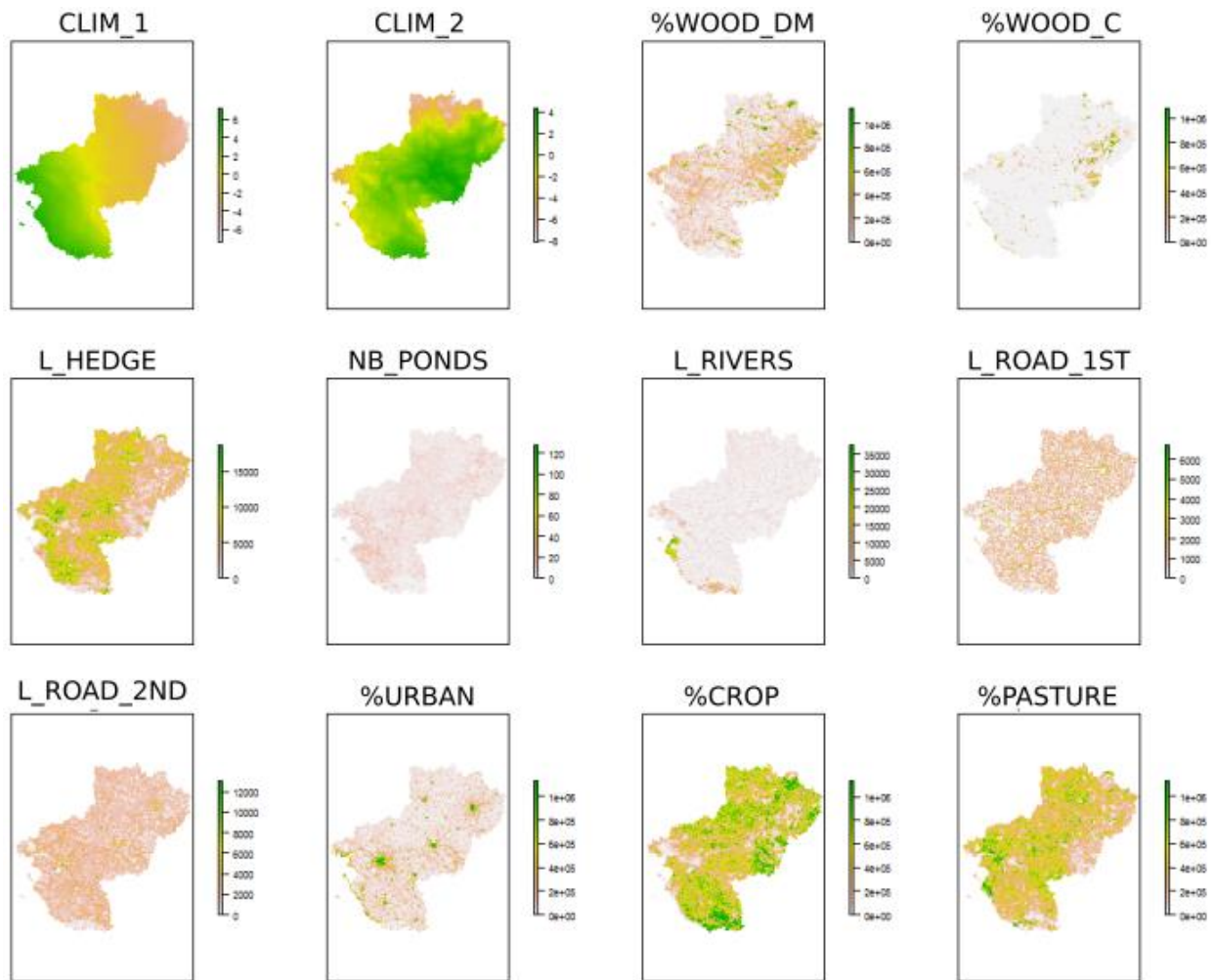


## Appendix 2 – Environmental variables: additional information

Variable category	Code	Variable description	References
Climatic	CLIM_1	first axis from a PCA on 12 worldclim variables and altitude (see Table 4)	Rothermel and Semlitsch, 2002; Pineda and Lobo, 2009; Girardello <i>et al.</i> , 2010; Hartel <i>et al.</i> , 2010
	CLIM_2	second axis from a PCA on 12 worldclim variables and altitude (see Table 4)	
Land cover	%WOOD_DM	Proportion of deciduous and mixed forest	Pope, Fahrig and Merriam, 2000; Pellet, Guisan and Perrin, 2004; Cushman, 2006; Zanini <i>et al.</i> , 2008; Hartel <i>et al.</i> , 2010; Boissinot <i>et al.</i> , 2015; Zhang <i>et al.</i> , 2016; Collins and Fahrig, 2017; Boissinot, Besnard and Lourdais, 2019
	%WOOD_C	Proportion of coniferous forest	
	%CROP	Proportion of crop	
	%PASTURE	Proportion of permanent pasture	
	NB_PONDS	Ponds density	
	L_HEDGE	Hedgerow density	
	L_ROAD_1ST	Primary Road density out of urban area	
	L_ROAD_2ND	Secondary Road density out of urban area	
	L_RIVER	Permanent rivers and canals density	
%URBAN	Proportion of urban (build up)	Knutson <i>et al.</i> , 1999; Lehtinen, Galatowitsch and Tester, 1999; Mann <i>et al.</i> , 2009; Hartel <i>et al.</i> , 2010; Boissinot, Besnard and Lourdais, 2019	
		Scribner <i>et al.</i> , 2001; Janin <i>et al.</i> , 2009; Hartel <i>et al.</i> , 2010	
		Janin <i>et al.</i> , 2009; Ribeiro <i>et al.</i> , 2011; Arntzen <i>et al.</i> , 2017; Boissinot, Besnard and Lourdais, 2019	
		Joly <i>et al.</i> , 2001; Pellet, Guisan and Perrin, 2004; Vos <i>et al.</i> , 2007; Angelone, Kienast and Holderegger, 2011; Boissinot, Besnard and Lourdais, 2019	
		Vos and Chardon, 1998; Carr and Fahrig, 2001; Hels and Buchwald, 2001; Cushman, 2006; Eigenbrod, Hecnar and Fahrig, 2008; Hartel <i>et al.</i> , 2010; Petrovan and Schmidt, 2016; Boissinot, Besnard and Lourdais, 2019	
		Ficetola <i>et al.</i> , 2008	
		Rubbo and Kiesecker, 2005; Gagné and Fahrig, 2007; Hartel <i>et al.</i> , 2010; Cayuela <i>et al.</i> , 2015; Zhang <i>et al.</i> , 2016	

**Table 1. Environmental variables used for species distribution modelling of each amphibian species in Pays de la Loire region and associated references.** See Figure 2/ table 4 for the list of climatic variables.



**Figure 1. Environmental variables used for modelling species distribution (before scaling). Final maps resolution: 500m. CLIM\_1 and CLIM\_2 initial resolution was 5km<sup>2</sup>.**

Variables	VIF
CLIM_1	1,26
CLIM_2	1,09
%WOOD_DM	2,86
%WOO8C	1,89
L_HEDGE	1,89
NB_PONDS	1,18
L_RIVERS	1,27
L_ROAD_1ST	1,05
L_ROAD_2ND	1,18
%URBAN	2,66
%CROP	5,26
%PASTURE	4,67

**Table 2. Variance inflation factor values for each predictor**

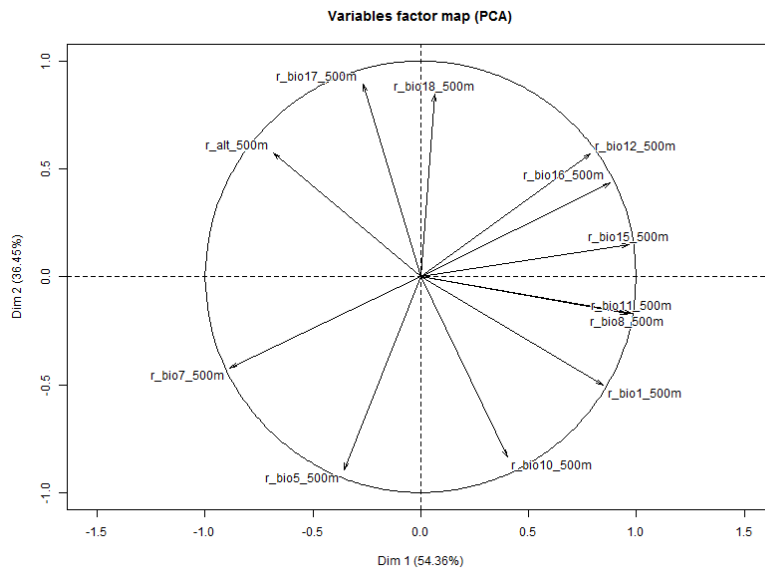
	CLIM_1	CLIM_2	%WOOD_DM	%WOO8C	L_HEDGE	NB_PONDS	L_RIVERS	L_ROAD_1ST	L_ROAD_2ND	%URBAN	%CROP	%PASTURE
CLIM_1	1,00											
CLIM_2	0,00	1,00										
%WOOD_DM	-0,19	0,08	1,00									
%WOO8C	-0,13	0,07	0,31	1,00								
L_HEDGE	0,14	-0,19	-0,33	-0,28	1,00							
NB_PONDS	0,15	0,03	-0,10	-0,09	0,27	1,00						
L_RIVERS	0,28	-0,03	-0,10	-0,06	-0,09	0,03	1,00					
L_ROAD_1ST	-0,06	0,01	-0,06	-0,05	0,04	0,06	-0,06	1,00				
L_ROAD_2ND	0,08	0,04	-0,20	-0,19	0,10	0,09	-0,11	0,08	1,00			
%URBAN	0,15	0,08	-0,06	-0,08	-0,16	0,02	-0,03	0,12	0,25	1,00		
%CROP	-0,08	0,07	-0,44	-0,30	0,01	-0,14	-0,14	0,04	0,08	-0,31	1,00	
%PASTURE	0,09	-0,16	-0,28	-0,25	0,57	0,27	0,18	-0,02	0,04	-0,22	-0,38	1,00

**Table 3. Pearson correlation test for each predictor**

**Climatic variables**

		Contribution (ACP)					
		Dim.1	Dim.2	Dim.3	Dim.4	Dim.5	
VARIABLES	Altitude	r_alt	7,18	7,52	0,62	44,81	22,89
	Annual mean temperature (°C)	r_bio1	10,91	5,80	4,91	1,11	2,24
	Mean temperature of warmest quarter (°C)	r_bio10	2,47	16,01	18,18	12,75	1,48
	Mean temperature of coldest quarter (°C)	r_bio11	14,67	0,66	0,02	1,48	1,88
	Annual precipitation (mm)	r_bio12	9,50	7,44	0,14	6,53	20,79
	Precipitation seasonality (C of V)	r_bio15	14,29	0,52	1,82	5,94	0,83
	Precipitation of wettest quarter (mm)	r_bio16	11,82	4,32	0,01	6,77	11,86
	Precipitation of driest quarter (mm)	r_bio17	1,10	18,31	14,72	2,48	0,17
	Precipitation of warmest quarter (mm)	r_bio18	0,06	16,39	43,64	13,22	0,66
	Max temperature of warmest week (°C)	r_bio5	1,95	18,28	11,16	2,30	6,93
	Temperature annual range (Bio05-Bio06) (°C)	r_bio7	12,01	4,07	4,43	1,96	5,07
	Mean temperature of wettest quarter (°C)	r_bio8	14,03	0,67	0,34	0,64	25,19

**Table 4. variable selection and their contribution for each axis of the PCA**



**Figure 2. Representation of the attributes on the factors 1 and 2 obtain by PCA by descriptor. We use layer for Worldclim at regional extent to obtain 2 layers according to axis 1 (CLIM\_1) and axis 2 (CLIM\_2) of the ACP. Final resolution was 500m to homogenize pixels size of climatic variables and landscape variables layers.**

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