2 (0.07)	3.8	23	140
	Cr	0.06	0.1	0.02 - 0.05	0.04 (0.009)	0.1 - 0.9	0.5 (0.2)	2	12	37
	Cu	0.7	1	0.4 - 0.7	0.6 (0.08)	1.0 - 3.0	2 (0.7)	1.7	3.9	7.8
	Fe	10	30	7.0 - 10.0	9 (1)	30 - 50	40 (6)	2.3	4.5	7.7
	Mn	0.2	0.4	0.1 - 0.2	0.2 (0.03)	0.4 - 0.8	0.6 (0.1)	1.5	3.4	6.7
	Ni	0.02	0.1	0.006 - 0.02	0.02 (0.005)	0.2 - 0.8	0.5 (0.2)	6.4	30	150
	Pb	0.002	0.01	0.002 - 0.002	0.002 (0)	0.02 - 0.2	0.1 (0.04)	8.6	45	77
	Se	0.6	1	0.2 - 0.5	0.4 (0.09)	1.0 - 3.0	2 (0.6)	2	5.4	14
	Zn	60	90	30 - 60	50 (8)	90 - 200	100 (20)	1.5	2.6	4.9
Hepatic TEs	As	0.02	0.2	0.002 - 0.02	0.01 (0.006)	0.2 - 1	0.8 (0.4)	7.1	60	660
	Cd	0.2	1	0.04 - 0.2	0.1 (0.04)	1.0 - 5.0	3 (1)	7.6	31	140
	Co	0.04	0.2	0.02 - 0.04	0.03 (0.007)	0.2 - 0.9	0.6 (0.2)	4.2	17	43
	Cr	0.02	0.06	0.02 - 0.02	0.02 (0)	0.06 - 0.2	0.1 (0.03)	2.7	4.8	7.1
	Cu	20	50	3.0 - 20.0	10 (6)	60 - 100	90 (20)	2.3	6.8	45
	Fe	300	700	60 - 300	200 (60)	700 - 2000	1000 (300)	2.7	7.9	31
	Mn	3	4	1.0 - 3.0	2 (0.5)	4.0 - 8.0	6 (0.9)	1.5	3	6
	Ni	0.02	0.05	0.007 - 0.02	0.01 (0.004)	0.06 - 1	0.5 (0.3)	2.7	38	140
	Pb	0.04	0.2	0.008 - 0.04	0.02 (0.008)	0.3 - 1	0.7 (0.3)	7.1	33	150
	Se	8	20	3.0 - 8.0	5 (1)	20 - 30	20 (6)	2	4.9	13
	Zn	100	200	60 - 100	80 (10)	200 - 200	200 (20)	1.6	2.4	3.8
Muscular TEs	As	0.02	0.2	0.02 - 0.02	0.02 (0)	0.2 - 2	0.9 (0.4)	9.9	39	69
	Cd	0.002	0.002	0.002 - 0.002	0.002 (0)	0.002 - 0.02	0.01 (0.005)	1.1	4.9	8.6
	Cr	0.02	0.02	0.02 - 0.02	0.02 (0)	0.05 - 0.3	0.2 (0.08)	2.1	8	13
	Cu	0.3	0.5	0.1 - 0.3	0.2 (0.05)	0.5 - 1	0.9 (0.2)	1.7	4.5	10
	Fe	3	5	2.0 -3.0	3 (0.4)	5.0 - 9.0	7 (1)	1.5	2.5	4.3
	Hg	0.1	0.3	0.02 - 0.1	0.07 (0.03)	0.3 - 0.6	0.5 (0.08)	2.6	6.9	40
	Mn	0.2	0.3	0.07 - 0.1	0.1 (0.02)	0.3 - 1	0.7 (0.2)	2.1	6.8	18
	Ni	0.01	0.05	0.004 - 0.01	0.008 (0.002)	0.05 - 0.2	0.1 (0.05)	4.5	18	57
	Pb	0.005	0.02	0.002 - 0.005	0.003 (0.0007)	0.02 - 0.1	0.07 (0.03)	4.1	20	60
	Se	0.2	0.6	0.02 - 0.2	0.1 (0.04)	0.6 - 3	2 (0.6)	3.2	17	110
	Zn	20	30	20 - 20	20 (1)	30 - 40	40 (3)	1.3	1.7	2.2
							μ (SD)	**4 (3.3)**	**28.6 (67.2)**	**123 (298)**

POP: persistent organic pollutants (ng·g^{-1} wet weight), TEs: trace elements (μg·g^{-1} dry weight). The data show the average (μ ± SD, standard deviation) and minimum and maximum (min – max) of contaminants concentrations for optimistic and pessimistic scenarios (one significant digit is displayed). The concentration thresholds for simulation of optimistic and pessimistic scenarios are respectively bounded from the Q0% – Q25% and Q75% – Q100% quartiles of the observed concentrations measured in the sampled female silver eels. Bioaccumulation ratio shifts represent the ratio of minimum (min), average (μ) and maximum (max) concentrations values between the two scenarios.

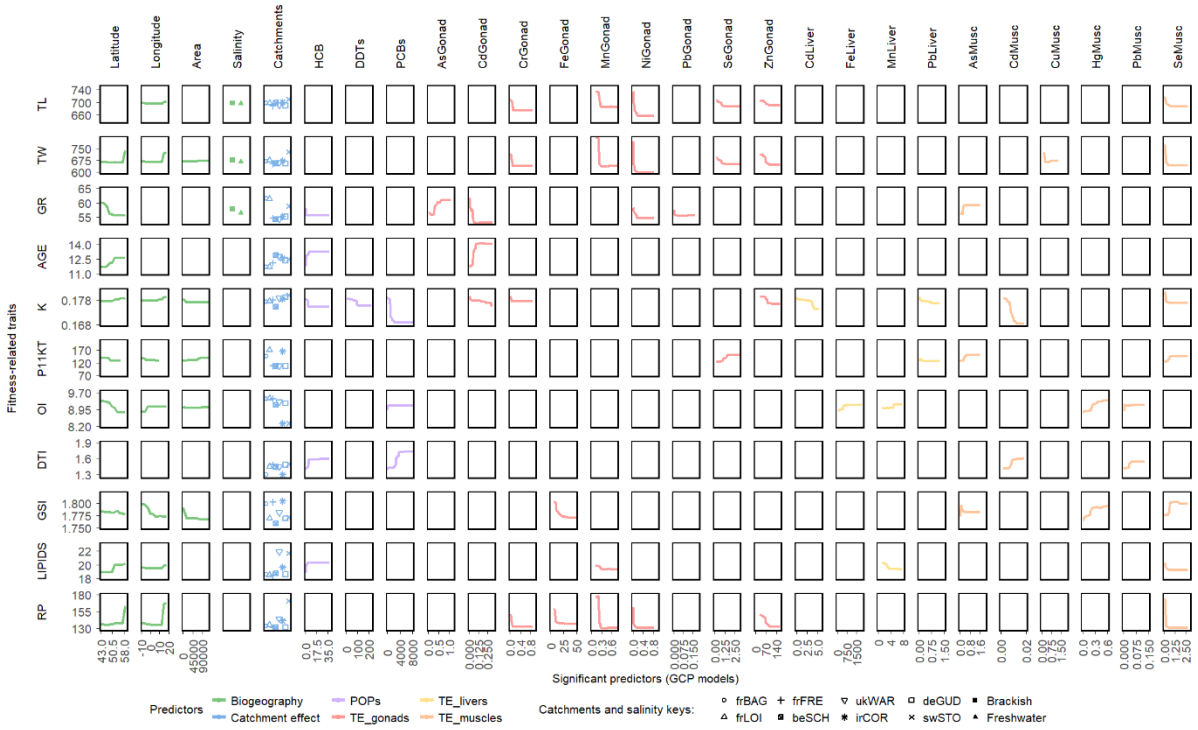

Figure S1. The marginal effect of geographic, local and contamination predictors (GCP) on the female silver eel fitness-related traits. Related to Figure 4. Each plot shows partial dependence of significant predictors after permutation test (n = 75 silver eels, 62 for P11KT trait). Biogeographic predictors include latitude, longitude, catchment area and salinity. The local predictor represents the site effect of each catchment. Contaminants include POPs (persistent organic pollutants) in muscles (labelled "Musc") and TEs (trace elements) in gonads, livers and muscles. TL: total length at silvering (mm), TW: total weight (g), GR: growth rate (mm·year^{-1}), AGE: estimated age (year), K: Fulton condition index (no unit), P11KT: plasma 11-ketotestoterone (pg·ml^{-1}), OI: Pankhurst's ocular index (%), DTI: digestive tract index (%), GSI: gonado-somatic index (%), LIPIDS: muscular lipid content (%), RP: reproductive potential index (g of eggs). Empty cells correspond to non-significant predictors.

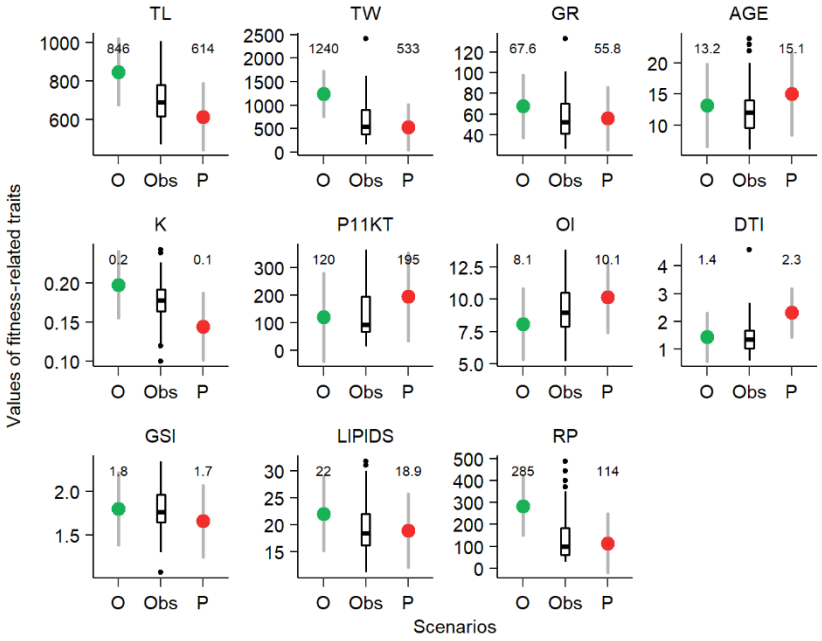

Figure S2. Distribution of fitness-related traits of female silver eels across an increasing bioaccumulation gradient. Related to Figure 5. Traits were predicted from geographic, local and contamination predictors (GCP models) in optimistic (label O, green dots) and pessimistic (label P, red dots) scenarios of contamination (see methods section) and were compared to the observed situation (label Obs, boxplot). The mean predicted values of traits and the mean confidence intervals (upper and lower, grey segments) of OOB prediction (95%) are both displayed. TL: total length at silvering (mm), TW: total weight (g), GR: growth rate (mm·year^{-1}), AGE: estimated age (year), K: Fulton condition index (no unit), P11KT: plasma 11-ketotestoterone (pg·ml^{-1}), OI: Pankhurst's ocular index (%), DTI: digestive tract index (%), GSI: gonado-somatic index (%), LIPIDS: muscular lipid content (%), RP: reproductive potential index (g of eggs). Empty cells correspond to non-significant predictors.