

Table S1. List of monitoring wildlife crossing structure

Longitude	Latitude	Type of WCS	Construction year	Monitoring days
128° 46' 21.698" E	37° 37' 12.698" N	OP	2005	325
128° 21' 18.270" E	36° 48' 32.393" N	OP	2009	17
127° 27' 49.770" E	36° 8' 55.471" N	OP	2007	130
127° 35' 50.932" E	35° 52' 51.629" N	OP	2000	171
127° 38' 0.640" E	35° 45' 42.311" N	OP	2006	58
127° 36' 59.969" E	35° 38' 32.752" N	OP	2008	503
127° 6' 30.960" E	35° 23' 1.709" N	OP	2006	119
127° 6' 5.918" E	35° 25' 15.290" N	OP	2006	119
128° 2' 12.970" E	36° 39' 2.999" N	OP	2001	115
127° 57' 17.417" E	36° 4' 2.507" N	OP	2005	473
128° 47' 50.453" E	37° 2' 20.317" N	OP	2005	205
128° 40' 41.084" E	36° 6' 40.399" N	OP	2010	921
126° 39' 37.933" E	34° 22' 55.085" N	OP	2012	21
126° 35' 53.185" E	34° 25' 1.610" N	OP	2012	21
127° 8' 57.070" E	35° 27' 44.730" N	OP	2012	22
127° 20' 44.599" E	35° 48' 48.820" N	OP	2013	21
127° 39' 35.942" E	35° 43' 21.349" N	OP	2002	438
127° 29' 9.499" E	35° 26' 55.500" N	OP	2003	503
127° 54' 5.602" E	35° 56' 24.500" N	OP	2003	789
127° 46' 13.318" E	37° 54' 32.321" N	OP	2005	576
128° 51' 10.321" E	37° 34' 36.952" N	OP	2003	254
128° 21' 20.599" E	38° 16' 45.098" N	OP	2003	608
128° 23' 48.570" E	38° 33' 29.138" N	OP	2012	96
128° 52' 42.388" E	37° 7' 1.985" N	OP	2003	141
128° 54' 12.593" E	37° 31' 15.092" N	OP	2003	583
128° 22' 39.652" E	37° 11' 5.701" N	OP	2004	142
128° 51' 10.598" E	37° 34' 38.302" N	OP	2008	366
128° 19' 1.290" E	36° 15' 53.078" N	OP	2009	73
128° 7' 53.000" E	36° 39' 17.899" N	OP	1999	66
128° 42' 2.995" E	36° 51' 26.082" N	OP	2005	88
128° 42' 50.512" E	36° 51' 46.868" N	OP	2005	141
128° 42' 30.740" E	36° 41' 40.668" N	OP	2010	71
126° 40' 47.000" E	36° 9' 43.280" N	OP	2014	279
126° 41' 3.390" E	36° 9' 55.610" N	OP	2014	581
127° 49' 35.810" E	35° 52' 10.030" N	OP	2007	303
128° 42' 3.330" E	36° 35' 45.350" N	OP	2014	71

129° 0' 33.682" E	37° 23' 0.280" N	UP	2004	465
126° 51' 22.331" E	35° 59' 42.860" N	UP	2006	83
127° 30' 12.370" E	35° 12' 11.768" N	UP	2009	390
127° 32' 29.011" E	35° 11' 33.191" N	UP	2011	279
128° 46' 56.140" E	37° 44' 3.772" N	UP	2001	436
128° 47' 23.971" E	37° 44' 51.680" N	UP	2001	436
127° 52' 52.489" E	37° 45' 19.109" N	UP	2009	435
128° 2' 38.101" E	36° 25' 33.931" N	UP	2007	435
128° 1' 22.289" E	36° 25' 44.641" N	UP	2007	435
126° 36' 48.200" E	35° 26' 34.598" N	UP	2013	83
126° 36' 41.501" E	35° 26' 34.102" N	UP	2013	83
128° 24' 4.030" E	38° 13' 15.750" N	UP	2009	435
128° 24' 17.630" E	38° 13' 16.140" N	UP	2009	218

OP: Overpass, UP: Underpass

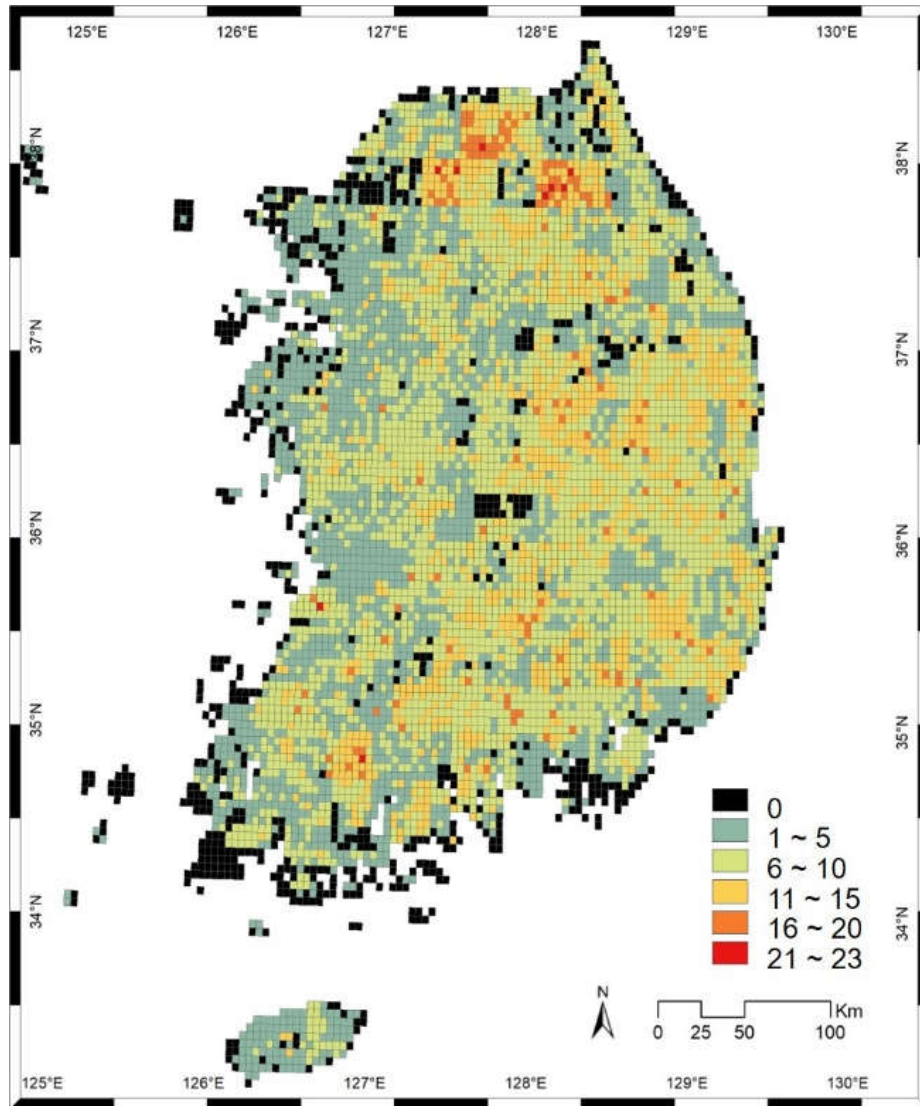


Figure S1. Thematic map dividing the number of species appearing in the mammalian survey grid of the Investigation of Natural Environment (INE) into 5 levels. Calculation was carried out by combining the results of all mammalian surveys of the 2nd INE (1997–2005) and 3rd INE (2006–2013). For the INE mammalian survey unit grid, the 1:25,000 map was divided into 9 zones and subdivided into 6,748 grids. By overlapping the 49 WCS locations on each grid, 6 WCS were included in the same grid; accordingly, 43 grids were identified as a subject. By calculating the number of species in 6,748 INE grids, up to 23 species were identified from the grid where no trace of habitat was found.

Table S2. 18 WCS evaluated for the effectiveness using the daily average frequency index(FI) and diversity index(DI)

	Code	Longitude	Latitude	CY	RT	RL	WT
HWC	HWC1	126° 39' 37.933" E	34° 22' 55.085" N	2012	NH	4	OP
	HWC2	128° 51' 10.321" E	37° 34' 36.952" N	2003	NH	2	OP
	HWC3	127° 27' 49.770" E	36° 8' 55.471" N	2007	GR	2	OP
	HWC4	128° 52' 42.388" E	37° 7' 1.985" N	2003	NH	2	OP
	HWC5	126° 41' 3.390" E	36° 9' 55.610" N	2014	NH	4	OP
	HWC6	126° 40' 47.000" E	36° 9' 43.280" N	2014	NH	4	OP
	HWC7	127° 54' 5.602" E	35° 56' 24.500" N	2003	NH	2	OP
	HWC8	127° 39' 35.942" E	35° 43' 21.349" N	2002	NH	2	OP
	HWC9	128° 2' 12.970" E	36° 39' 2.999" N	2001	LH	2	OP
LWC	LWC1	128° 19' 1.290" E	36° 15' 53.078" N	2009	NH	4	OP
	LWC2	126° 35' 53.185" E	34° 25' 1.610" N	2012	NH	4	OP
	LWC3	128° 22' 39.652" E	37° 11' 5.701" N	2004	NH	4	OP
	LWC4	127° 35' 50.932" E	35° 52' 51.629" N	2000	LH	2	OP
	LWC5	128° 40' 41.084" E	36° 6' 40.399" N	2010	LH	2	OP
	LWC6	127° 57' 17.417" E	36° 4' 2.507" N	2005	LH	2	OP
	LWC7	127° 6' 5.918" E	35° 25' 15.290" N	2006	LH	2	OP
	LWC8	128° 42' 3.330" E	36° 35' 45.350" N	2014	NH	4	OP
	LWC9	128° 42' 30.740" E	36° 41' 40.668" N	2010	NH	4	OP

RT: Road type, NH: National highway, GR: Gun road, LH: Local highway, OP: Overpass

Table S3. Results of Mann-Whitney U test in human-dominated landscape and conservation zone where development is prohibited

Category	Radius		N	Mean	Standard deviation	Z	P-value
Urban	1km	LWC	9	0.116	0.058	-.662	.508
		HWC	9	0.223	0.217		
	5km	LWC	9	3.326	2.252	-1.369	.171
		HWC	9	2.377	1.634		
Agricultural land	1km	LWC	9	0.484	0.384	-.574	.566
		HWC	9	0.741	0.684		
	5km	LWC	9	14.760	6.605	-.221	0.825
		HWC	9	12.963	7.176		
Statutory protected area	1km*	LWC	9	0.155	0.465	-2.051	.040*
		HWC	9	1.381	1.932		
	5km	LWC	9	5.044	7.829	-1.079	.280
		HWC	9	14.351	15.823		
Non-statutory protected area	1km	LWC	9	0.058	0.125	-.251	.802
		HWC	9	0.046	0.087		
	5km	LWC	9	2.478	3.705	-1.590	.112
		HWC	9	4.778	4.738		

Table S4 Results of Mann-Whitney U test landscape metrics using MAPA

Category	Radius		N	Mean	Standard deviation	Z	P-value
Core	1km	LWC	9	1.630	0.524	-.397	.691
		HWC	9	1.457	0.913		
	5km	LWC	9	36.791	13.410	-.839	.402
		HWC	9	42.932	17.063		
Islet	1km	LWC	9	0.022	0.031	0.000	1.000
		HWC	9	0.034	0.040		
	5km	LWC	9	0.514	0.337	-.574	.566
		HWC	9	0.505	0.431		
Perforation	1km	LWC	9	0.045	0.059	-.580	.562
		HWC	9	0.035	0.046		
	5km	LWC	9	0.863	0.463	-1.280	.200
		HWC	9	1.305	0.753		
Loop	1km	LWC	9	0.032	0.017	-.177	.860
		HWC	9	0.031	0.016		
	5km	LWC	9	0.767	0.139	-1.634	.102
		HWC	9	0.895	0.180		
Edge	1km*	LWC	9	0.398	0.146	-1.988	.047*
		HWC	9	0.290	0.078		
	5km	LWC	9	7.892	3.131	-1.369	.171
		HWC	9	5.970	2.601		
Branch	1km	LWC	9	0.086	0.042	-.221	.825
		HWC	9	0.098	0.074		
	5km	LWC	9	2.018	0.980	-.839	.402
		HWC	9	1.709	1.118		
Background	1km	LWC	9	0.858	0.419	-.574	.566
		HWC	9	1.106	0.753		
	5km	LWC	9	28.082	10.802	-.751	.453
		HWC	9	23.926	14.930		
Bridge	1km	LWC	9	0.073	0.051	-.707	.480
		HWC	9	0.092	0.065		
	5km	LWC	9	1.613	1.150	-.397	.691
		HWC	9	1.294	0.794		