Table S1

The difference in Akaike information criterion (ΔAIC) and the number of parameters (K) for varying models of resource selection for bison at the Tallgrass Prairie Preserve, OK, USA; model parameters include time since fire (*tsf*), distance to water (*water*), slope (*slope*), distance to fire patch edge (*edge*), woody vegetation (*wood*), elevation (*elevation)*, fire patch area (*area*), northing (*north*) and easting (*east*), both derivatives of aspect. We included individual animals as a random intercept in the mixed-effect logistic regression. We included main effects in all models with interaction terms.

	K	ΔAIC	LL
tsf×water + tsf×slope + tsf×edge + tsf×wood + tsf×elevation + tsf×area + tsf×north + tsf×east	19	8.6	-627312.1
tsf×water + tsf×slope + tsf×edge + tsf×wood + tsf×elevation + tsf×area + north + east	17	16.0	-627317.8
tsf×water + tsf×slope + tsf×edge + tsf×wood + tsf×elevation + tsf×area	15	0.0	-627311.8
tsf×water + tsf×slope + tsf×edge + tsf×wood + tsf×elevation + area	14	9974.4	-632300.0
tsf×water + tsf×slope + tsf×edge + tsf×wood + elevation + tsf×area	14	2349.8	-628487.7
tsf×water + tsf×slope + tsf×edge + wood + tsf×elevation + tsf×area	14	15.8	-627320.7
tsf×water + tsf×slope + edge + tsf×wood + tsf×elevation + tsf×area	14	1431.4	-628028.5
tsf×water + slope + tsf×edge + tsf×wood + tsf×elevation + tsf×area	14	1533.4	-628079.5
water + tsf×slope + tsf×edge + tsf×wood + tsf×elevation + tsf×area	14	1477.0	-628051.3
tsf + water + slope + edge + wood + elevation + area	9	18583.8	-636609.7
water + slope + edge + wood + elevation + area	8	68313.4	-661475.5

Table S2

The difference in Akaike information criterion (ΔAIC) and the number of parameters (K) for varying models of resource selection for cattle at the Tallgrass Prairie Preserve, OK, USA; model parameters include time since fire (*tsf*), distance to water (*water*), slope (*slope*), distance to fire patch edge (*edge*), woody vegetation (*wood*), elevation (*elevation)*, northing (*north*) and easting (*east*), both derivatives of aspect. We included individual animals as a random intercept in the mixed-effect logistic regression. We included main effects in all models with interaction terms.

	K	ΔAIC	LL
tsf×water + tsf×slope + tsf×edge + tsf×wood + tsf×elevation + tsf×north + tsf×east	18	1.2	-466100.2
tsf×water + tsf×slope + tsf×edge + tsf×wood + tsf×elevation + north + east	16	0.0	-466101.6
tsf×water + tsf×slope + tsf×edge + tsf×wood + tsf×elevation	14	45.4	-466126.3
tsf×water + tsf×slope + tsf×edge + tsf×wood + tsf×elevation	14	45.4	-466126.3
tsf×water + tsf×slope + tsf×edge + tsf×wood + elevation	13	157.0	-466183.1
tsf×water + tsf×slope + tsf×edge + wood + tsf×elevation	13	352.2	-466280.7
tsf×water + tsf×slope + edge + tsf×wood + tsf×elevation	13	183.8	-466196.5
tsf×water + slope + tsf×edge + tsf×wood + tsf×elevation	13	1647.8	-466928.5
water + tsf×slope + tsf×edge + tsf×wood + tsf×elevation	13	1761.6	-466985.4
tsf + water + slope + edge + wood + elevation	9	4406.4	-468311.8
water + slope + edge + wood + elevation	8	38629.0	-48542.1

Table S3

The difference in Akaike information criterion (ΔAIC) and the number of parameters (K) for varying models of resource selection for cattle at the Oklahoma State University Research Range, OK, USA; model parameters include time since fire (*tsf*), distance to water (*water*), slope (*slope*), woody vegetation (*wood*), northing (*north*) and easting (*east*), both derivatives of aspect. We included individual animals as a random intercept in the mixed-effect logistic regression. We included main effects in all models with interaction terms.

	K	ΔAIC	LL
tsf×water + tsf×slope + tsf×wood + tsf×north + tsf×east	12	4.6	-415563.5
tsf×water + tsf×slope + tsf×wood + north + east	10	0.0	-415563.2
tsf×water + tsf×slope + tsf×wood	8	71.8	-415581.6
tsf×water + tsf×slope + wood	7	768.0	-415930.7
tsf×water + slope + tsf×wood	7	148.0	-415620.8
water + tsf×slope + tsf×wood	7	240.1	-415666.8
tsf + water + slope + wood	5	953.5	-416025.5
water + slope + wood	4	66650.8	0.0

Table S4

Varying models of resource selection for cattle at the Tallgrass Prairie Preserve, OK, USA. Patches in cattle units vary in size relative to total area. The difference in Akaike information criterion (ΔAIC), log likelihood (LL), and the number of parameters (K) are shown. Model parameters include time since fire (*tsf*), distance to water (*water*), slope (*slope*), distance to fire patch edge (*edge*), woody vegetation (*wood*), elevation (*elevation)*, northing (*north*) and easting (*east*), both derivatives of aspect. We included individual animals nested within fire patches as a random intercept in the mixed-effect logistic regression. We included main effects in all models with interaction terms.

	K	ΔAIC	LL
Patch size - 50%			
tsf×water + tsf×slope + tsf×edge + tsf×wood + tsf×elevation + tsf×north + tsf×east	17	5.8	-33925.83
tsf×water + tsf×slope + tsf×edge + tsf×wood + tsf×elevation + north + east	15	3.1	-33926.46
tsf×water + tsf×slope + tsf×edge + tsf×wood + tsf×elevation	13	3.0	-33928.43
tsf×water + tsf×slope + tsf×edge + tsf×wood + elevation	12	51.1	-33953.48
tsf×water + tsf×slope + tsf×edge + wood + tsf×elevation	12	2.2	-33929.00
tsf×water + tsf×slope + edge + tsf×wood + tsf×elevation	12	514.9	-34185.37
tsf×water + slope + tsf×edge + tsf×wood + tsf×elevation	12	30.4	-33943.11
water + tsf×slope + tsf×edge + tsf×wood + tsf×elevation	12	0.0	-33927.92
tsf + water + slope + edge + wood + elevation	8	744.6	-34304.20
Patch size - 33%			
tsf×water + tsf×slope + tsf×edge + tsf×wood + tsf×elevation + tsf×north + tsf×east	17	8.4	-86403.15
tsf×water + tsf×slope + tsf×edge + tsf×wood + tsf×elevation + north + east	15	0.0	-86400.95
tsf×water + tsf×slope + tsf×edge + tsf×wood + tsf×elevation	13	21.7	-86413.80
tsf×water + tsf×slope + tsf×edge + tsf×wood + elevation	12	36.2	-86422.05
tsf×water + tsf×slope + tsf×edge + wood + tsf×elevation	12	72.1	-86440.00
tsf×water + tsf×slope + edge + tsf×wood + tsf×elevation	12	1507.0	-87157.45
tsf×water + slope + tsf×edge + tsf×wood + tsf×elevation	12	11.1	-86409.50
water + tsf×slope + tsf×edge + tsf×wood + tsf×elevation	12	42.4	-86425.15
tsf + water + slope + edge + wood + elevation	8	2453.9	-87484.90
Patch size - 25%			
tsf×water + tsf×slope + tsf×edge + tsf×wood + tsf×elevation + tsf×north + tsf×east	17	9.6	-101297.40
tsf×water + tsf×slope + tsf×edge + tsf×wood + tsf×elevation + north + east	15	3.5	-101296.35
tsf×water + tsf×slope + tsf×edge + tsf×wood + tsf×elevation	13	0.0	-101296.60
tsf×water + tsf×slope + tsf×edge + tsf×wood + elevation	12	4.5	-101299.85
tsf×water + tsf×slope + tsf×edge + wood + tsf×elevation	12	72.7	-101333.95
tsf×water + tsf×slope + edge + tsf×wood + tsf×elevation	12	1749.5	-101672.35
tsf×water + slope + tsf×edge + tsf×wood + tsf×elevation	12	8.7	-101301.95
water + tsf×slope + tsf×edge + tsf×wood + tsf×elevation	12	113.0	-101354.10
tsf + water + slope + edge + wood + elevation	8	955.2	-101779.20
Patch size - 17%			
tsf×water + tsf×slope + tsf×edge + tsf×wood + tsf×elevation + tsf×north + tsf×east	17	0.0	-92030.60
tsf×water + tsf×slope + tsf×edge + tsf×wood + tsf×elevation + north + east	15	28.6	-92043.90

tsf×water + tsf×slope + tsf×edge + tsf×wood + tsf×elevation	13	77.4	-92.073.3
tsf×water + tsf×slope + tsf×edge + tsf×wood + elevation	12	308.7	-92189.95
tsf×water + tsf×slope + tsf×edge + wood + tsf×elevation	12	80.3	-92075.72
tsf×water + tsf×slope + edge + tsf×wood + tsf×elevation	12	5404.6	-94737.90
tsf×water + slope + tsf×edge + tsf×wood + tsf×elevation	12	87.9	-92079.55
water + tsf×slope + tsf×edge + tsf×wood + tsf×elevation	12	134.3	-92102.75
tsf + water + slope + edge + wood + elevation	8	6050.6	-95064.90
Patch size - 12%			
tsf×water + tsf×slope + tsf×edge + tsf×wood + tsf×elevation + tsf×north + tsf×east	17	1.2	-47284.00
tsf×water + tsf×slope + tsf×edge + tsf×wood + tsf×elevation + north + east	15	0.0	-47285.39
tsf×water + tsf×slope + tsf×edge + tsf×wood + tsf×elevation	13	0.3	-47287.52
tsf×water + tsf×slope + tsf×edge + tsf×wood + elevation	12	168.2	-47372.47
tsf×water + tsf×slope + tsf×edge + wood + tsf×elevation	12	20.2	-47298.49
tsf×water + tsf×slope + edge + tsf×wood + tsf×elevation	12	198.6	-47387.68
tsf×water + slope + tsf×edge + tsf×wood + tsf×elevation	12	49.1	-47312.92
water + tsf×slope + tsf×edge + tsf×wood + tsf×elevation	12	132.5	-47351.62
tsf + water + slope + edge + wood + elevation	8	477.8	-47531.27

Table S5
List of studies that examine the fire-grazing interaction, separated by continent. List is not all inclusive.

Africa	
	Moe, Wegge, & Kapela 1990; Wilsey 1996; Salvatori et al. 2001; Gureja & Owen-Smith 2002; Tomor & Owen-Smith 2002; Archibald & Bond 2004; Archibald et al. 2005; Klop, van Goethem, & de Iongh 2007; Savadogo, Sawadogo, & Tiveau 2007; Archibald 2008; Hassan et al. 2008; Klop & van Goethem 2008; Waldram, Bond, & Stock 2008; Parrini & Owen-Smith 2010
Asia	
	Moe & Wegge 1994; Moe & Wegge 1997; Sankaran 2005
Australia	
	Kirkpatrick, Marsden-Smedley, & Leonard In press; Kutt & Woinarski 2007; Murphy & Bowman 2007; Leonard, Kirkpatrick, & Marsden-Smedley 2010
Europe	
	Kramer, Groen, & van Wieren 2003; Vandvik et al. 2005; Onodi et al. 2008; Davies et al. 2010
North America	
	Duvall & Whitaker 1964; Hobbs & Spowart 1984; Vinton et al. 1993; Turner et al. 1994; Pearson et al. 1995; Wallace et al. 1995; Coppedge & Shaw 1998; Biondini, Steuter, & Hamilton 1999; Smith, Hardin, & Flinders 1999; Fuhlendorf & Engle 2004; Schuler et al. 2006; Van Dyke & Darragh 2007; Bleich et al. 2008; Meek et al. 2008

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