SUPPORTING INFORMATION

for the paper

C. Cianfrani, O. Broennimann, A. Loy, A. Guisan**.** More than range exposure: global otters' vulnerability to climate change. *Biological Conservation*.

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S1 – Species occurrences

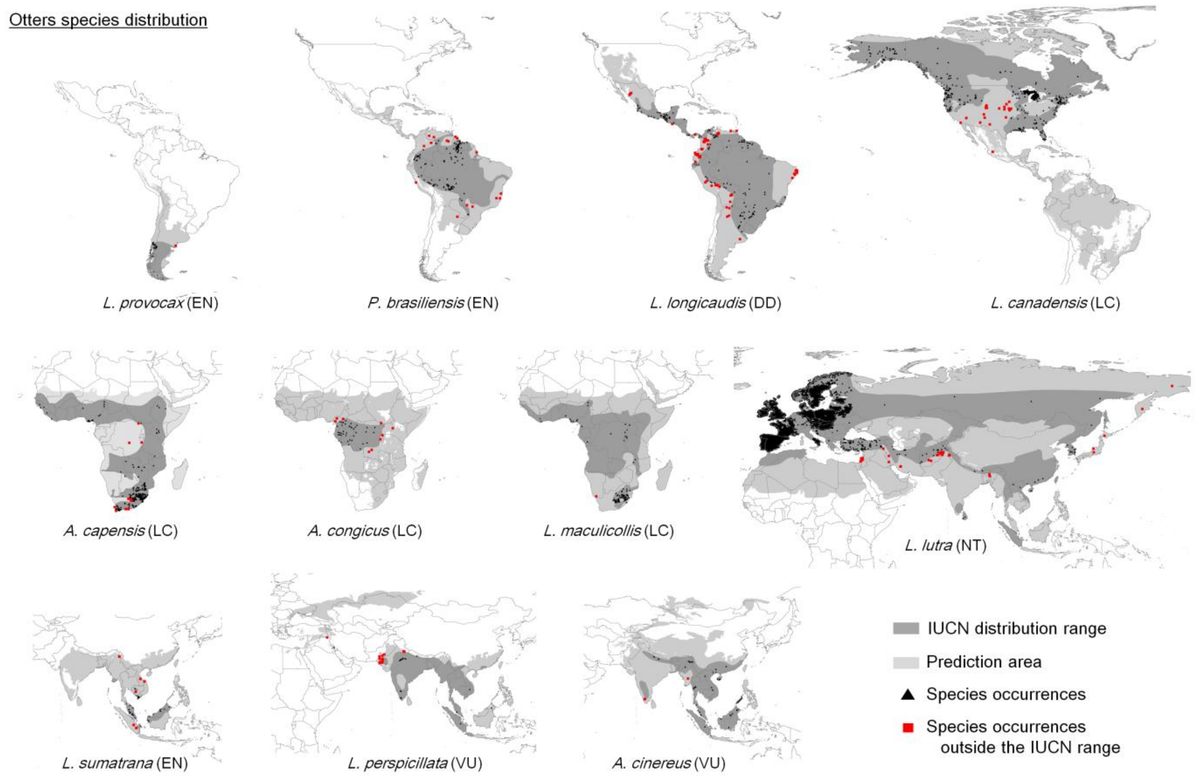
Table S1 - Freshwater otter species, inhabited region, IUCN population trend, references from part of the occurrences were gathered (or georeferenced), the number of occurrences coming from these references and total number of occurrences (occurrences from GBIF and occurrences number from references) used to build models.

Species	**Region**	**IUCN population trend**	**References from where occurrences were gathered**	**Number of occurrences gathered from literature**	**Occurrences number total (GBIF+literature)**
Lontra canadensis (North American river otter)	North America	Least Concern Stable	(Larivière and Lyle, 1998)	0	1354
Lontra longicaudis (Neotropical otter)	Central and South America	Near Threatened Decreasing	(Astua et al., 2010; González and Utrera, 2001; Rheingantz et al., 2011)	114	514
Pteronura brasiliensis (Giant river otter)	South America	Endangered Decreasing	(Carter and Rosas, 1997; Díaz and Sánchez, 2002; Evangelista and Rosas, 2001; Lima et al., 2012; Utreras et al., 2005; van Damme et al., 2002)	150	180
Lontra provocax (Southern river otter)	South America	Endangered Decreasing	(Cassini et al., 2010; Medina, 1998; Porro and Chehébar, 1996)	34	104
Aonyx congicus (Congo Clawless Otter)	Africa	Near Thretened Decreasing	(Jacques et al., 2009)	48	48*
Aonyx capensis (African Small Clawed Otter)	Africa	Near Thretened Decreasing	(Angelici et al., 2005; Jacques et al., 2009; Nel and Somers, 2007; Rowe-Rowe, 1992; Rowe-Rowe, 1995)	231	276
Hydrictis maculicollis (Spotted-necked Otter)	Africa	Near Thretened Decreasing	(Angelici et al., 2005; Lejeune and Frank, 1988; Rowe-Rowe, 1992; Rowe-Rowe, 1995)	99	109
Lutra lutra (Eurasian otter)	Europe and Asia	Near Threatened Decreasing	(Baryshnikov and Puzachenko, 2011; Cianfrani et al., 2011; Khan et al., 2012; Lau et al., 2010)	0	67144
Lutrogale perspicillata (Smooth coated otter)	Asia	Vulnerable Decreasing	(Acharya et al., 2009; Anoop and Hussain, 2004; Bernard et al., 2013; Goldthorpe et al.,	55	55*

			2010; Hussain and Choudhury, 1997; Khan et al., 2009; Nawab and Hussain, 2012; Omer et al., 2012)		
Aonyx cinereus (Asian Small-clawed otter)	Asia	Vulnerable A2acd Decreasing	(González and Utrera, 2001; Hon et al., 2010; Lau et al., 2010; Matsubayashi et al., 2007; Perinchery et al., 2011; Steinmetz et al., 2006; Zaw et al., 2008)	64	77
Lutra sumatrana (Hairy-nosed otter)	Asia	Endangered A2cd Decreasing	(Maddox et al., 2007; Sasaki et al., 2009)	34	34*

*No data occurrences in GBIF database.

Figure S1 – Maps of: 1) IUCN distribution range of the eleven freshwater otter species, 2) prediction areas: areas where the Species Distribution Models were projected, which correspond to the biomes occupied by the species and 3) known occurrences of the species.



S2 – Model evaluation

***Table S2* -** Mean validation values for each species models obnained through TSS and Boyce index.

Species	TSS (mean)	Boyce (mean)
A. capensis	0.63	0.99
A. cinereus	0.66	0.93
A. congicus	0.76	0.87
L. canadensis	0.60	0.98
L. longicaudis	0.62	0.89
L. provocax	0.72	0.86
L. lutra	0.62	1.00
H. maculicollis	0.61	0.97
L. sumatrana	0.71	0.93
L. perspicillata	0.57	0.93
P. brasiliensis	0.53	0.98

We used the TSS and Boyce index to assess model performance. We used two indices because while TSS present problems for presence-only data or for comparisons between species when the extents of calibration area differ, the Boyce index only requires presences and measures how much model predictions differ from random distribution of the observed presences across the prediction gradient. It is continuous and varies between -1 and+1 where positive values indicate a model which present predictions are consistent with the distribution of presences in the evaluation dataset, values close to zero mean that the model is not different from a random model, negative values indicate counter predictions, i.e., predicting poor quality areas where presences are more frequent.

S3 – Species climate change vulnerability components integration

Each components of climate change vulnerability were converted in an index going from -100 to +100, where positive values indicate positive effect of climate change and negative values indicate negative effect on climate change (Table S4).

Table S3 – Vulnerability component significance and conversion

Components	**Original component values ranges**	**Significance of original values**	**Original component values corresponding to higher vulnerability**	**Component conversion**	**New component values index corresponding to higher vulnerability**	**Component name in the vulnerability formula**
Specialization (S)	0; 1	0 = minimum of S 1 = maximum of S	1	-1*S *100	-100	S
Margi nality (M)	0; 1	0 = minimum of M 1 = maximum of M	1	-1*M*100	-100	M
Extent % change (Ex)	-100; +100	-100 = maximum of Ex reduction +100 = maximum of Ex increasing	-100	Ex	-100	Ex
Edges index % change (Ed)	-100; +100	-100 = maximum of Ed reduction +100 = maximum of Ed increasing	-100	Ed	-100	Ed
Perim/Area ratio index % change (P/A)	-100; +100	-100 = maximum P/A reduction +100 = maximum of P/A increasing	+100	-1(P/A)	-100	P/A
Shape index % change (Sh)	-100; +100	-100 = maximum Sh reduction +100 = maximum Sh increasing	+100	-1(Sh)	-100	Sh
Core area index % change (CA)	-100; +100	-100 = maximum CA reduction +100 = maximum CA increasing	-100	CA	-100	CA
Protected area coverage % change (PA)	-100; +100	-100 = maximum PA reduction +100 = maximum PA increasing	-100	PA	-100	PA
Human footprint % change (HF)	-100 ; +100	-100 = maximum HF reduction	+100	-1(HF)	-100	HF

		+100 = maximum HF increasing				

We then calculated an index for sensitivity, for exposure and for vulnerability by doing a mean of components.

Vulnerability index = (S + M + Ex + Fr + PA + HF) / 6

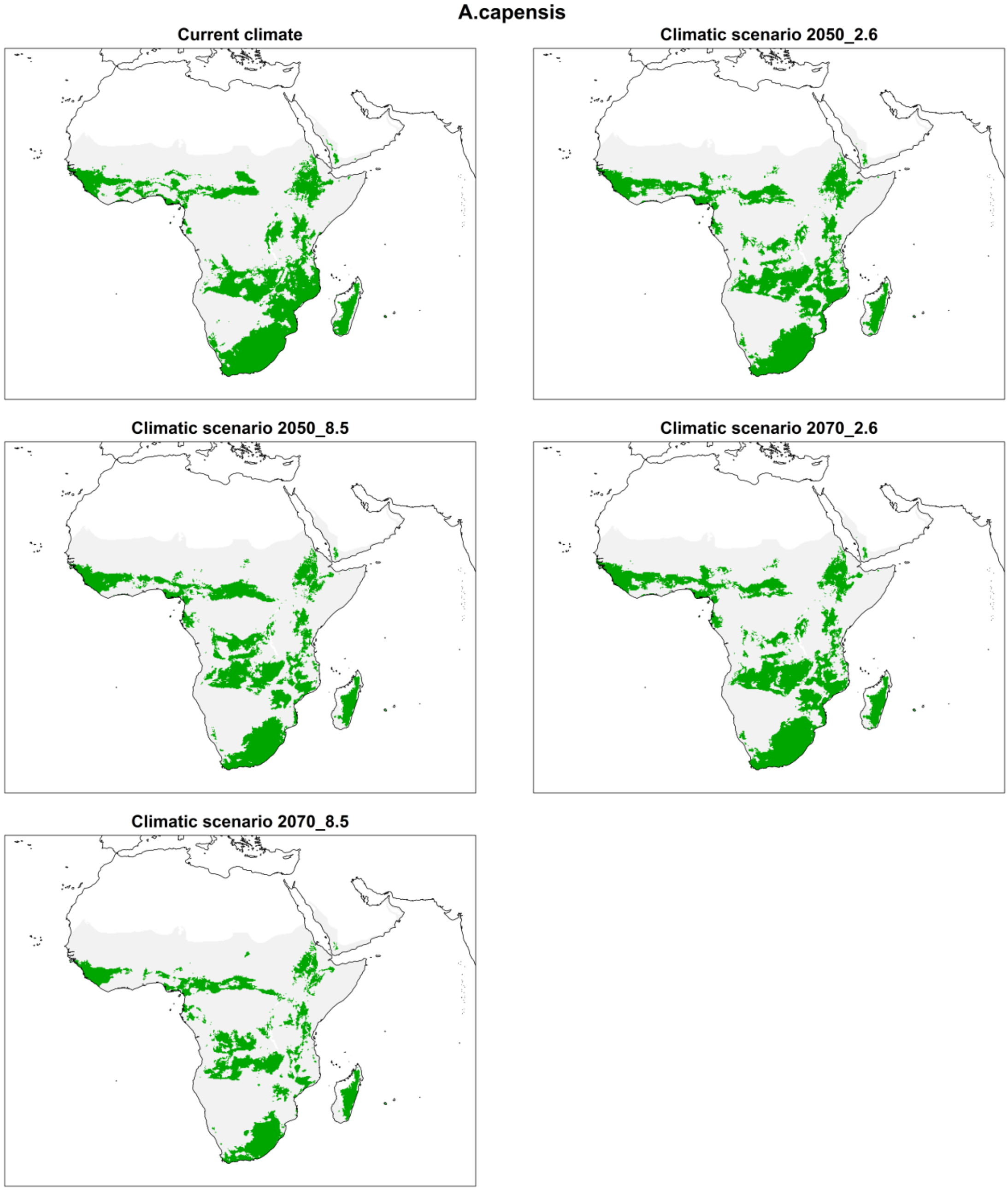
S4 – Measures of climatic niche sensitivity to climate change

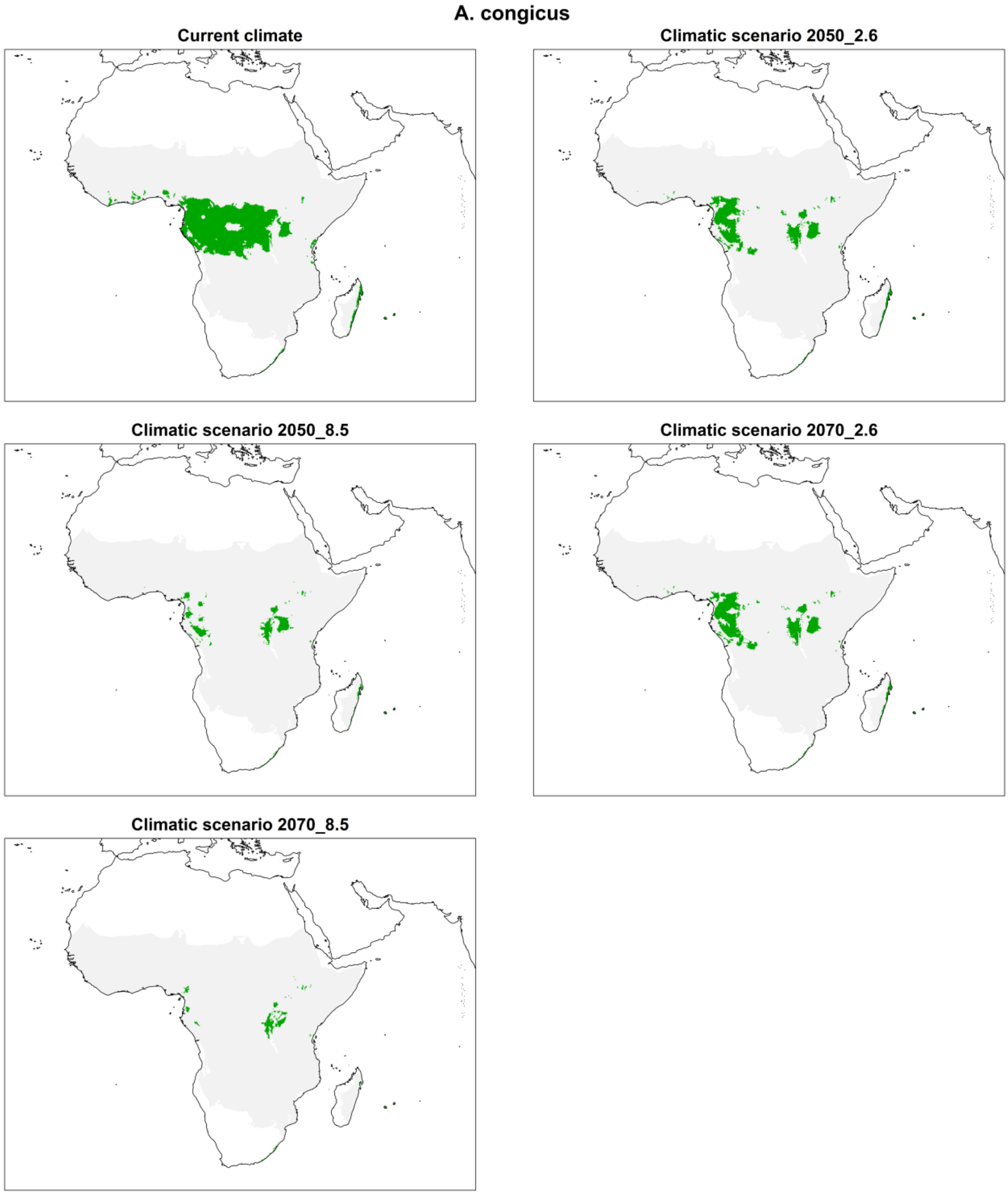
Table S4 **–** Otters' climatic niche. For each climatic variables we calculated : variable importance (Imp.); specialization (Spec.) and marginality (Marg.). Specialization is computed as one minus the ratio of the standard deviation of the distribution of the variable inside the suitable climate to that of the background across the world. Small specialization values (near 0) indicate generalist species, and high values (near 1) indicate specialized species. Marginality is computed as the absolute difference between the mean values within the biome and the mean values within the species' suitable climate; the absolute difference is divided by 1.96 times the standard deviation of the variable within the world

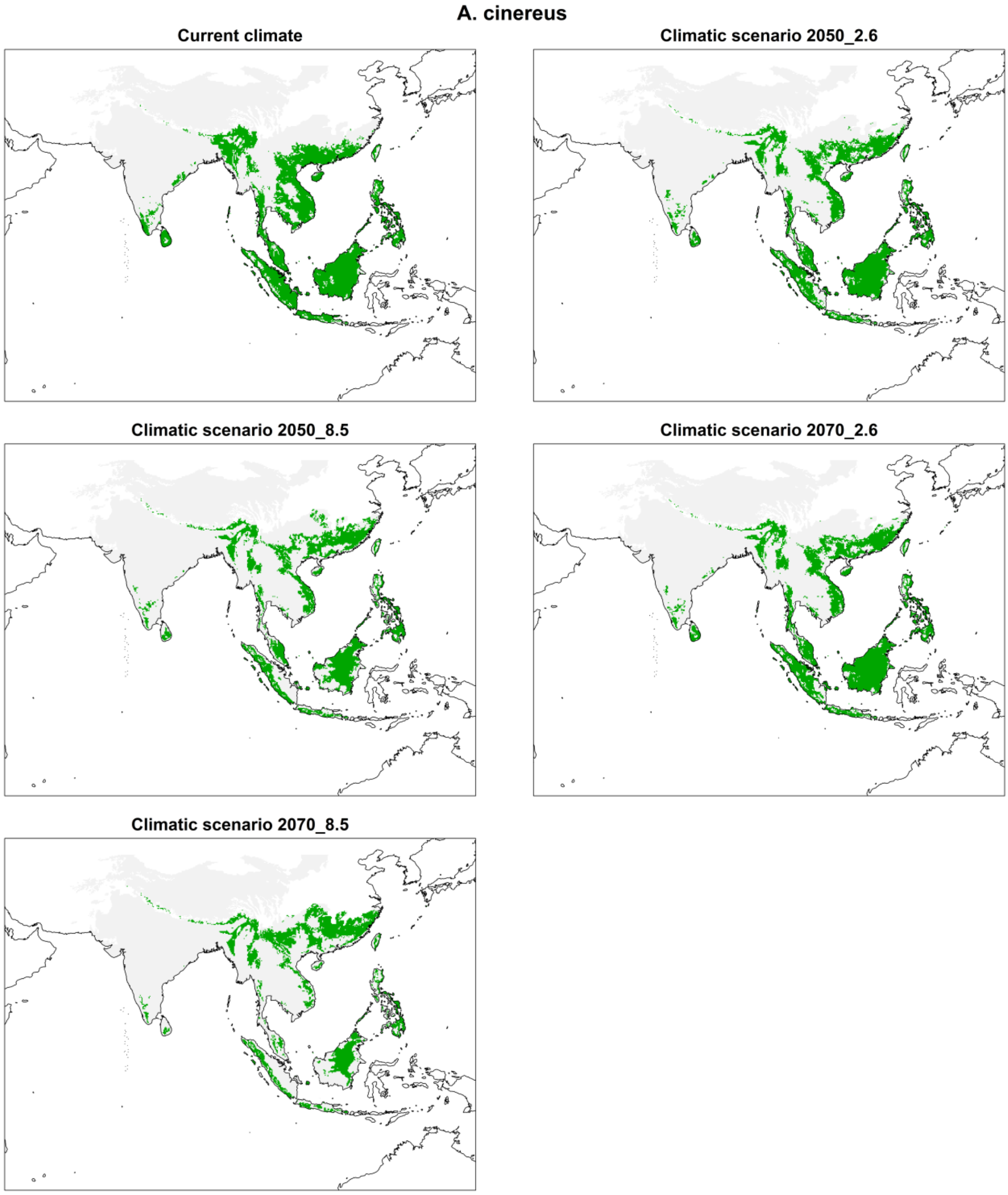
		L. prov.	***P. bras***	***L. long.***	***L. can.***	***A. cap.***	***A. cong.***	***H. mac.***	***L. lutra***	***L. sum.***	***L. persp.***	***A. cin.***
Ann. Mean Temp.	VarImp	6.34	55.78	9.72	69.87	61.03	8.62	28.76	33.79	22.72	42.32	19.72
	Spec	0.83	0.94	0.82	0.55	0.75	0.91	0.75	0.54	0.89	0.91	0.82
	Marg	0.01	0.61	0.55	0.19	0.45	0.55	0.48	0.10	0.61	0.60	0.55
Mean Diurnal range	VarImp	11.72	6.19	4.58	7.27	3.58	25.39	5.01	2.84	14.81	6.72	21.62
	Spec	0.28	0.57	0.43	0.35	0.27	0.70	0.25	0.36	0.72	0.33	0.61
	Marg	0.17	0.12	0.00	0.00	0.39	0.14	0.15	0.24	0.44	0.13	0.36
Mean Temp. Wettes Quarter	VarImp	31.84	9.63	5.81	9.10	8.56	3.05	6.99	12.98	7.83	5.65	6.91
	Spec	0.73	0.92	0.79	0.33	0.69	0.87	0.74	0.47	0.86	0.75	0.84
	Marg	0.48	0.51	0.47	0.21	0.35	0.42	0.36	0.04	0.50	0.59	0.50
Prec. Seasonality	VarImp	14.17	12.40	5.96	3.81	11.84	51.63	27.76	4.35	23.67	11.13	11.69
	Spec	0.58	0.44	0.40	0.52	0.30	0.57	0.34	0.36	0.51	0.05	0.16
	Marg	0.45	0.14	0.06	0.37	0.37	0.19	0.00	0.23	0.43	0.70	0.03
Prec. Wettest Quarter	VarImp	13.35	11.11	65.96	2.99	20.96	4.40	10.22	23.25	5.76	4.86	10.28
	Spec	0.00	0.36	0.18	0.52	0.00	0.58	0.18	0.34	0.27	0.00	0.00
	Marg	0.05	1.03	0.82	0.05	0.44	0.56	0.40	0.01	1.08	0.80	1.16
Prec. Driest Quarter	VarImp	9.98	11.03	6.83	4.52	13.96	6.76	7.70	14.94	12.80	4.79	5.85
	Spec	0.00	0.00	0.00	0.25	0.65	0.12	0.14	0.46	0.00	0.14	0.00
	Marg	0.43	0.76	0.45	0.24	0.21	0.35	0.11	0.07	1.74	0.13	0.77

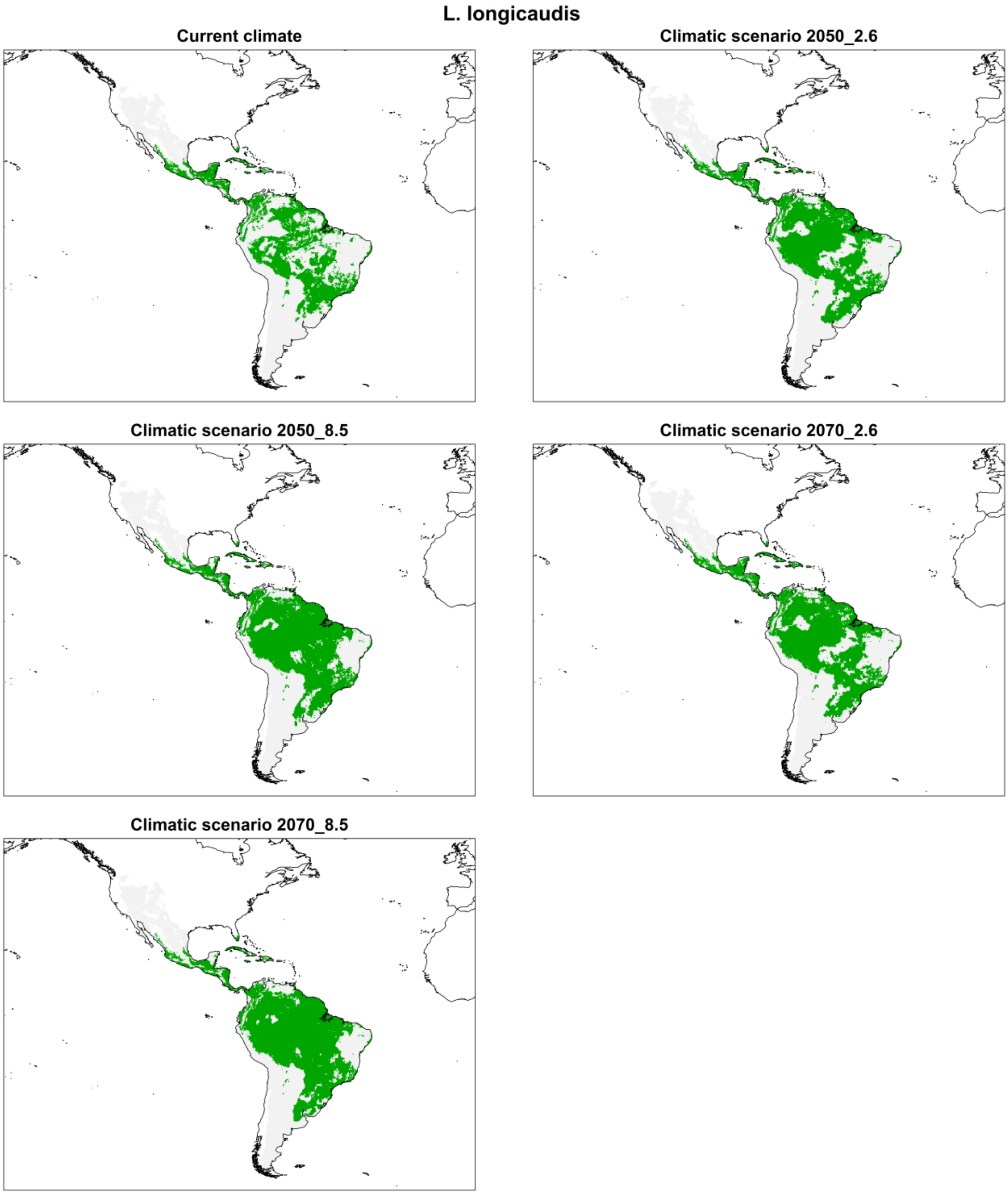
S5 – Species distribution models under current and future climatic conditions

***Figure S5a* -** Model projections of climate-driven changes in habitat suitability for the 11 freshwater otter species of the world: green indicates suitable areas , and grey represents unsuitable areas within the projected zone.

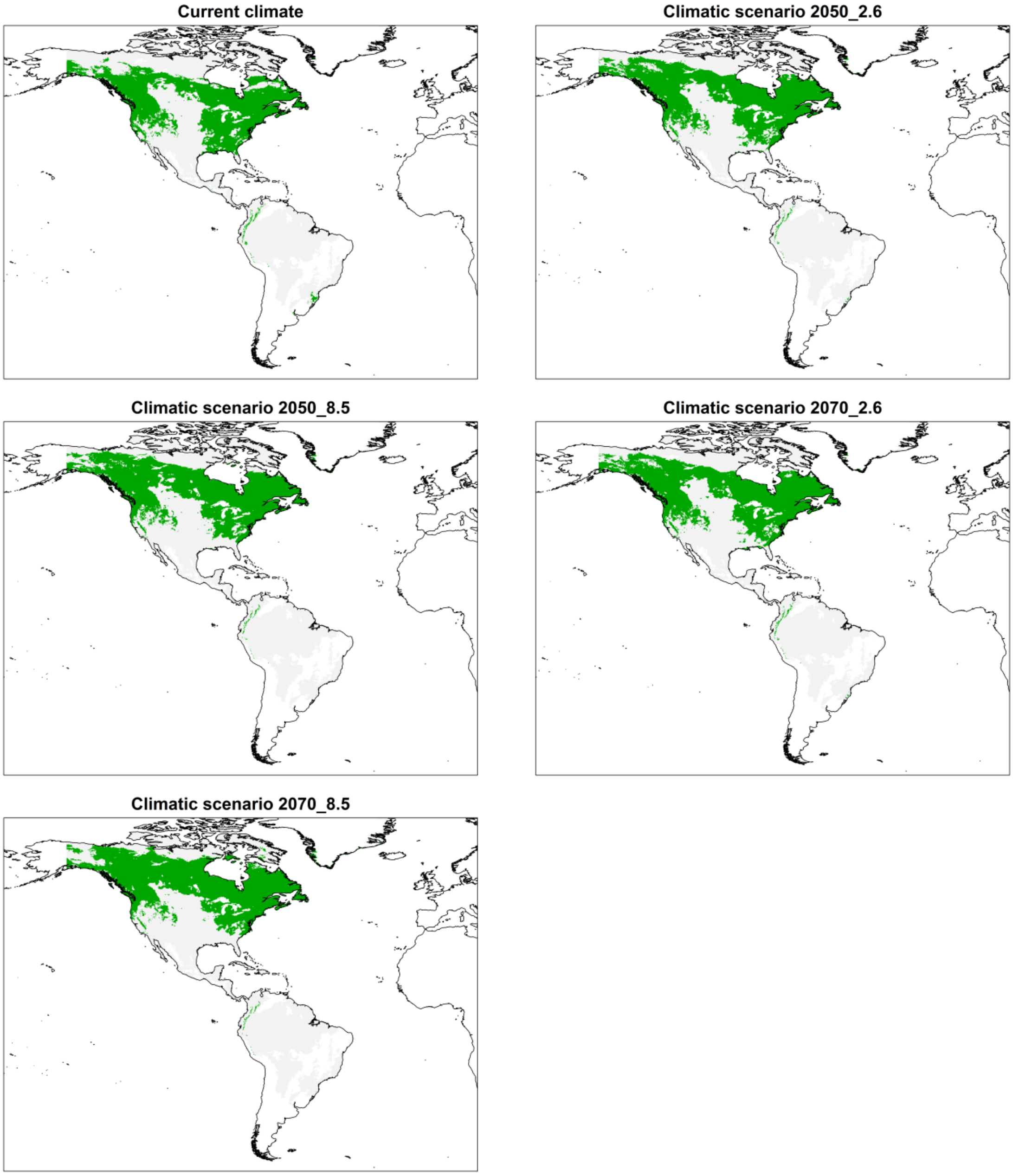



A. congicus
Current climate
Climatic scenario 2050_2.6
Climatic scenario 2050_8.5
Climatic scenario 2070_2.6
Climatic scenario 2070_8.5

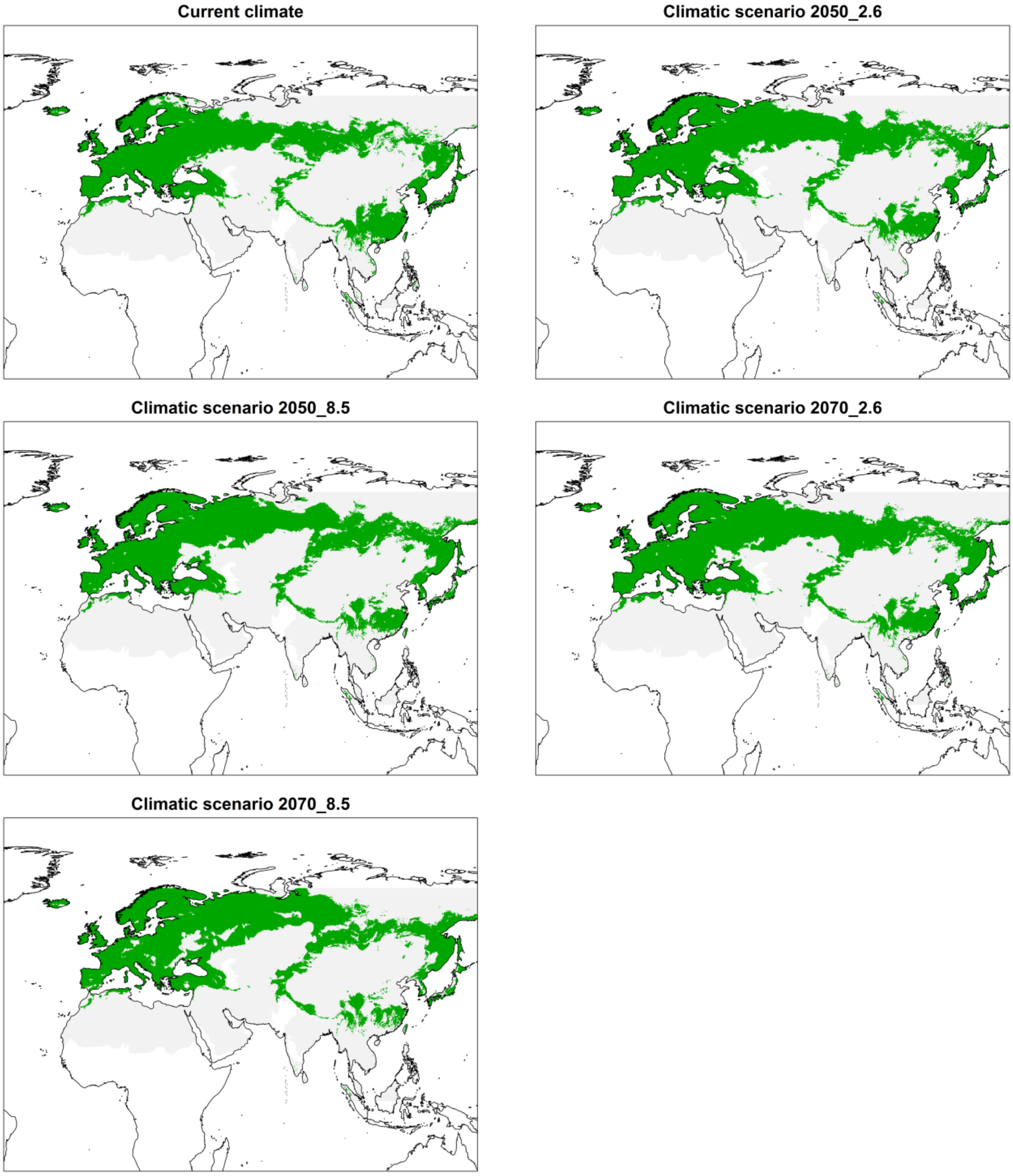

A. cinereus
Current climate
Climatic scenario 2050_2.6
Climatic scenario 2050_8.5
Climatic scenario 2070_2.6
Climatic scenario 2070_8.5


L. longicaudis
Current climate
Climatic scenario 2050_2.6
Climatic scenario 2050_8.5
Climatic scenario 2070_2.6
Climatic scenario 2070_8.5

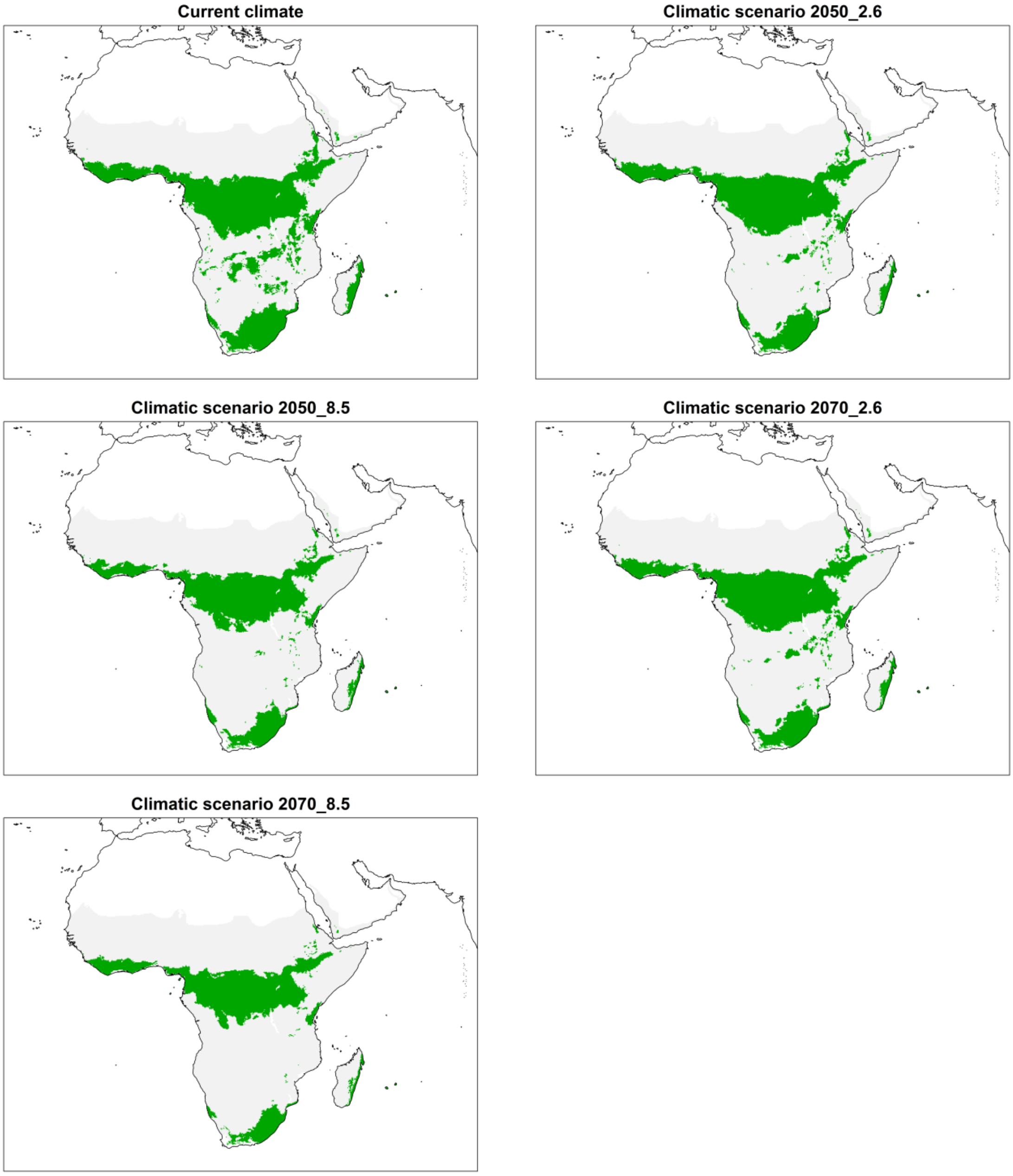
L. canadensis



L. lutra

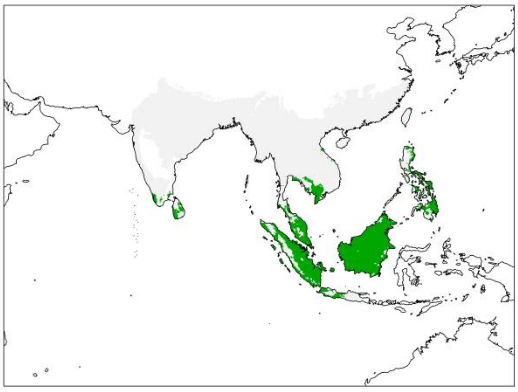

Current climate
Climatic scenario 2050_2.6
Climatic scenario 2050_8.5
Climatic scenario 2070_2.6
Climatic scenario 2070_8.5

L. maculicollis

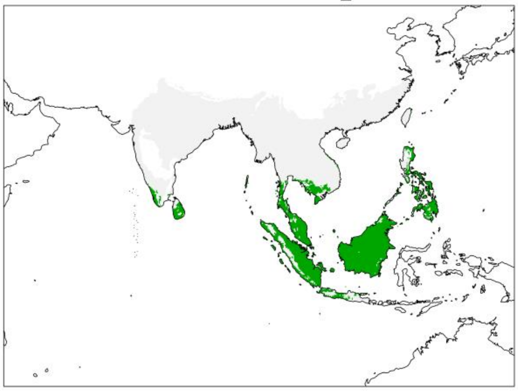


L. sumatrana

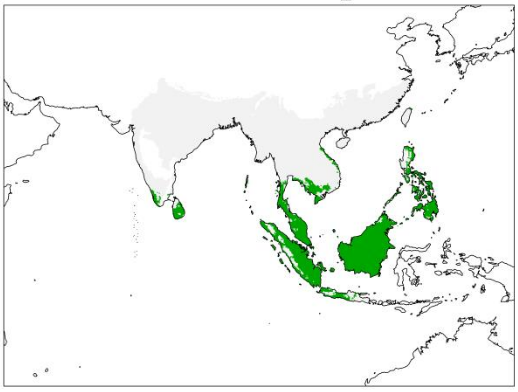
Current climate



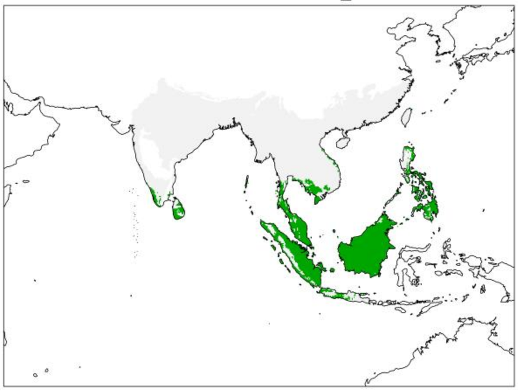
Climatic scenario 2050_2.6



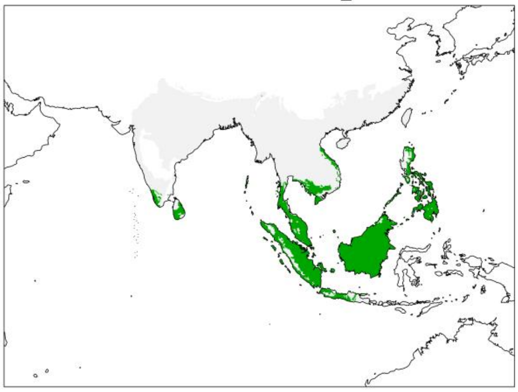
Climatic scenario 2050_8.5

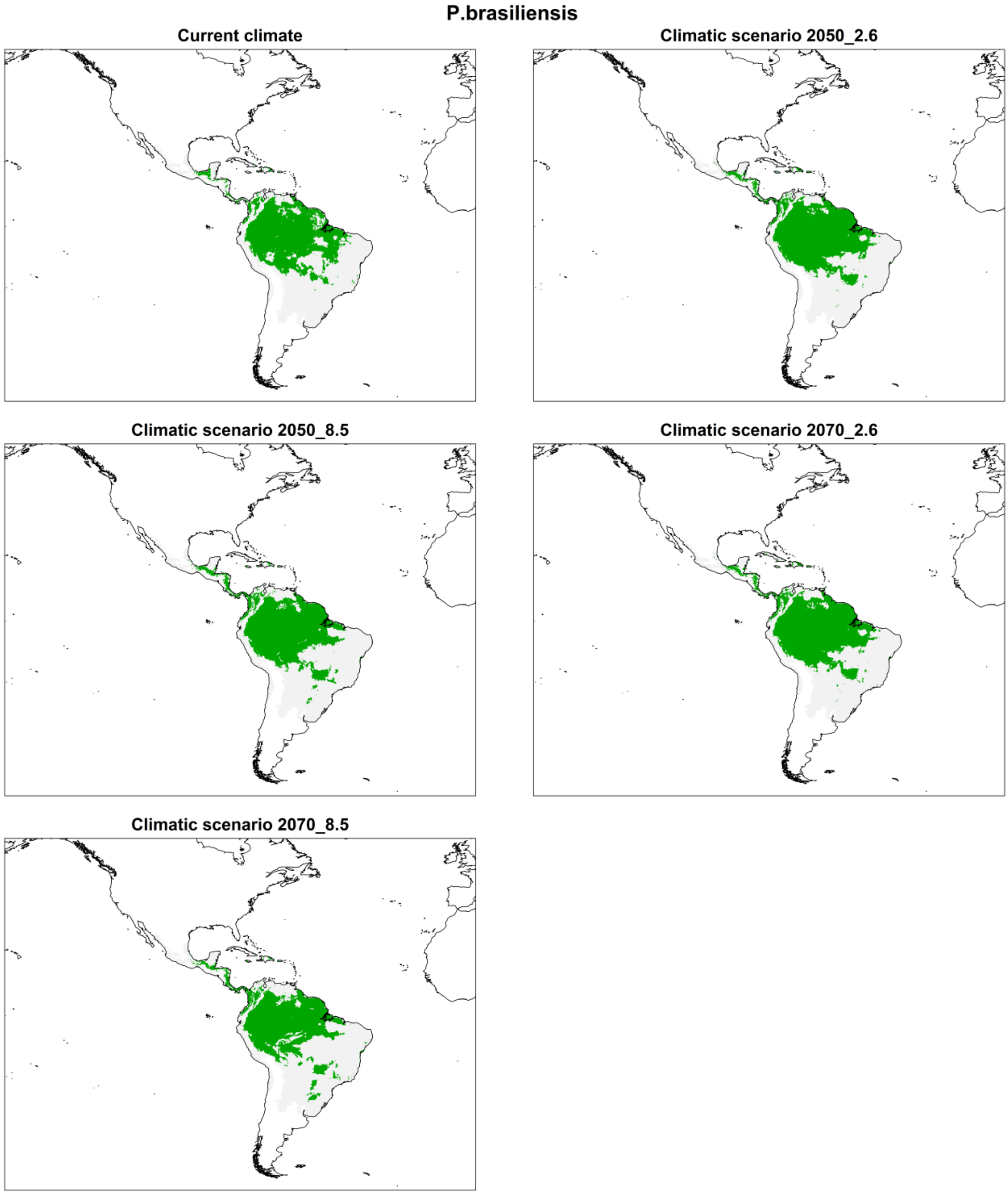


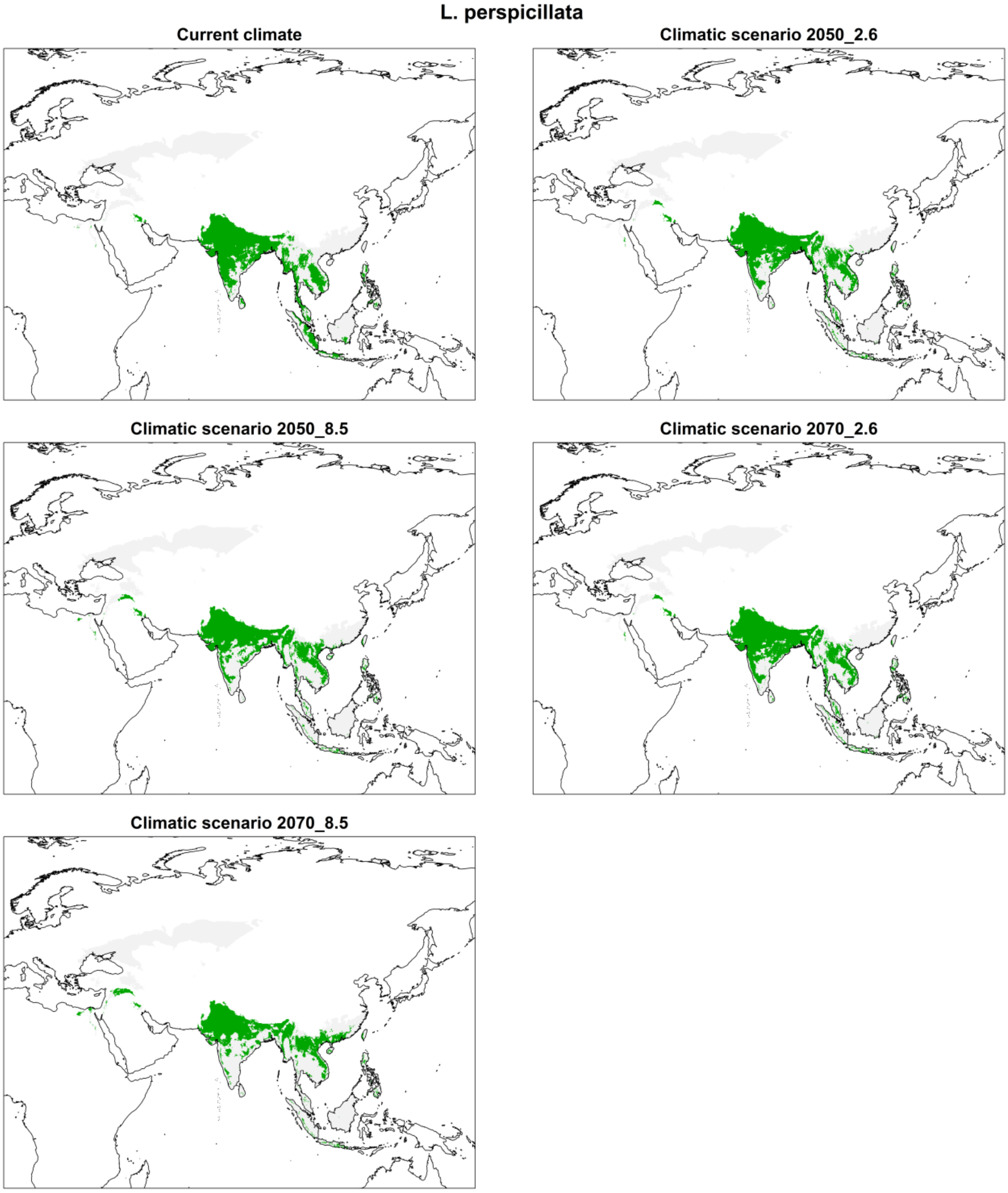
Climatic scenario 2070_2.6



Climatic scenario 2070_8.5




P.brasiliensis
Current climate
Climatic scenario 2050_2.6
Climatic scenario 2050_8.5
Climatic scenario 2070_2.6
Climatic scenario 2070_8.5


L. perspicillata
Current climate
Climatic scenario 2050_2.6
Climatic scenario 2050_8.5
Climatic scenario 2070_2.6
Climatic scenario 2070_8.5

L.provocax

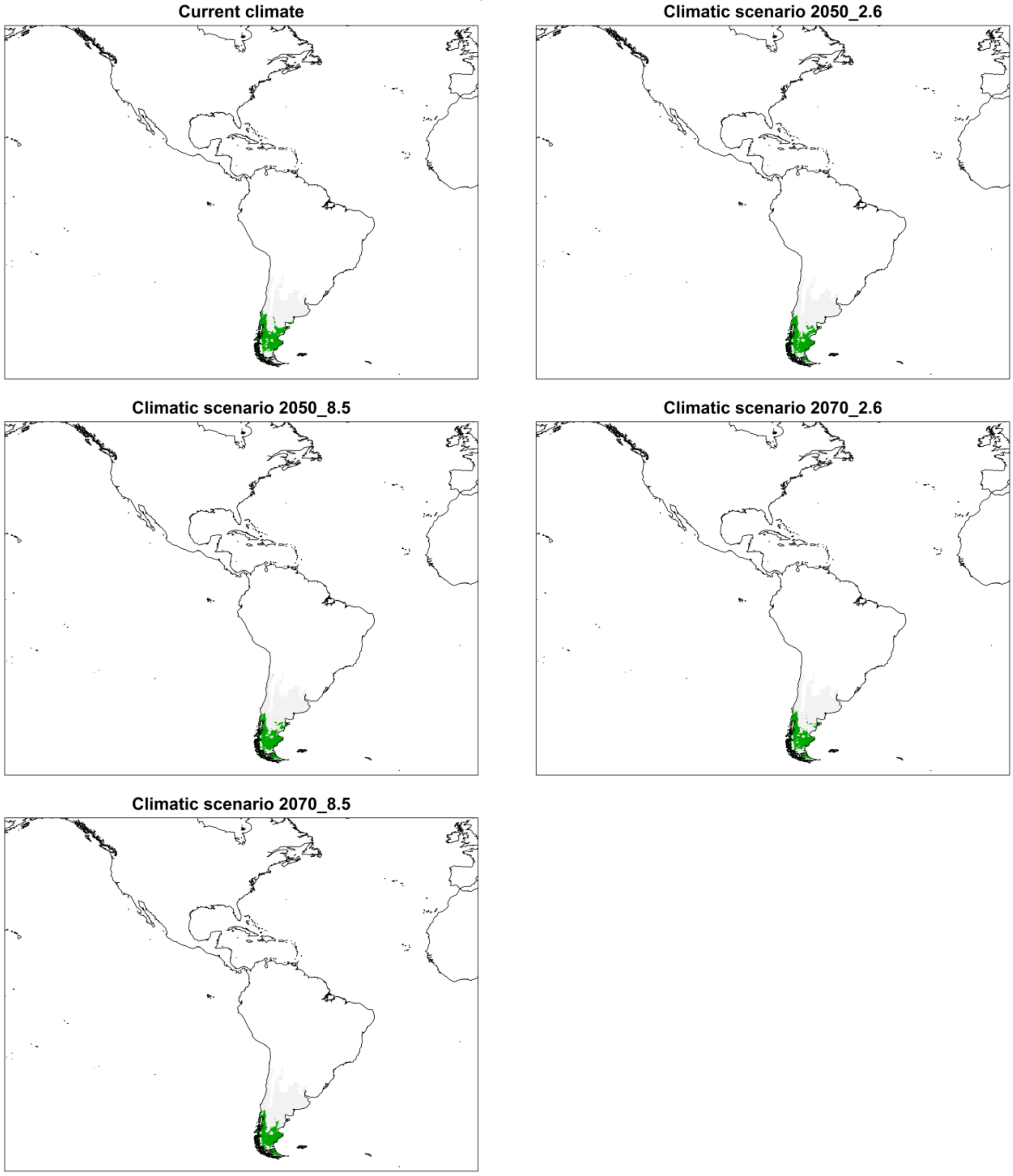
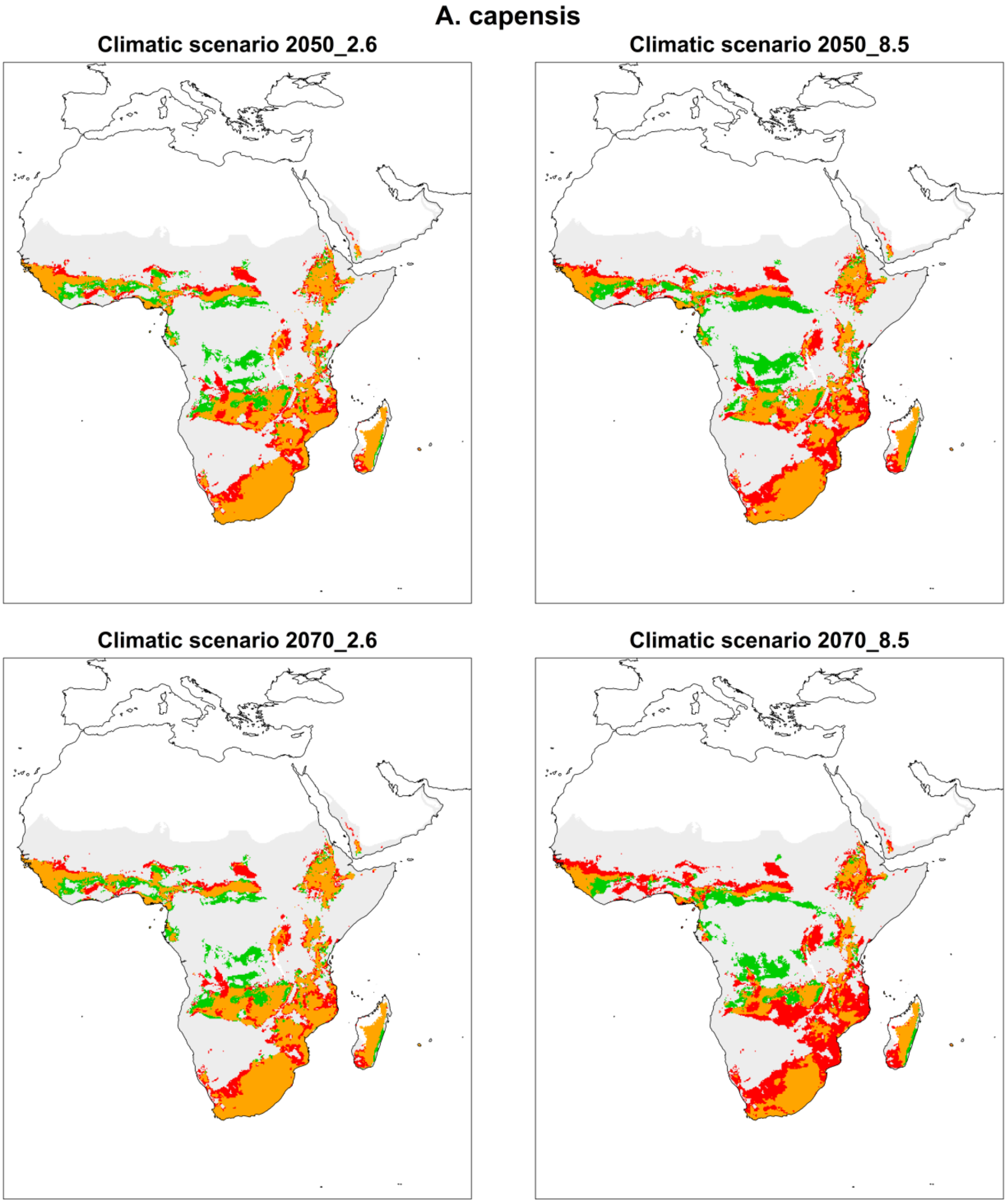
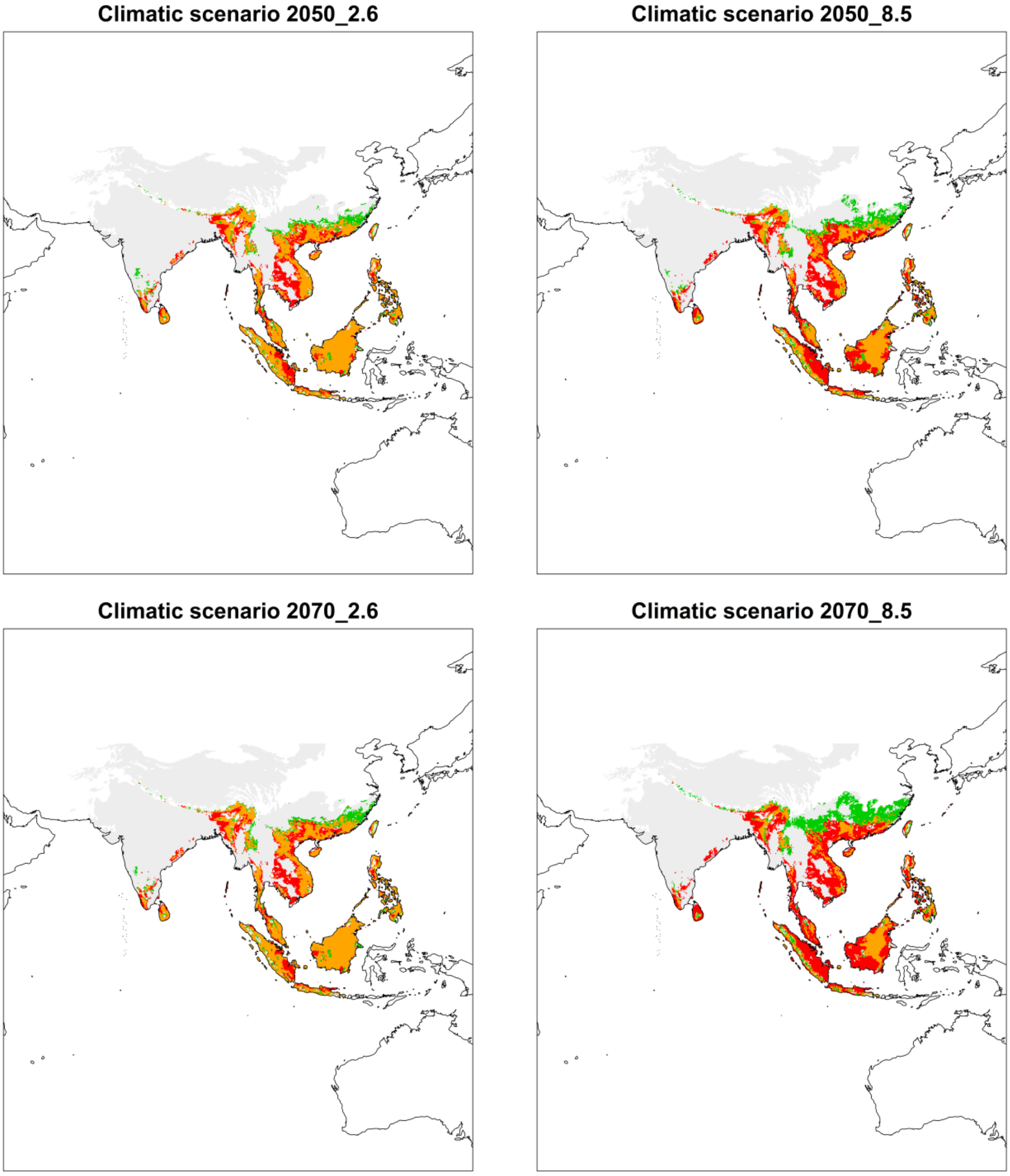

Current climate
Climatic scenario 2050_2.6
Climatic scenario 2050_8.5
Climatic scenario 2070_2.6
Climatic scenario 2070_8.5

Figure S5b – Climate change effects on otters suitable area distribution. 1) Red indicate suitable areas will be lost under future climatic scenarios areas; 2) Orange indicate suitable areas that will stayed unchanged under future climatic scenarios; 3) Green indicate suitable areas will be gained under future climatic scenarios. In gray are indicated the unsuitable areas inside the projected zone.



A. cinereus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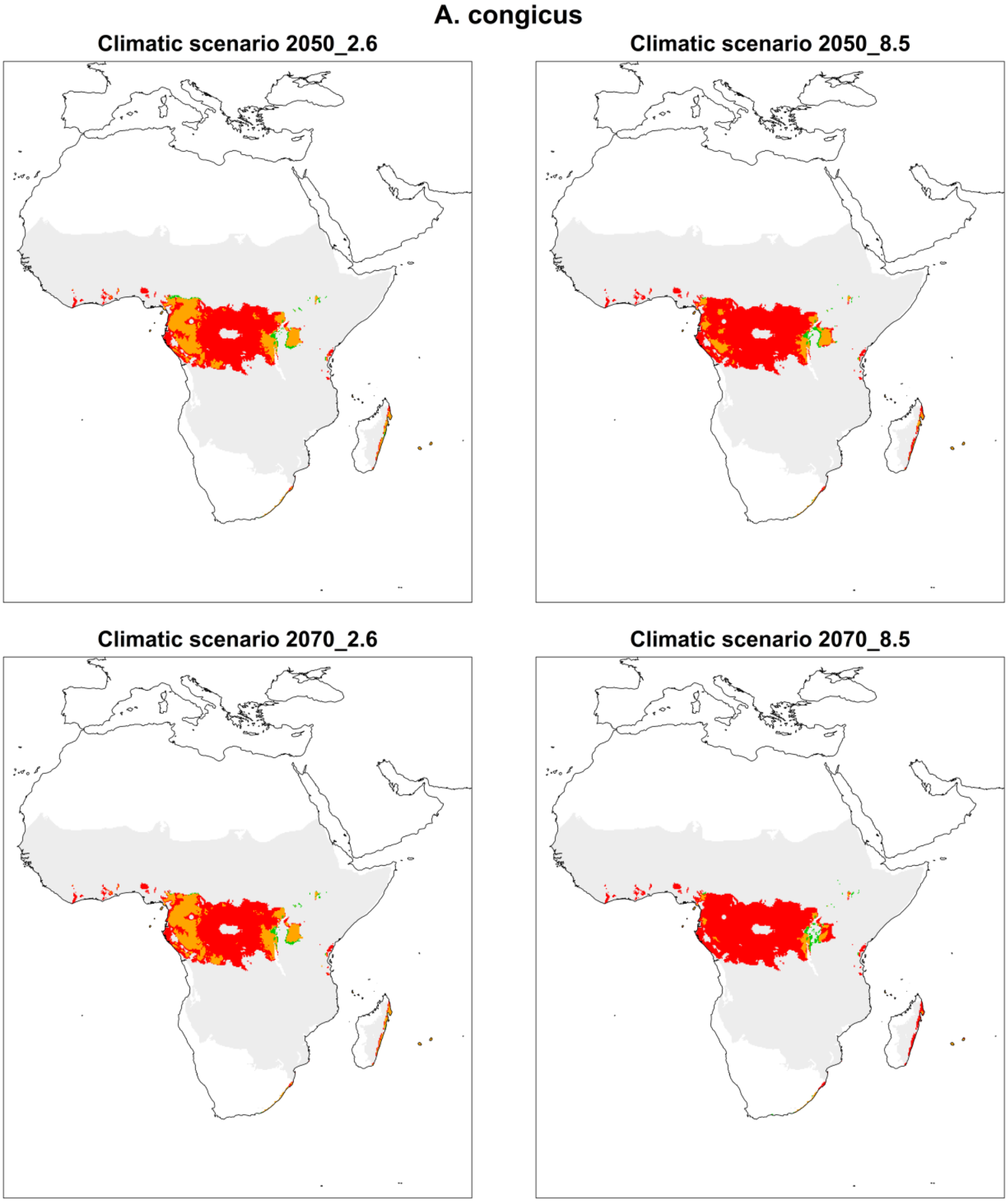
Climatic scenario 2050_8.5
Climatic scenario 2070_2.6
Climatic scenario 2070_8.5


A. congicus
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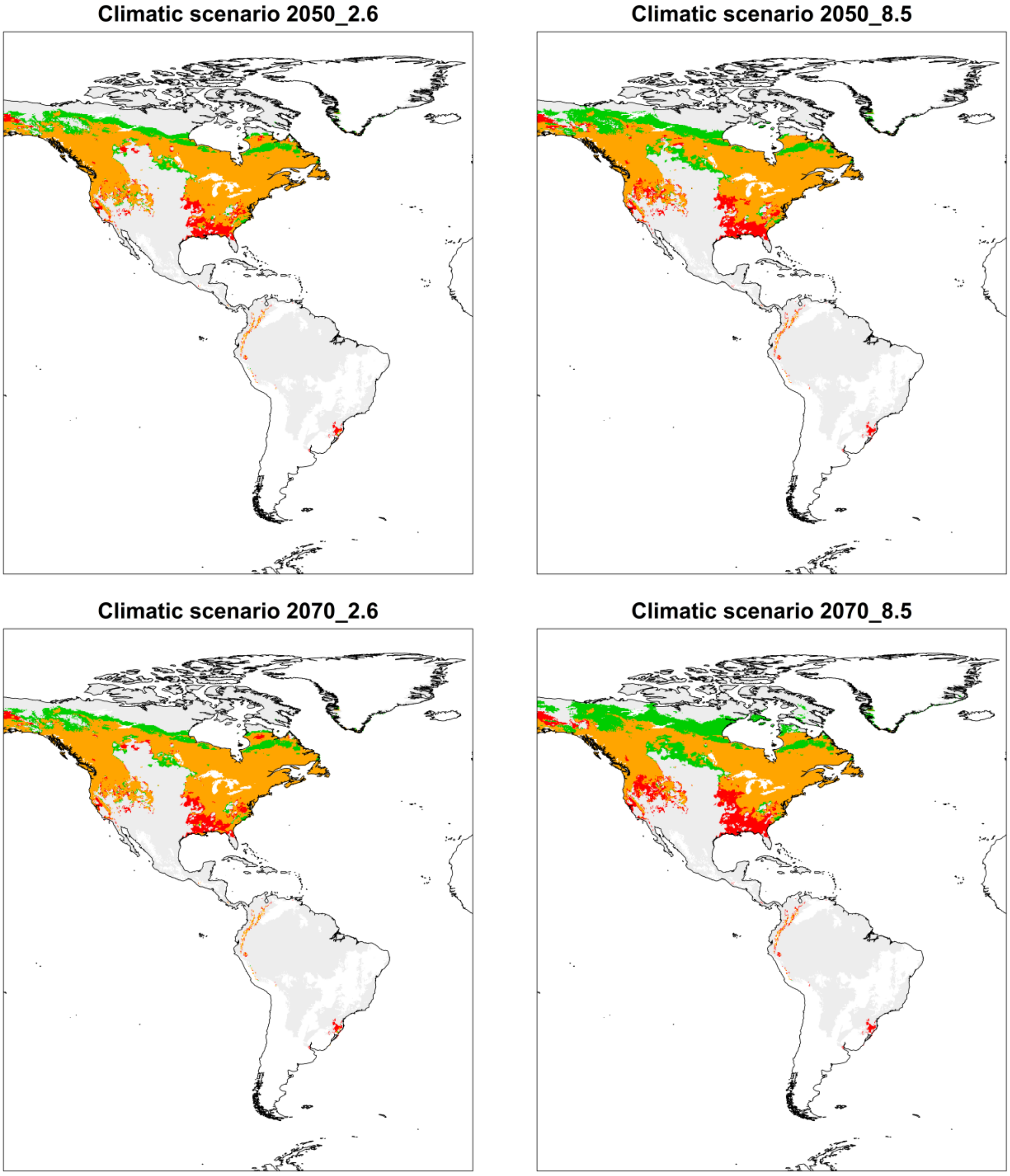
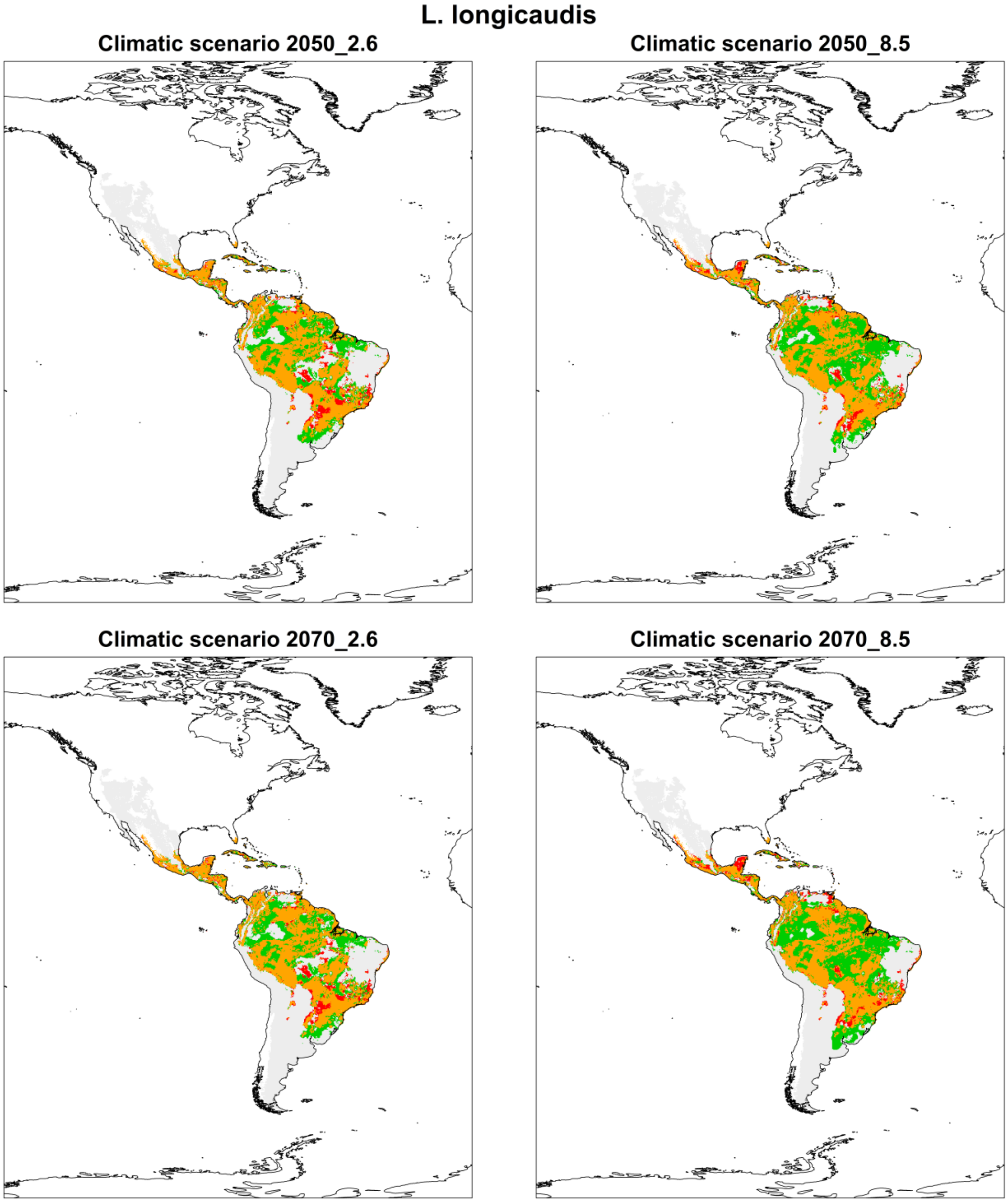
Climatic scenario 2050_8.5
Climatic scenario 2070_2.6
Climatic scenario 2070_8.5

L. canadensis




L. longicaudis
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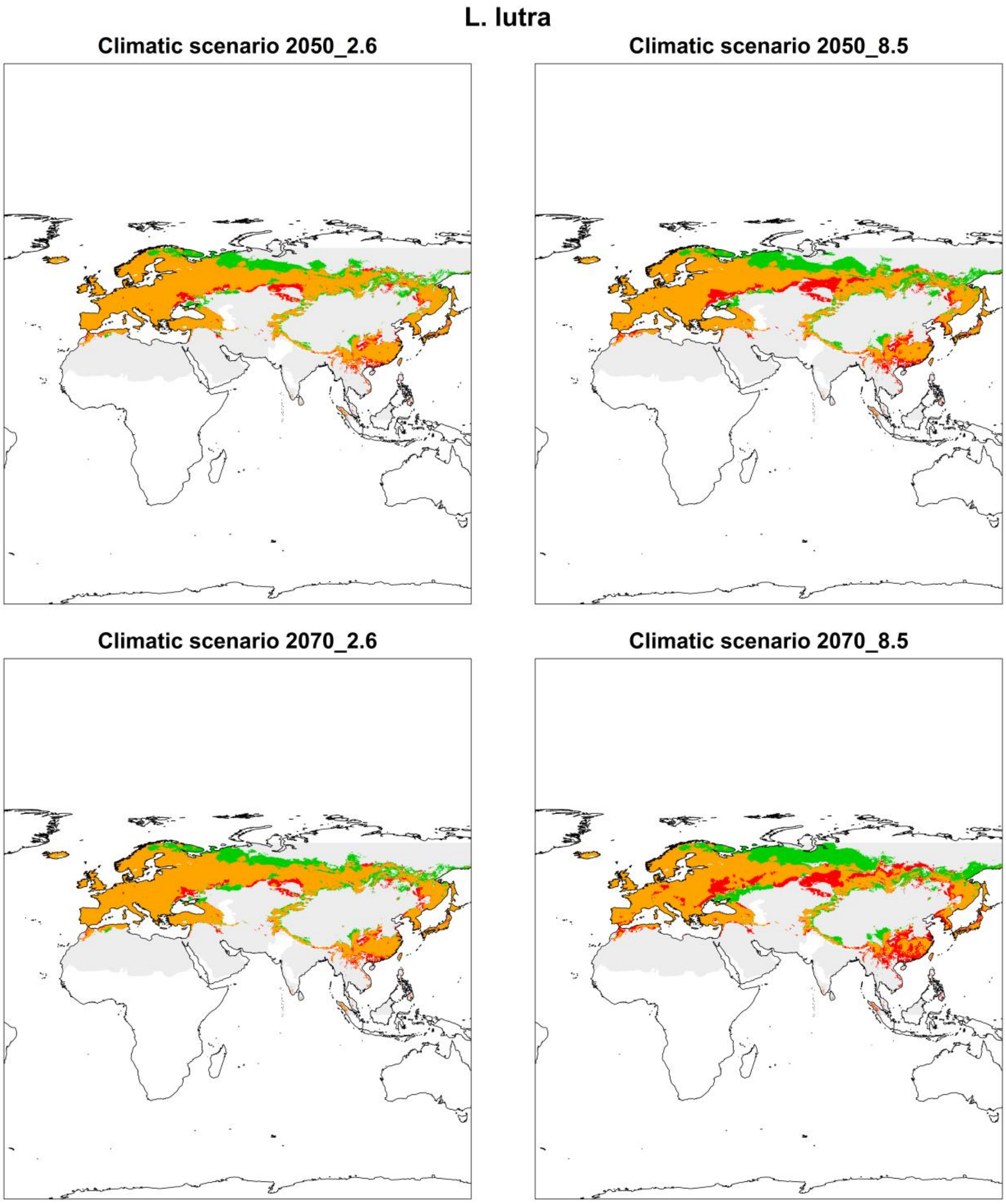
Climatic scenario 2050_8.5
Climatic scenario 2070_2.6
Climatic scenario 2070_8.5


L. lutra
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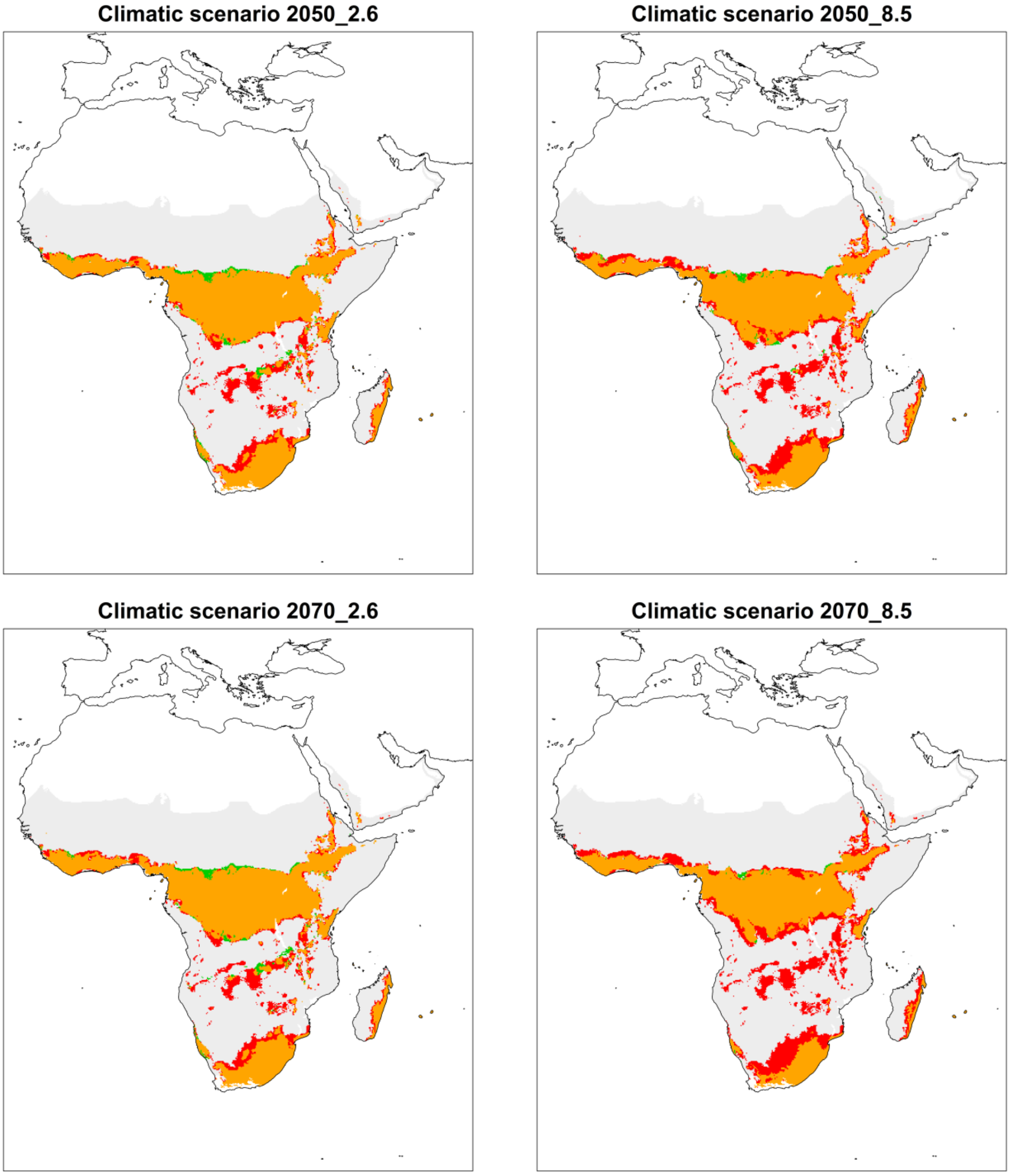
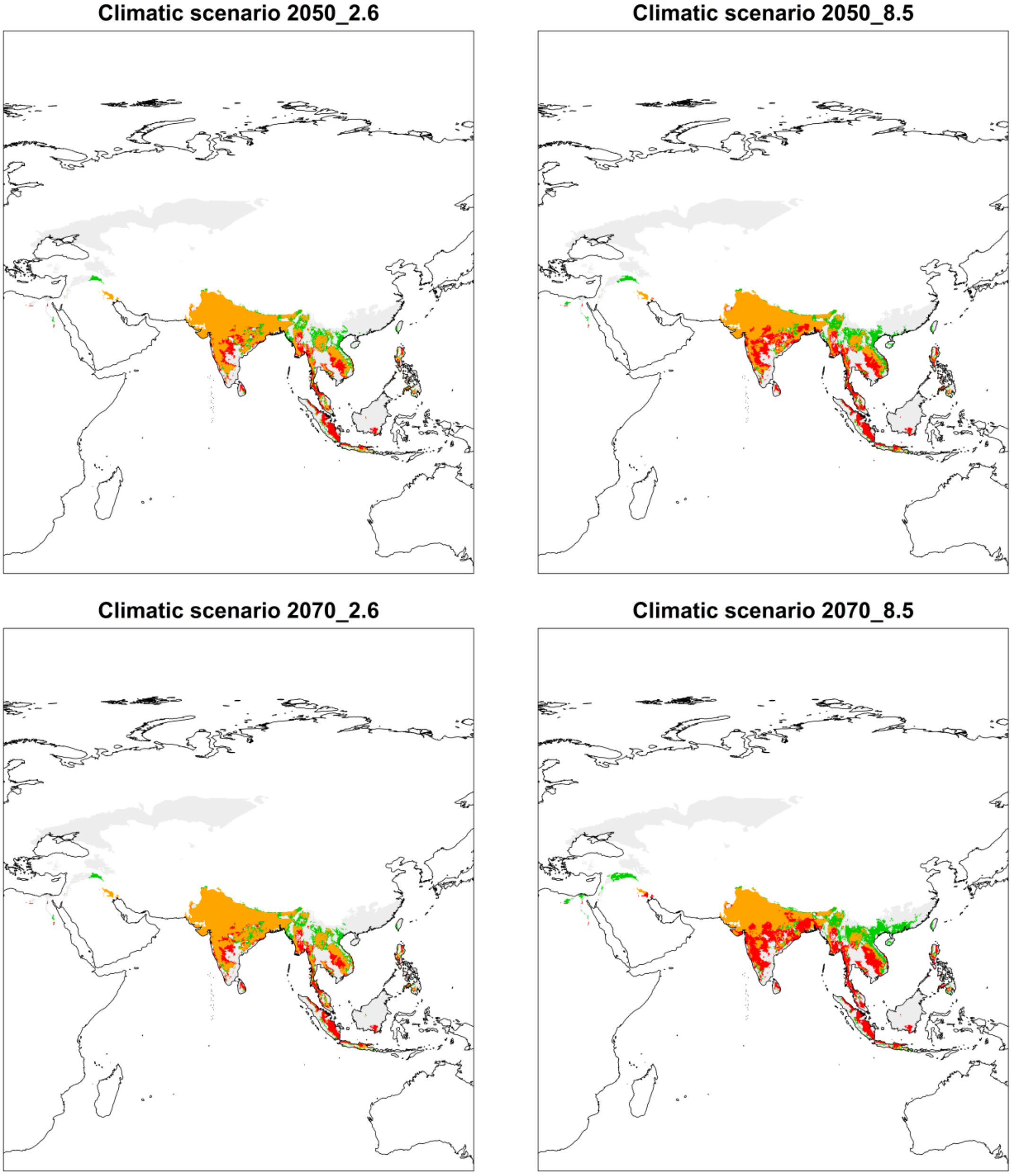
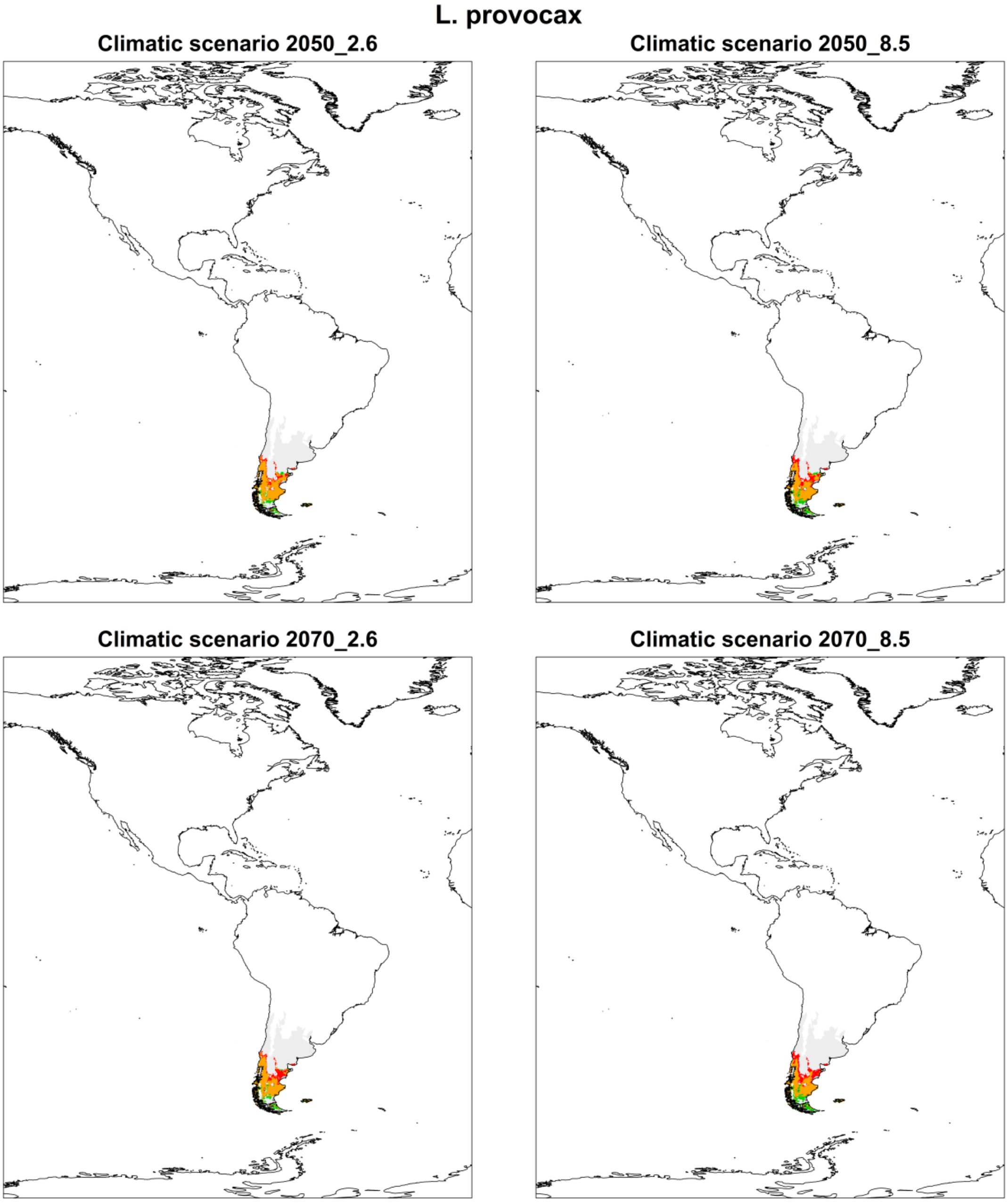
Climatic scenario 2050_8.5
Climatic scenario 2070_2.6
Climatic scenario 2070_8.5

L. maculicollis

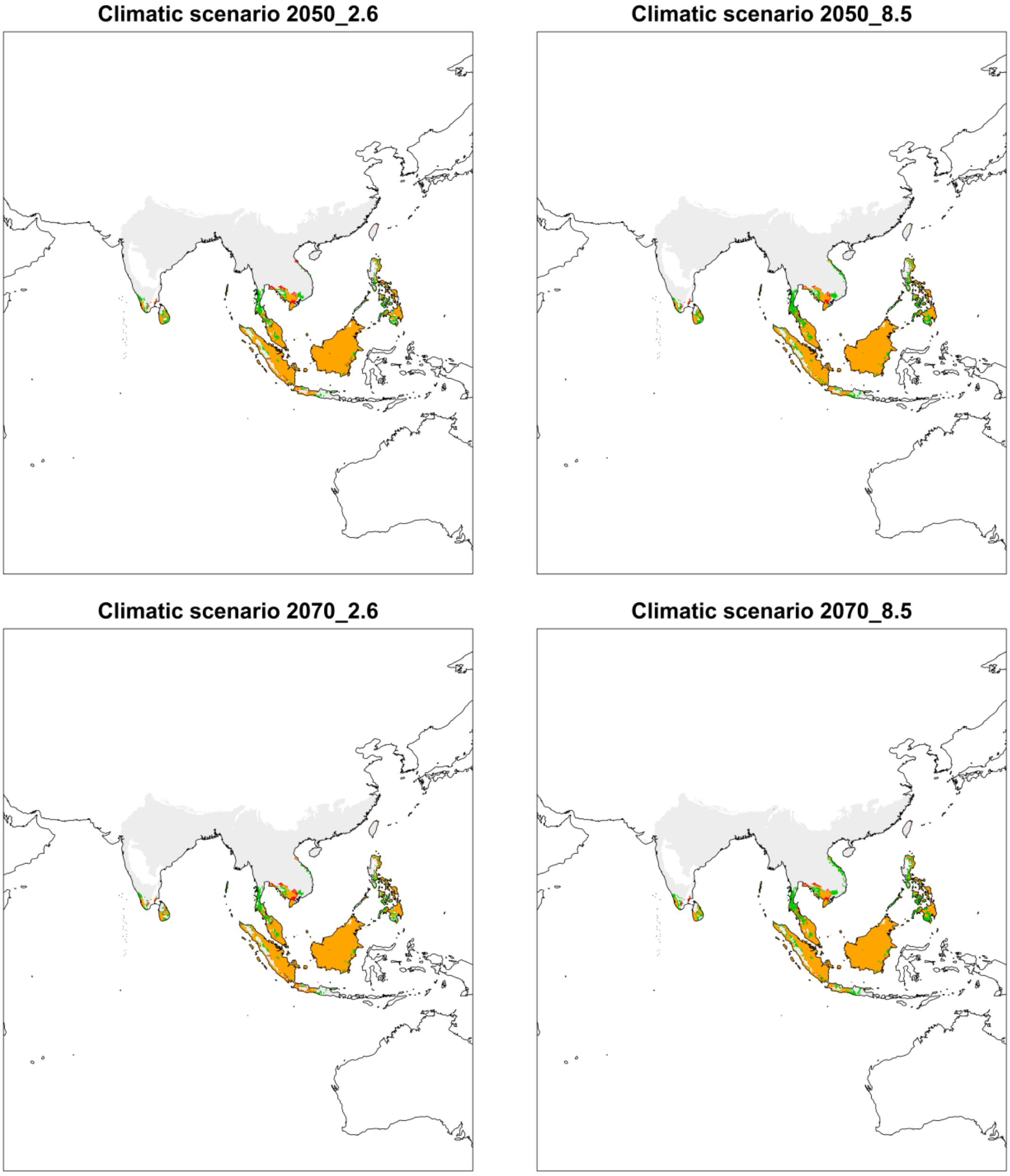


L. perspicillata

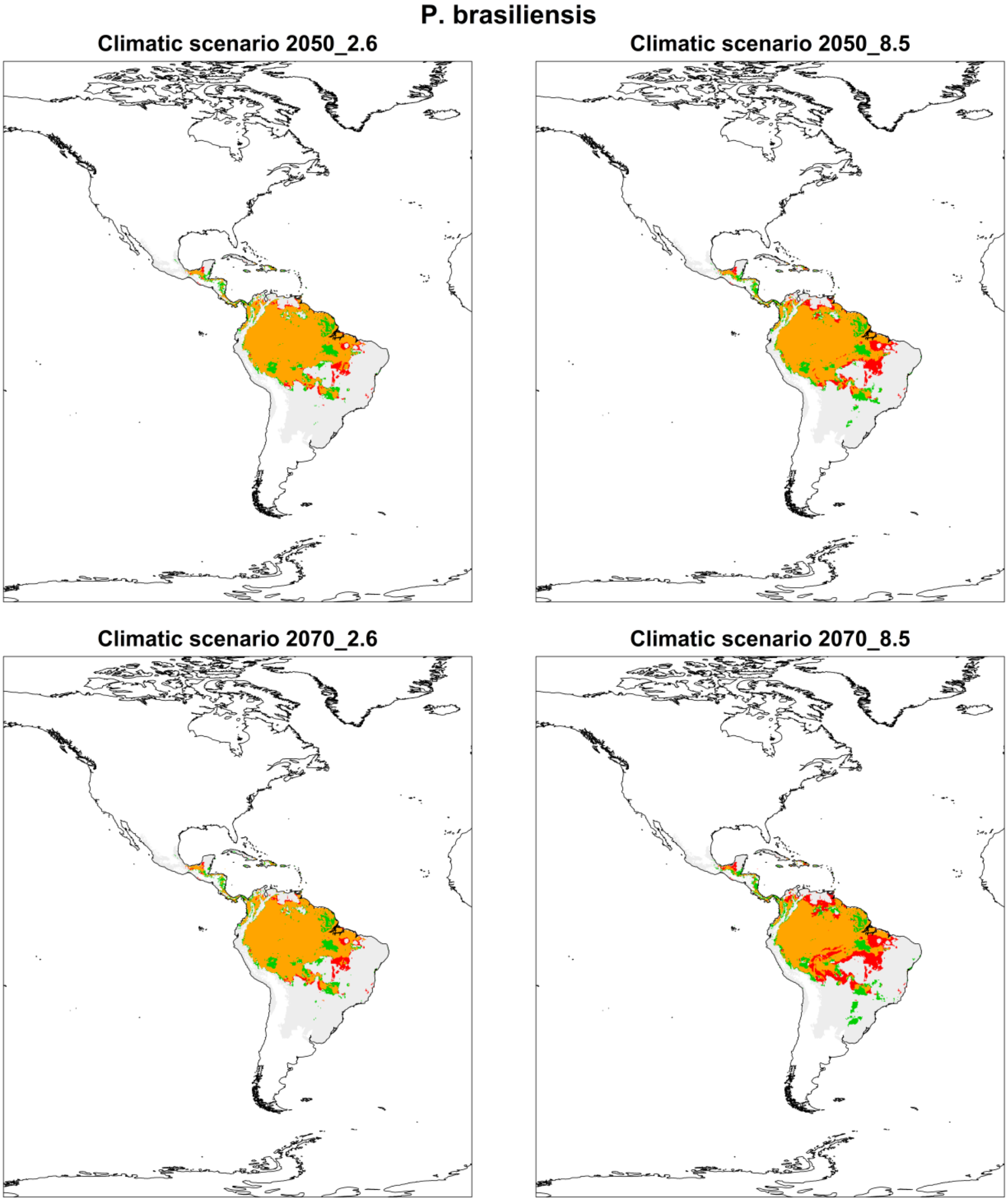



L. provocax
Climatic scenario 2050_2.6
Climatic scenario 2050_8.5
Climatic scenario 2070_2.6
Climatic scenario 2070_8.5

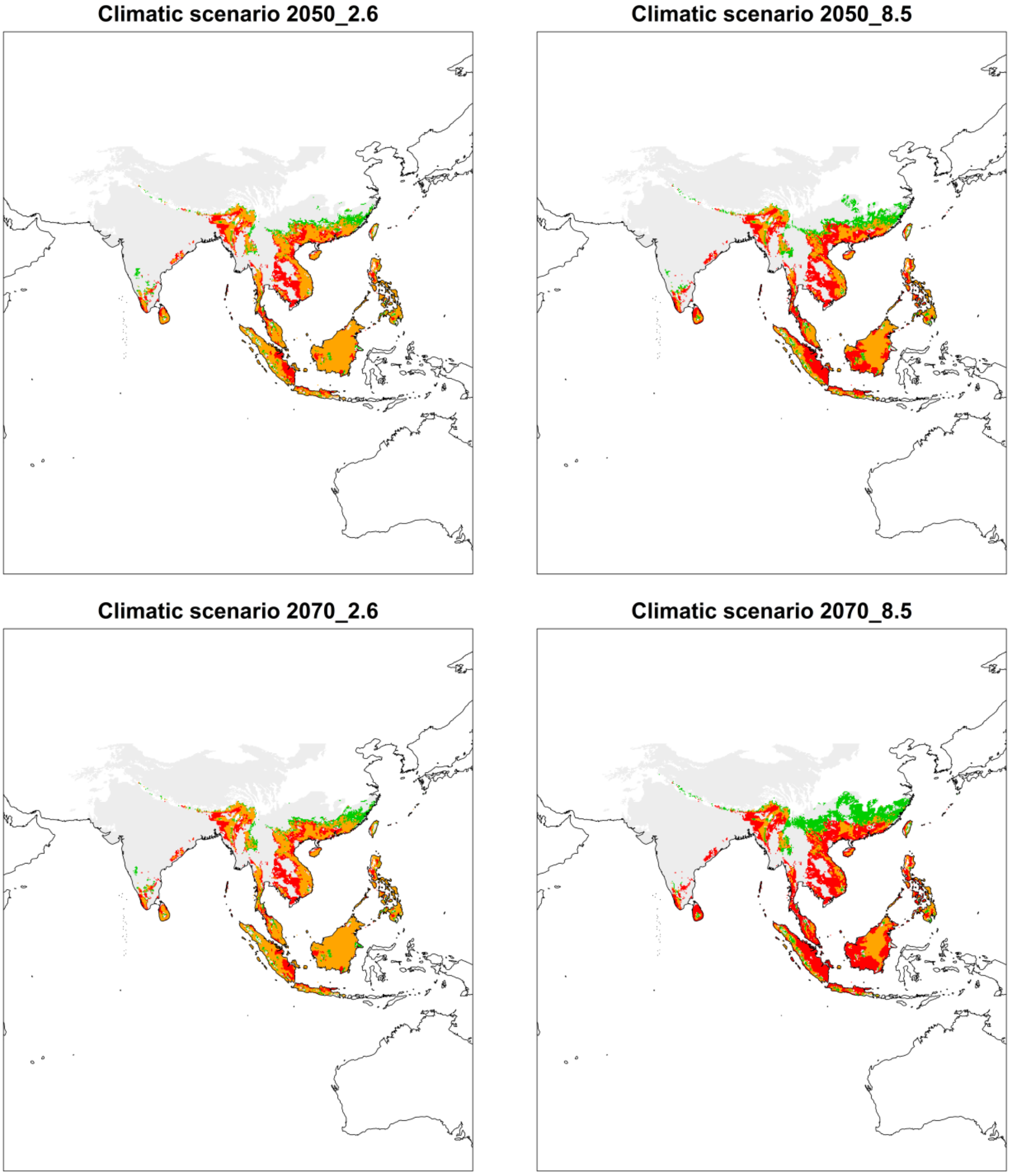
L. sumatrana



Climatic scenario 2050_2.6
Climatic scenario 2050_8.5
Climatic scenario 2070_2.6
Climatic scenario 2070_8.5


P. brasiliensis
Climatic scenario 2050_2.6
Climatic scenario 2050_8.5
Climatic scenario 2070_2.6
Climatic scenario 2070_8.5

A. cinereus


Climatic scenario 2050_2.6
Climatic scenario 2050_8.5
Climatic scenario 2070_2.6
Climatic scenario 2070_8.5

S6 - Measures of species range exposure to climate change

Table S6a - Range extent, percentage of protection coverage and human footprint value for the periods 2050 and 2070 and scenarios RCP 2.6 and 8.5 and percentage of change.

	Suitable areas in projected areas (biomes) (%)									**Suitable areas under protection (%)**									**Human footprint average in suitable areas**								
	Present	Future				Percentage of change				Present	Future				Percentage of change				Present	Future				Percentage of change			
		2050		2070		2050		2070			2050		2070		2050		2070			2050		2070		2050		2070	
Species		2.6	8.5	2.6	8.5	2.6	8.5	2.6	8.5		2.6	8.5	2.6	8.5	2.6	8.5	2.6	8.5		2.6	8.5	2.6	8.5	2.6	8.5	2.6	8.5
A. cap.	29	26.8	24.7	27.5	19	-7.6	-14.8	-5	-34.6	19.6	18	17.2	18.5	15.3	-8.1	-12.4	-5.7	-21.8	22.1	22.6	22.2	22.5	22.8	1.9	0.1	1.5	2.5
A. cin.	26	21.5	17.6	21.5	15.2	-17.3	-32.5	-17.3	-41.5	19	20.3	21	20.5	18.6	6.9	10.2	8	-2.2	26.3	24.3	23.6	24.3	23.9	-7.5	-10.3	-7.7	-9.1
A. con.	14.8	5.1	2.2	5.2	1.1	-65.8	-84.9	-64.9	-92.7	15	16.1	16.5	15.8	21.2	7.6	10.1	5.3	41.7	18.9	20.4	23.3	20.2	27.7	8.3	23.5	7.1	46.9
L. can.	32.8	35.9	37	35.6	38.1	9.6	12.8	8.6	16.1	15.7	16.1	16.4	16.3	15.7	2.8	4.3	3.6	0.1	14.8	12	11.3	12.2	10.2	-18.7	-24	-18	-31.2
L. long.	35.5	46.7	51.6	47.1	53.9	31.3	45.1	32.6	51.6	30.3	31.9	33.1	31.8	32.8	5.3	9.3	5	8.3	19.1	17.6	16.9	17.5	16.8	-8.3	-11.9	-8.7	-12
L. prov.	29	29	28.2	26.6	26.8	0	-2.7	-8.3	-7.6	19.5	21.1	21.5	22.7	23.3	8.3	9.9	16.4	19.4	12.6	12.1	11.7	12.3	11.5	-4	-7.2	-2.8	-9
L. lutra	31.7	35.3	35.1	35.5	35.1	11.1	10.7	11.8	10.8	16.1	17	17.3	16.9	17.6	5.2	7.1	4.8	8.9	26.3	23	21.9	23.1	20.7	-12.4	-16.5	-12.1	-21.2
H. mac.	31.4	26.5	22.9	26.5	20.3	-15.7	-27	-15.5	-35.3	19.1	17.5	17.8	17.3	17.7	-7.9	-6.8	-9	-6.9	21.7	21.9	21.9	21.9	22	0.8	0.8	0.5	1.2
L. sum.	21.2	24	25	23.7	25.2	13	17.7	11.7	18.6	18.9	20.1	20.7	20	20.9	6.4	9.9	6.2	11	23.6	24.5	24.6	24.4	24.6	3.7	4.2	3.2	4.1
L. per.	34.4	32.5	29.6	32.8	27.6	-5.5	-13.9	-4.6	-19.8	11.2	11.9	11.9	11.9	12	6	6.4	6.7	7.4	34	33.5	33	33.5	32.4	-1.6	-3	-1.5	-4.8
P. bras.	42.9	46.4	44.1	46.2	40.3	8.2	2.8	7.6	-6.1	41.5	43.4	44.3	43.5	44.3	4.5	6.8	4.7	6.8	10.9	11.2	11.1	11.2	11.2	2.8	1.8	3.4	3.3

***Table S6b* -** Suitable areas fragmentation indices for the periods 2050 and 2070 and scenarios RCP 2.6 and 8.5 and percentage of change. We used the R package PathStat . We calculated the following fragmentation indices : N_edges_per: the number of outer perimeter cell edges of the patch; Per_area_ratio: the ratio of the patch perimeter (m) to area (m2); Shape_index: the shape complexity, sum of each patches perimeter divided by the square root of patch area; Core_area_index : quantifies core area as a percentage of patch area.

	N_edges_per									**Per_area_ratio**								
	Present	Future				Percentage of change				Present	Future				Percentage of change			
		2050		2070		2050		2070			2050		2070		2050		2070	
Species		2.6	8.5	2.6	8.5	2.6	8.5	2.6	8.5		2.6	8.5	2.6	8.5	2.6	8.5	2.6	8.5
A. cap.	8196	8458	7988	8396	7222	3.20	-2.54	2.44	-11.88	0.44	0.47	0.59	0.47	0.59	7.87	34.66	7.87	34.66
A. cin.	6582	6572	6090	6426	5432	-0.15	-7.47	-2.37	-17.47	0.65	0.77	0.92	0.77	0.92	18.03	41.01	18.03	41.01
A. con.	2066	1876	1244	1886	790	-9.20	-39.79	-8.71	-61.76	0.25	0.66	1.33	0.66	1.33	159.86	423.18	159.86	423.18
L. can.	14252	13780	13882	13730	13704	-3.31	-2.60	-3.66	-3.85	0.31	0.28	0.26	0.28	0.26	-11.33	-17.20	-11.33	-17.20
L. long.	13004	9664	8668	9856	7680	-25.68	-33.34	-24.21	-40.94	0.55	0.32	0.21	0.32	0.21	-42.82	-61.04	-42.82	-61.04
L. prov.	1578	1644	1618	1618	1530	4.18	2.53	2.53	-3.04	0.65	0.73	0.68	0.73	0.68	11.82	4.98	11.82	4.98
L. lutra	23958	22574	22290	22108	24384	-5.78	-6.96	-7.72	1.78	0.29	0.24	0.26	0.24	0.26	-17.48	-8.11	-17.48	-8.11
H. mac.	5822	4308	3980	4354	3372	-26.00	-31.64	-25.21	-42.08	0.29	0.25	0.26	0.25	0.26	-11.48	-10.52	-11.48	-10.52
L. sum.	2984	5205	5422	5143	3070	74.43	81.70	72.35	2.88	0.65	0.65	0.59	0.65	0.59	0.24	-8.79	0.24	-8.57
L. per.	5514	5598	5428	5432	5464	1.52	-1.56	-1.49	-0.91	0.44	0.45	0.54	0.45	0.54	3.32	23.57	3.32	23.57
P. bras.	5224	4536	4614	4516	5356	-13.17	-11.68	-13.55	2.53	0.25	0.20	0.28	0.20	0.28	-19.69	9.14	-19.69	9.14

	Shape_index									Core_area_index								
	Present	Future				Percentage of change				Present	Future				Percentage of change			
		2050		2070		2050		2070			2050		2070		2050		2070	
Species		2.6	8.5	2.6	8.5	2.6	8.5	2.6	8.5		2.6	8.5	2.6	8.5	2.6	8.5	2.6	8.5
A. cap.	14.96	15.72	16.27	15.72	16.27	5.13	8.76	5.13	8.76	0.65	0.62	0.54	0.62	0.54	-4.28	-17.21	-4.28	-17.21
A. cin.	16.29	17.46	17.52	17.46	17.52	7.18	7.55	7.18	7.55	0.50	0.44	0.36	0.44	0.36	-12.98	-29.09	-12.98	-29.09
A. con.	5.71	8.81	8.06	8.81	8.06	54.42	41.25	54.42	41.25	0.80	0.53	0.21	0.53	0.21	-32.84	-74.21	-32.84	-74.21
L. can.	16.61	15.36	14.83	15.36	14.83	-7.54	-10.71	-7.54	-10.71	0.75	0.77	0.79	0.77	0.79	3.43	6.04	3.43	6.04
L. long.	21.11	13.92	10.13	13.92	10.13	-34.06	-52.01	-34.06	-52.01	0.54	0.72	0.81	0.72	0.81	33.41	50.49	33.41	50.49
L. prov.	7.97	8.52	8.05	8.52	8.05	6.85	1.04	6.85	1.04	0.53	0.48	0.50	0.48	0.50	-10.05	-6.24	-10.05	-6.24
L. lutra	20.65	18.03	19.95	18.03	19.95	-12.69	-3.39	-12.69	-3.39	0.77	0.81	0.78	0.81	0.78	4.83	1.73	4.83	1.73
H. mac.	10.21	8.31	7.36	8.31	7.36	-18.65	-27.92	-18.65	-27.92	0.77	0.79	0.79	0.79	0.79	2.41	1.82	2.41	1.82
L. sum.	10.97	11.66	10.82	11.60	10.93	6.24	-1.33	5.71	-0.35	0.56	0.54	0.57	0.54	0.56	-3.41	1.99	-2.39	1.23
L. per.	12.25	12.35	13.52	12.35	13.52	0.75	10.38	0.75	10.38	0.67	0.67	0.61	0.67	0.61	-0.90	-8.93	-0.90	-8.93
P. bras.	9.07	7.58	9.60	7.58	9.60	-16.45	5.83	-16.45	5.83	0.79	0.84	0.78	0.84	0.78	6.38	-1.52	6.38	-1.52

S7 – Vulnerability index

Table S7a – Fragmentation component

		L. provoc.	*P. bras.*	*L. longic.*	*L. canad.*	*A. cap.*	*A. cong.*	*H. maculic.*	*L. lutra*	*L. sumatr.*	*L. persp.*	*A. ciner.*
2050_2.6	*Edges*	4.18	-13.17	-25.68	-3.31	3.2	-9.2	-26	-5.78	74.43	1.52	-0.15
	Per/area	-11.82	19.69	42.82	11.33	-7.87	-100	11.48	17.48	-0.24	-3.32	-18.03
	Shape	-6.85	16.45	34.06	7.54	-5.13	-54.42	18.65	12.69	-6.24	-0.75	-7.18
	Core Area	-10.05	6.38	33.41	3.43	-4.28	-32.84	2.41	4.83	-3.41	-0.9	-12.98
	Fragm_ave	-6.14	7.34	21.15	4.75	-3.52	-49.12	1.64	7.31	16.14	-0.86	-9.59
2050_8.5	*Edges*	2.53	-11.68	-33.34	-2.6	-2.54	-39.79	-31.64	-6.96	81.7	-1.56	-7.47
	Per/area	-4.98	-9.14	61.04	17.2	-34.66	-100	10.52	8.11	8.79	-23.57	-41.01
	Shape	-1.04	-5.83	52.01	10.71	-8.76	-41.25	27.92	3.39	1.33	-10.38	-7.55
	Core Area	-6.24	-1.52	50.49	6.04	-17.21	-74.21	1.82	1.73	1.99	-8.93	-29.09
	Fragm_ave	-2.43	-7.04	32.55	7.84	-15.79	-63.81	2.16	1.57	23.45	-11.11	-21.28
2070_2.6	*Edges*	2.53	-13.55	-24.21	-3.66	2.44	-8.71	-25.21	-7.72	72.35	-1.49	-2.37
	Per/area	-11.82	19.69	42.82	11.33	-7.87	-100	11.48	17.48	-0.24	-3.32	-18.03
	Shape	-6.85	16.45	34.06	7.54	-5.13	-54.42	18.65	12.69	-5.71	-0.75	-7.18
	Core Area	-10.05	6.38	33.41	3.43	-4.28	-32.84	2.41	4.83	-2.39	-0.9	-12.98
	Fragm_ave	-6.55	7.24	21.52	4.66	-3.71	-48.99	1.83	6.82	16.00	-1.62	-10.14
2070_8.5	*Edges*	-3.04	2.53	-40.94	-3.85	-11.88	-61.76	-42.08	1.78	2.88	-0.91	-17.47
	Per/area	-4.98	-9.14	61.04	17.2	-34.66	-100	10.52	8.11	8.57	-23.57	-41.01
	Shape	-1.04	-5.83	52.01	10.71	-8.76	-41.25	27.92	3.39	0.35	-10.38	-7.55
	Core Area	-6.24	-1.52	50.49	6.04	-17.21	-74.21	1.82	1.73	1.23	-8.93	-29.09

	Fragm_ave	-6.55	7.24	21.52	4.66	-3.71	-48.99	1.83	6.82	16	-1.62	-10.14

Fragm_ave = (edges + Per/area + Shape + Core Area) / 4

Table S7b - Vulnerability index and component values.

	L. provoc.	*P. bras.*	*L. longic.*	*L. canad.*	*A. cap.*	*A. cong.*	*H. maculic.*	*L. lutra*	*L. sumatr.*	*L. persp.*	*A. ciner.*
Specialization	-73.5	-93.5	-17.7	-54.8	-74.5	-57.3	-75.4	-54	-50.7	-91.5	-61.4
Marginality	-48.3	-61.4	-82.3	-19.4	-45.1	-18.7	-47.7	-10	-42.5	-60.1	-35.8
Sensitivity	-60.9	-77.45	-50	-37.1	-59.8	-38	-61.55	-32	-46.6	-75.8	-48.6
Range change 50_2.6	0	8.2	31.3	9.6	-7.6	-65.8	-15.7	11.1	13	-5.5	-17.3
Range change 50_8.5	-2.7	2.8	45.1	12.8	-14.8	-84.9	-27	10.7	17.7	-13.9	-32.5
Range change 70_2.6	-8.3	7.6	32.6	8.6	-5	-64.9	-15.5	11.8	11.7	-4.6	-17.3
Range change 70_8.5	-7.6	-6.1	51.6	16.1	-34.6	-92.7	-35.3	10.8	18.6	-19.8	-41.5
Fragmentation 50_2.6	-6.14	7.34	21.15	4.75	-3.52	-49.12	1.64	7.31	16.14	-0.86	-9.59
Fragmentation50 8.5	-2.43	-7.04	32.55	7.84	-15.79	-63.81	2.16	1.57	23.45	-11.11	-21.28
Fragmentation 70_2.6	-6.55	7.24	21.52	4.66	-3.71	-48.99	1.83	6.82	16	-1.62	-10.14
Fragmentation 70_8.5	-6.55	7.24	21.52	4.66	-3.71	-48.99	1.83	6.82	16	-1.62	-10.14
PA_coverage 50_2.6	8.3	4.5	5.3	2.8	-8.1	7.6	-7.9	5.2	6.4	6	6.9
PA_coverage 50_8.5	9.9	6.8	9.3	4.3	-12.4	10.1	-6.8	7.1	9.9	6.4	10.2
PA_coverage 70_2.6	16.4	4.7	5	3.6	-5.7	5.3	-9	4.8	6.2	6.7	8
PA_coverage 70_8.5	19.4	6.8	8.3	0.1	-21.8	41.7	-6.9	8.9	11	7.4	-2.2
HF average 50_2.6	4	-2.8	8.3	18.7	-1.9	-8.3	-0.8	12.4	-3.7	1.6	7.5
HF average 50_8.5	7.2	-1.8	11.9	24	-0.1	-23.5	-0.8	16.5	-4.2	3	10.3
HF average 70_2.6	2.8	-3.4	8.7	18	-1.5	-7.1	-0.5	12.1	-3.2	1.5	7.7
HF average 70_8.5	9	-3.3	12	31.2	-2.5	-46.9	-1.2	21.2	-4.1	4.8	9.1
Exposure_50_2.6	1.54	4.31	16.51	8.96	-5.28	-28.9	-5.69	9	7.96	0.31	-3.12
Exposure_50_8.5	2.99	0.19	24.71	12.23	-10.77	-40.53	-8.11	8.97	11.71	-3.9	-8.32
Exposure_70_2.6	4.24	-1.52	25.64	13.73	-19.26	-41.8	-10.96	11.16	7.19	-4.64	-14.6
Exposure_70_8.5	1.09	4.04	16.96	8.72	-3.98	-28.92	-5.79	8.88	7.68	0.5	-2.94
Global vulnerability_50_2.6	-19.27	-22.94	-5.66	-6.39	-23.45	-31.94	-24.31	-4.67	-10.23	-25.06	-18.28
Global vulnerability_50_8.5	-18.31	-25.69	-0.19	-4.21	-27.12	-39.69	-25.92	-4.69	-7.73	-27.87	-21.75
Global vulnerability_70_2.6	-19.58	-23.13	-5.36	-6.56	-22.59	-31.95	-24.38	-4.75	-10.42	-24.94	-18.16
Global vulnerability_70_8.5	-17.93	-25.04	-1.1	-3.69	-30.37	-37.15	-27.45	-2.71	-8.62	-26.8	-23.66

Sensitivity = (S + M) / 2

Exposure = (Ex + Fr + PA + HF) / 4

Vulnerability index = (S + M + Ex + Fr + PA + HF) / 6

Table S7c – Fragmentation component calculated for *L. canadensis* without the two climatic suitable areas in South America.

Edges	50_2.6	-3.31
Per/area	50_2.6	11.33
Shape	50_2.6	7.54
Core Area	50_2.6	3.43
Fragm_ave	50_2.6	4.75
Edges	50_2.6	-2.6
Per/area	50_2.6	17.2
Shape	50_2.6	10.71
Core Area	50_2.6	6.04
Fragm_ave	50_2.6	7.84
Edges	50_2.6	-3.66
Per/area	50_2.6	11.33
Shape	50_2.6	7.54
Core Area	50_2.6	3.43
Fragm_ave	50_2.6	4.66
Edges	50_2.6	-3.85
Per/area	50_2.6	17.2
Shape	50_2.6	10.71
Core Area	50_2.6	6.04
Fragm_ave	50_2.6	4.66

Table S7d – Vulnerability index and components values calculated for *L. canadensis* without the two climatic suitable areas in South America.

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Specialization		-54.8
Marginality		-19.4
Sensitivity		-37.1
Range change	50_2.6	9.6
Range change	50_8.5	12.8
Range change	70_2.6	8.6
Range change	70_8.5	16.1
Fragmentation	50_2.6	4.75
Fragmentation	50_8.5	7.84
Fragmentation	70_2.6	4.66

Fragmentation	70_8.5	4.66
PA_coverage	50_2.6	2.8
PA_coverage	50_8.5	4.3
PA_coverage	70_2.6	3.6
PA_coverage	70_8.5	0.1
HF average	50_2.6	18.7
HF average	50_8.5	24
HF average	70_2.6	18
HF average	70_8.5	31.2
Exposure	50_2.6	8.96
Exposure	50_8.5	12.23
Exposure	70_2.6	13.73
Exposure	70_8.5	8.72
Global vulnerability	50_2.6	-6.39
Global vulnerability	50_8.5	-4.21
Global vulnerability	70_2.6	-6.56
Global vulnerability	70_8.5	-3.69

S8 – Sensitivity analysis of vulnerability index

Fig. S8a – Sensitivity analysis was run by putting 11 different weights (from 0 to 1 at interval of 0.1) to one components at time and leaving weight 1 to the other. For each combination, we calculated the vulnerability index as weighted average. For each species the sensitivity analysis was run for the four climate change scenarios (four boxplots corresponding to 2050 with RCP scenarios 2.6 (light gray), 2050 with RCP scenarios 8.5 (mid gray), 2070 with RCP scenarios 2.6 (gray), and 2070 with RCP scenarios 8.5 (dark gray)).

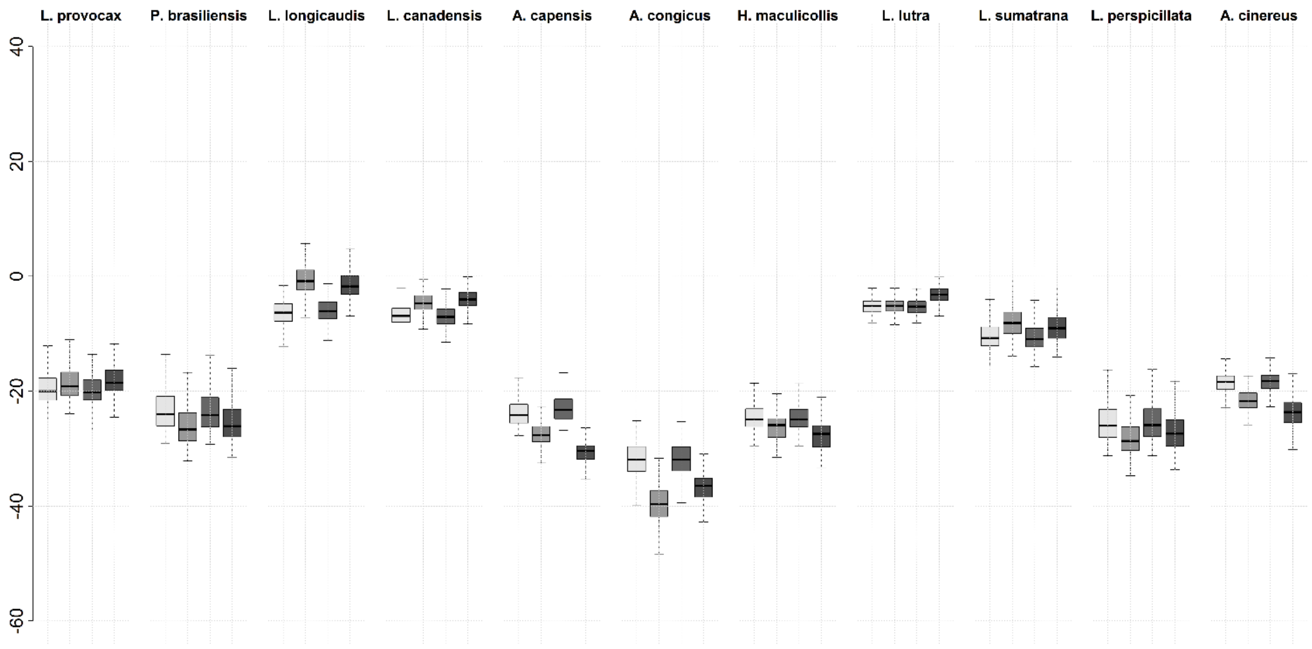


Fig. S8b – Sensitivity analysis was run by putting 11 different weights (from 0 to 1 at interval of 0.1) to both specialization and marginality (sensitivity components) and leaving weight 1 to the other. For each combination, we calculated the vulnerability index as weighted average. For each species the sensitivity analysis was run for the four climate change scenarios (four boxplots corresponding to 2050 with RCP scenarios 2.6 (light gray), 2050 with RCP scenarios 8.5 (mid gray), 2070 with RCP scenarios 2.6 (gray), and 2070 with RCP scenarios 8.5 (dark gray)).

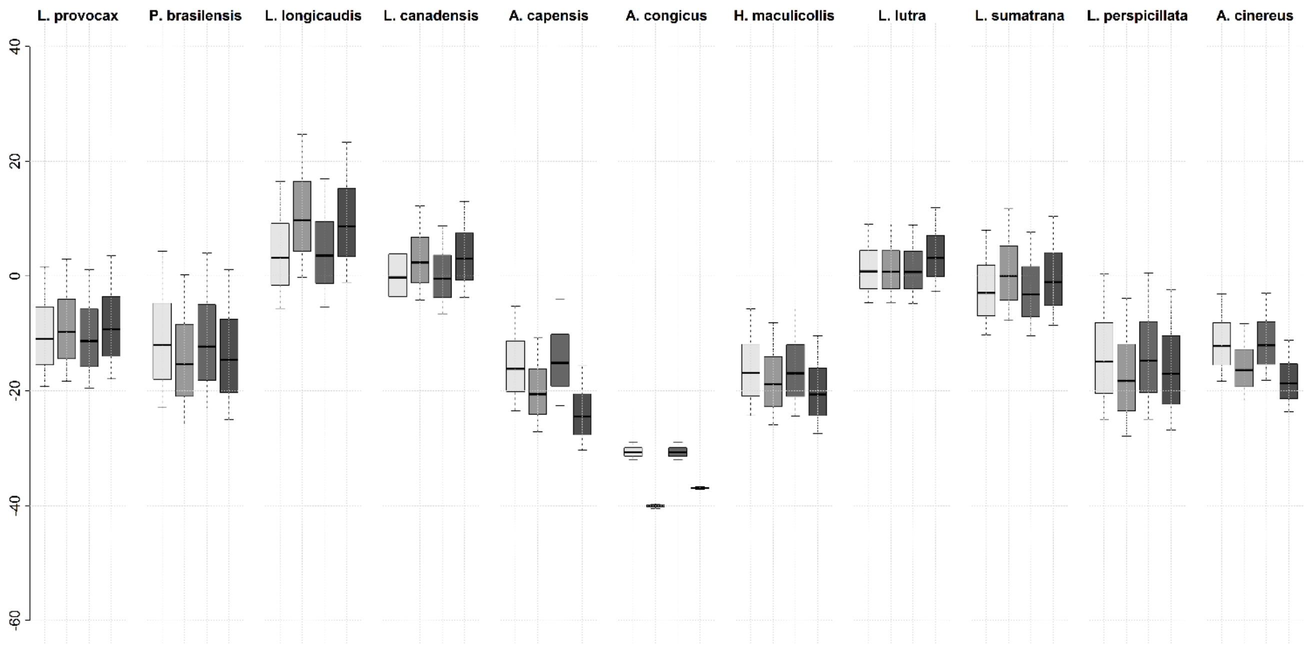
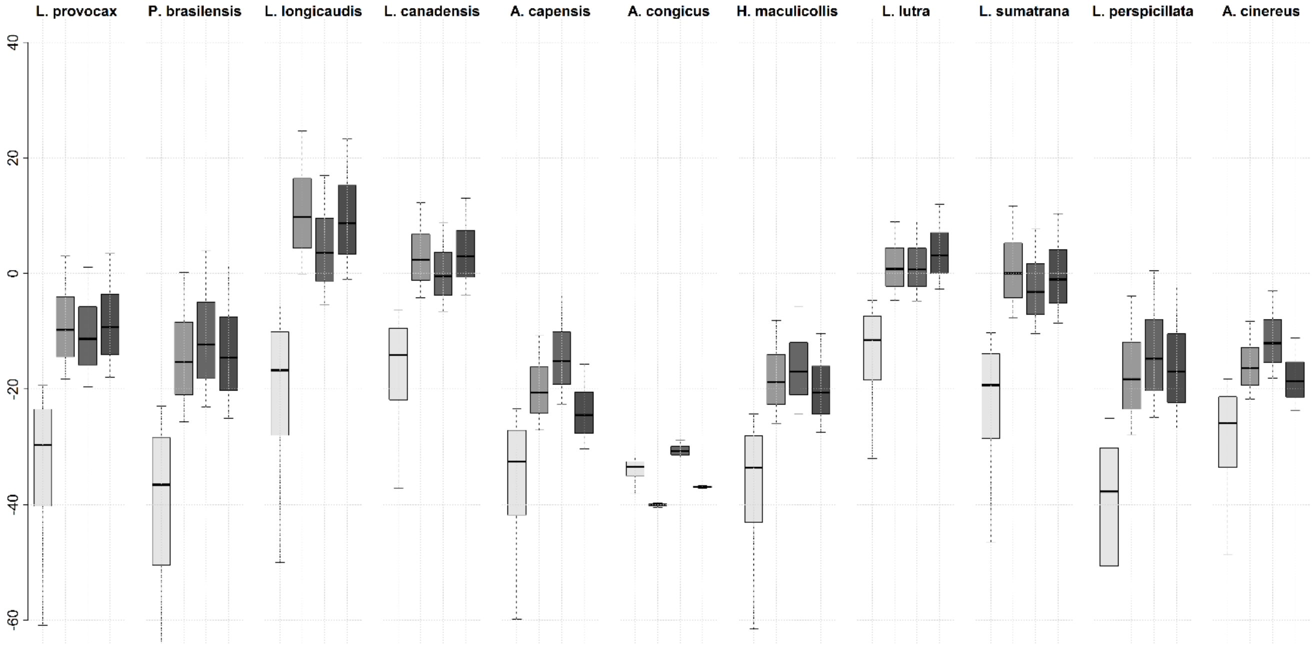


Fig. S8c – Sensitivity analysis was run by putting 11 different weights (from 0 to 1 at interval of 0.1) to range change, fragmentation, PA coverage and HF average (exposure components) and leaving weight 1 to the other. For each combination, we calculated the vulnerability index as weighted average. For each species the sensitivity analysis was run for the four climate change scenarios (four boxplots corresponding to 2050 with RCP scenarios 2.6 (light gray), 2050 with RCP scenarios 8.5 (mid gray), 2070 with RCP scenarios 2.6 (gray), and 2070 with RCP scenarios 8.5 (dark gray)).


L. provocax
P. brasilensis
L. longicaudis
L. canadensis
A. capensis
A. congicus
H. maculicollis
L. lutra
L. sumatrana
L. perspicillata
A. cinereus
40
20
0
-20
-40
-60

S9 – Supplementary References

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