Table S1 Key predictor variables used to explain and predict the occupancy and abundance of all exotic species and exotic forbs in the Corangamite catchment.

Variable	Description*	Indicates	N	Mean (SE)	Range
Distance to edge[PAH]	Fragmentation: interior distance from the edge of remnant vegetation (D; km)	Propagule pressure, disturbance, resource availability	3118	0.86 (0.02)	0 - 6.05
Relevant land use[PAH]	Land use category most closely corresponding to the year of survey (i.e. within 16 years, P; categorical: Ag, Agriculture – dryland; B, Benign ; O, Other; Pr, Production; Ub, Urban)	Propagule pressure, anthropogenic disturbance	3118	B (mode)	B>Ag>O> Pr>Ub
Building density[PH]	Building density (1 km radius) (D; number of 25 m^2 cells with ≥1 building km^{-2})	Propagule pressure, anthropogenic disturbance	3118	91 (4.1)	0 - 2242
Distance to road[PH]	Distance to nearest sealed road (D; km)	Propagule pressure, anthropogenic disturbance	3118	1.71 (0.03)	0.0004 – 9.16
Distance to river[PA]	Distance to nearest watercourse (D; km)	Propagule dispersal, resource availability, disturbance	3118	0.2 (0.005)	0.0001 - 1.98
1888 land use[AH]	Land use in 1888 (P; categorical: Ag, Agriculture (dryland); B, Benign ; O, Other; Pr, Production; PU, Public use; Ub, Urban)	Historical land use	3118	Ag (mode)	Ag>Pr> B>PU> O>Ub

Summer rainfall[A]	Precipitation in Warmest Quarter (P; mm)	Resource availability, physiological tolerance, growth rates	3118	160 (0.9)	104 - 292
Wetness index[A]	Soil moisture: Topographic Wetness Index (*sensu* Beven & Kirby 1979) (P)	Resource availability, physiological tolerance, growth rates	3118	7.5 (0.02)	5.7 - 12.4
ThorInvPot[A]	Soil characteristics: Ratio of the inverse radioelement count of Thorium and the radioelement count of Potassium; relates to soil texture (i.e. high value = deep sand, low fertility; low value = heavy clay, high fertility) (P)	Soil characteristics	3118	499 (0.8)	275 - 587
Geology[A]	Geology: environmental description (D; categorical: IgEx, Igneous Extrusive; IgIn, Igneous Intrusive; IgInGran, Igneous Intrusive (Granite I-type); Sed, Sedimentary)	Soil characteristics	3118	Sed (mode)	Sed>IgEx> IgIn> IgInGran
MaxTemp-WarmestP[A]	Highest temperature of any weekly maximum temperature (P; ºC)	Physiological tolerance	3118	22.7 (0.03)	19.6 - 26.5
MinTemp-ColdestP[A]	Coldest temperature of any weekly minimum temperature (P; ºC)	Physiological tolerance	3118	4.6 (0.02)	1.4 - 6.3
Radiation (direct)[A]	Direct Solar Radiation (P; Watts m^{-2} $year^{-1}$)	Resource availability	3118	995009 (1137)	549023 - 1158389
Time since fire[AB]	Time since last wildfire (D; year)	Disturbance, resource	1560	31 (0.5)	0 - 67

		availability			
Veg cover[B]	Total vegetation foliar cover (P; % of quadrat)‡	Productivity, competition	3118	141 (1.3)	3 - 609
Forb cover[B]†	Total forb cover abundance (P; % of quadrat)‡	Habitat suitability, competition	2909	24 (0.6)	0.2 - 300
NDVI[B]	Vegetation: Mean Normalised Difference Vegetation Index derived from LANDSAT 7 TM of years 1989 – 2005 (P)	Productivity, competition, shading	3118	0.5 (0.003)	-0.18 - 0.76
Survey year	Date vegetation quadrat was surveyed (D; year)	Time since introduction, time for spread	3118	1990 (0.1)	1972 - 2006

*P indicates that factor has a proximal (direct) influence, D indicates distal (indirect) influence; [P]Variable indicates propagule pressure; [A]Variable indicates abiotic conditions; [B]Variable indicates biotic characteristics; [H]Variable indicates human influence; †only included in forb models; ‡Multiple vegetation layers mean that foliar cover can exceed 100% of quadrat area.

Beven, K. J. & Kirby, M. J. (1979) A physically-based, variable contributing area model of basin hydrology. *Hydrological Sciences Bulletin,* **24,** 43-69.

Table S2 Correlation matrix showing relationship among the environmental predictors. Values reported are the Pearson correlation coefficient. Strong correlations (>0.6) are in bold.

	Veg cover	Forb cover	Survey year	Summer rainfall	Wetness index	Thor InvPot	Building density	Distance to edge	Distance to road	Distance to river	Time since fire	NDVI	MaxTemp WarmestP	MinTemp ColdestP
Forb cover	0.43													
Survey year	-0.05	0.04												
Summer rainfall	0.23	-0.09	-0.35											
Wetness index	-0.20	0.17	0.18	**-0.60**										
ThorInvPot	0.23	-0.06	-0.24	0.17	0.01									
Building density	-0.04	0.07	0.09	-0.32	0.23	-0.05								
Distance to edge	0.32	0.16	-0.32	**0.61**	-0.32	0.11	-0.20							
Distance to road	0.22	0.07	-0.28	0.49	-0.36	0.11	-0.27	**0.75**						
Distance to river	-0.13	0.05	0.11	-0.19	0.31	0.11	-0.01	-0.14	-0.17					
Time since fire	0.00	-0.01	-0.27	0.48	-0.22	0.40	-0.50	0.17	0.22	0.21				
NDVI	0.30	-0.13	-0.30	**0.67**	**-0.67**	0.13	-0.28	0.45	0.44	-0.34	0.41			
MaxTemp WarmestP	-0.26	0.12	0.35	**-0.88**	0.57	-0.35	0.24	-0.56	-0.43	0.14	-0.48	**-0.65**		
MinTemp ColdestP	-0.03	-0.08	0.12	-0.38	0.20	0.26	0.27	-0.35	0.4	0.14	-0.14	-0.26	-0.01	
Radiation (direct)	0.00	0.09	-0.02	-0.05	0.26	-0.05	0.02	0.02	0.02	0.00	-0.20	-0.05	0.15	-0.30

Figure S1 Partial dependence plots showing relationship between the 12 most influential predictor variables and fitted values of (a) the probability of all exotic species occupancy (logit-transformed), (b) all exotic species proportional cover (logit-transformed), (c) the probability of exotic forb occupancy (logit-transformed), and (d) exotic forb proportional cover (log_{10}-transformed).

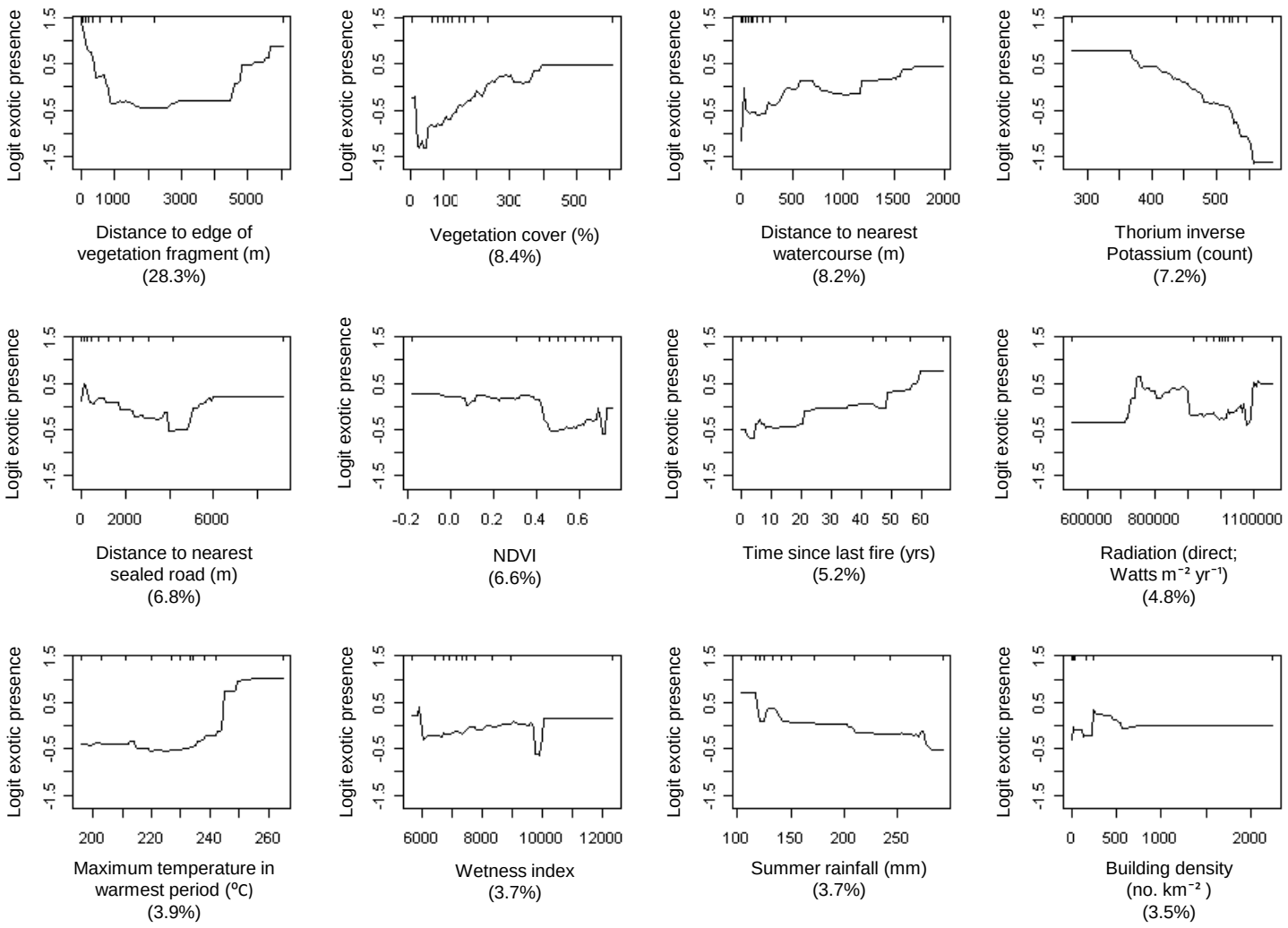
Logit exotic presence
Distance to edge of vegetation fragment (m) (28.3%)
Vegetation cover (%) (8.4%)
Distance to nearest watercourse (m) (8.2%)
Thorium inverse Potassium (count) (7.2%)
Distance to nearest sealed road (m) (6.8%)
NDVI (6.6%)
Time since last fire (yrs) (5.2%)
Radiation (direct; Watts m⁻² yr⁻¹) (4.8%)
Maximum temperature in warmest period (ºC) (3.9%)
Wetness index (3.7%)
Summer rainfall (mm) (3.7%)
Building density (no. km⁻²) (3.5%)

Figure S1a

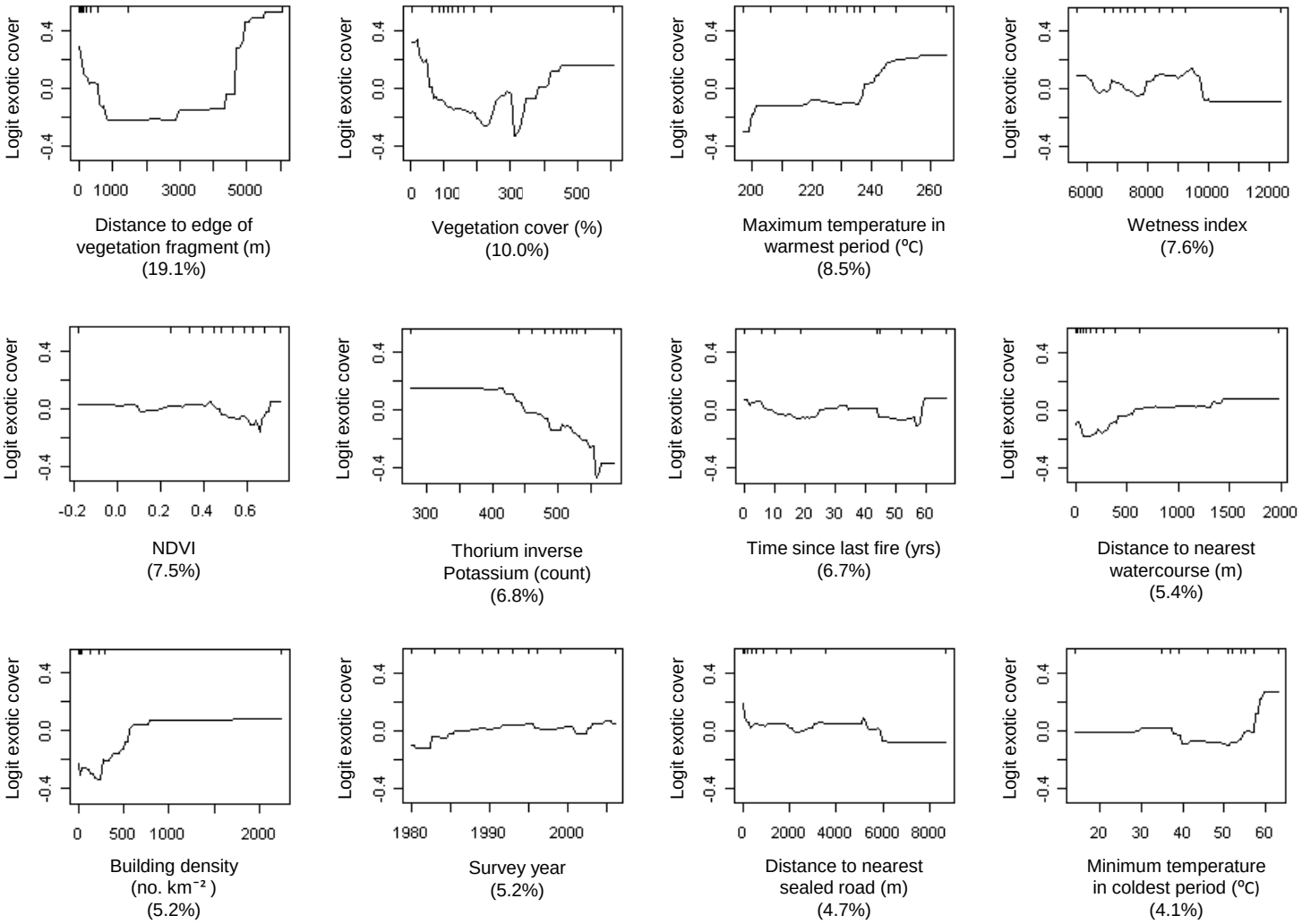
Logit exotic cover
Distance to edge of vegetation fragment (m) (19.1%)
Vegetation cover (%) (10.0%)
Maximum temperature in warmest period (ºC) (8.5%)
Wetness index (7.6%)
NDVI (7.5%)
Thorium inverse Potassium (count) (6.8%)
Time since last fire (yrs) (6.7%)
Distance to nearest watercourse (m) (5.4%)
Building density (no. km⁻²) (5.2%)
Survey year (5.2%)
Distance to nearest sealed road (m) (4.7%)
Minimum temperature in coldest period (ºC) (4.1%)

Figure S1b

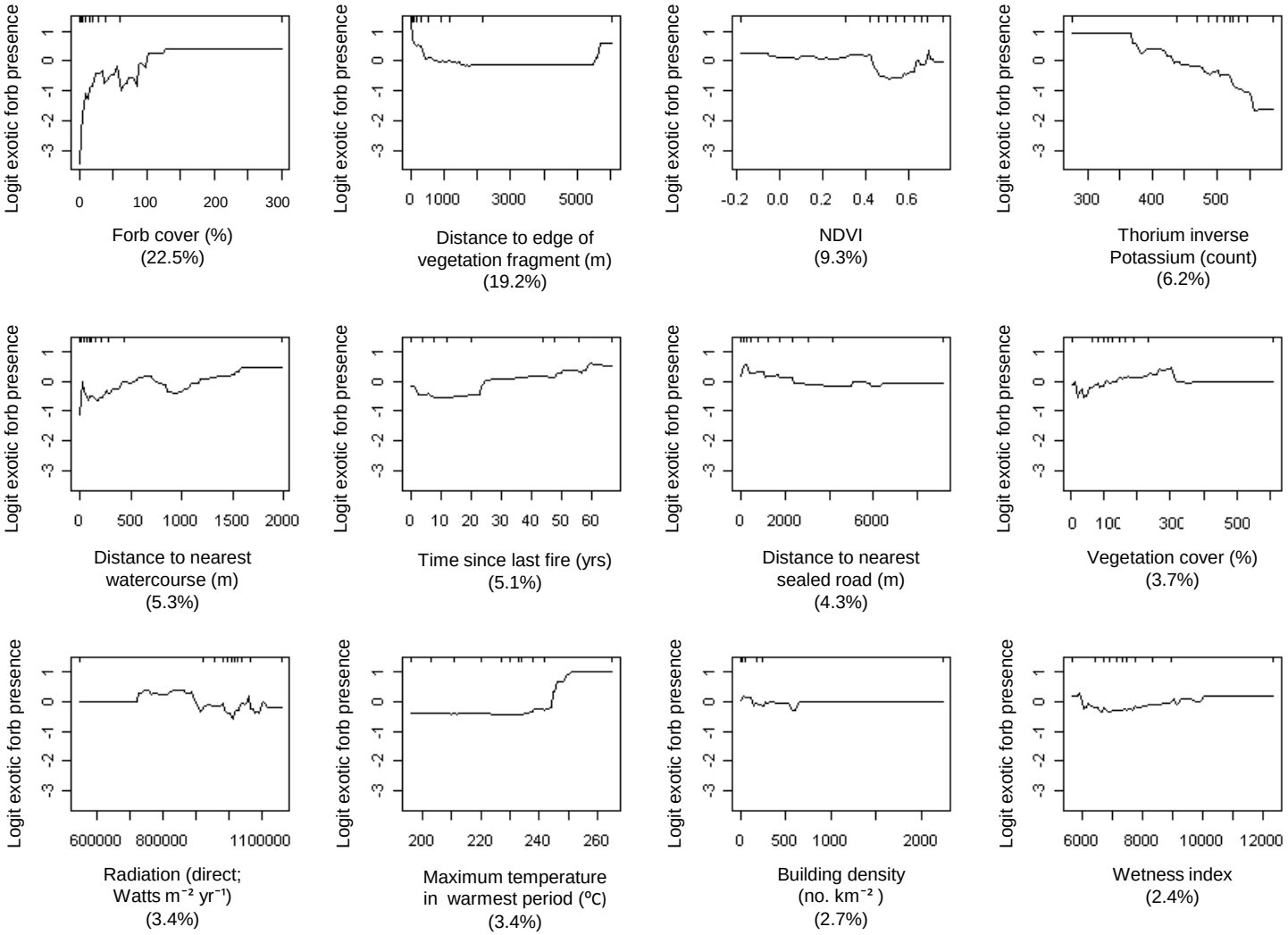
Logit exotic forb presence
-3 -2 -1 0 1
0 100 200 300
Forb cover (%)
(22.5%)
0 1000 3000 5000
Distance to edge of
vegetation fragment (m)
(19.2%)
-0.2 0.0 0.2 0.4 0.6
NDVI
(9.3%)
300 400 500
Thorium inverse
Potassium (count)
(6.2%)
0 500 1000 1500 2000
Distance to nearest
watercourse (m)
(5.3%)
0 10 20 30 40 50 60
Time since last fire (yrs)
(5.1%)
0 2000 6000
Distance to nearest
sealed road (m)
(4.3%)
0 100 300 500
Vegetation cover (%)
(3.7%)
600000 800000 1100000
Radiation (direct;
Watts m⁻² yr⁻¹)
(3.4%)
200 220 240 260
Maximum temperature
in warmest period (ºC)
(3.4%)
0 500 1000 2000
Building density
(no. km⁻²)
(2.7%)
6000 8000 10000 12000
Wetness index
(2.4%)

Figure S1c

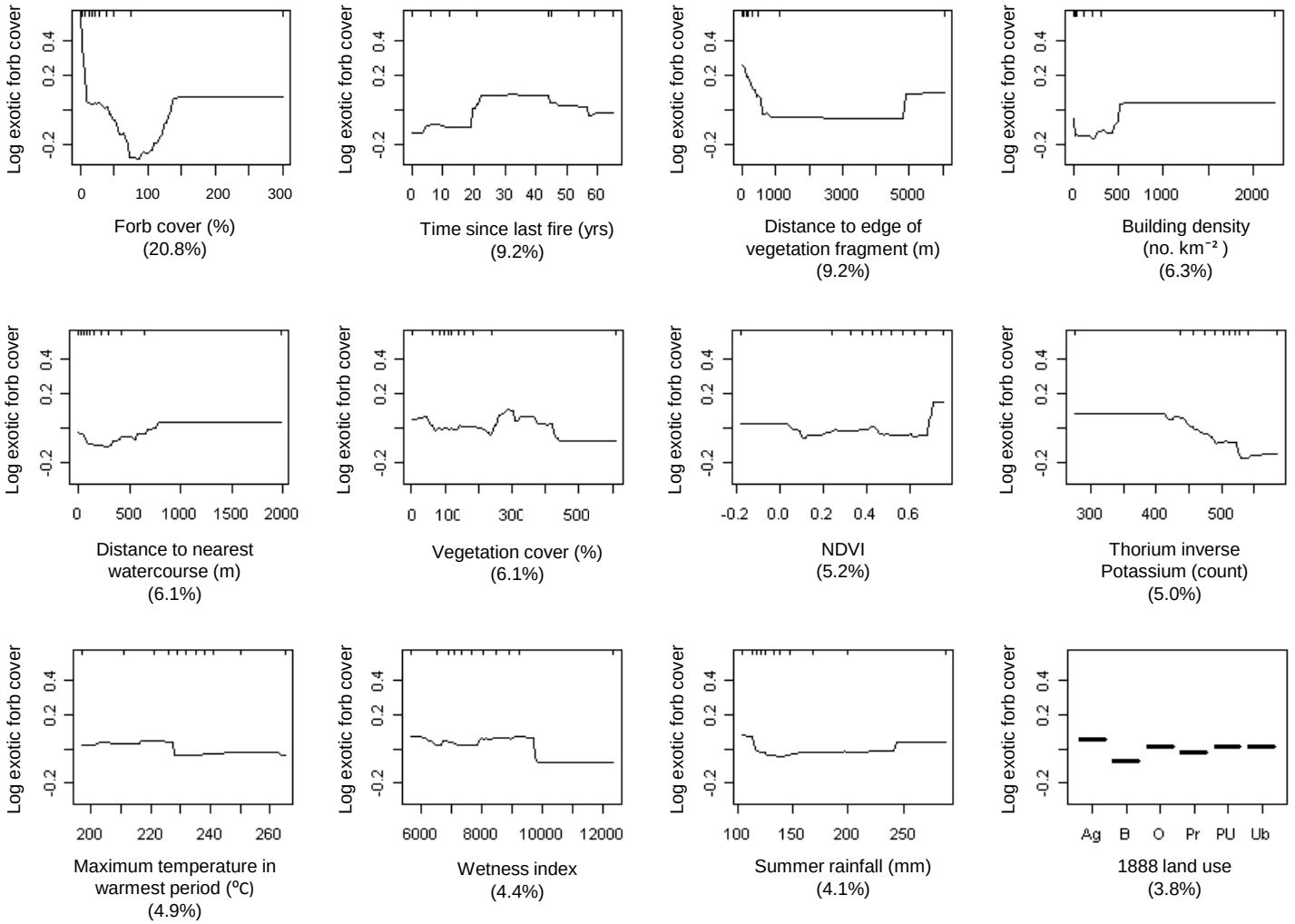
Log exotic forb cover
-0.2
0.2
0.4
0 100 200 300
Forb cover (%)
(20.8%)
0 10 20 30 40 50 60
Time since last fire (yrs)
(9.2%)
0 1000 3000 5000
Distance to edge of
vegetation fragment (m)
(9.2%)
0 500 1000 2000
Building density
(no. km⁻²)
(6.3%)
0 500 1000 1500 2000
Distance to nearest
watercourse (m)
(6.1%)
0 100 300 500
Vegetation cover (%)
(6.1%)
-0.2 0.0 0.2 0.4 0.6
NDVI
(5.2%)
300 400 500
Thorium inverse
Potassium (count)
(5.0%)
200 220 240 260
Maximum temperature in
warmest period (ºC)
(4.9%)
6000 8000 10000 12000
Wetness index
(4.4%)
100 150 200 250
Summer rainfall (mm)
(4.1%)
Ag B O Pr PU Ub
1888 land use
(3.8%)

Figure S1d

Table S3 Summary table showing the most important interactions (i.e. >10%) in the BRT models. The abundance models did not have interactions >5%. Model details as in Table 1.

Variable 1	Variable 2	Interaction size (%)	Description
All exotic occupancy			
Geology	ThorInvPot	62.5	Probability of occupancy decreases linearly from low to high ThorInvPot across all geological types; probability consistently highest under IgInGran.
Time since fire	ThorInvPot	18.8	Single-variable effects exaggerated
Distance to edge	Veg cover	13.2	Single-variable effects exaggerated
Radiation (direct)	Veg cover	12.1	Peaks when both are high and at medium radiation levels.
Exotic forb occupancy			
Veg cover	Forb cover	56.1	Lowest under low forb and veg cover, steps up and is highest at medium-high forb and veg cover
Time since fire	ThorInvPot	30.5	Lowest under high ThorInvPot and short time since last fire, highest under opposite conditions; effect of year since fire most apparent under low ThorInvPot
Geology	ThorInvPot	20.6	Probability of occupancy decreases linearly from low to high ThorInvPot across all geological types; probability consistently higher under IgInGran and IgEx than IgIn and Sed
Distance to edge	Forb cover	10.3	Highest under medium-high forb cover; effect of distance to edge most pronounced under low forb cover

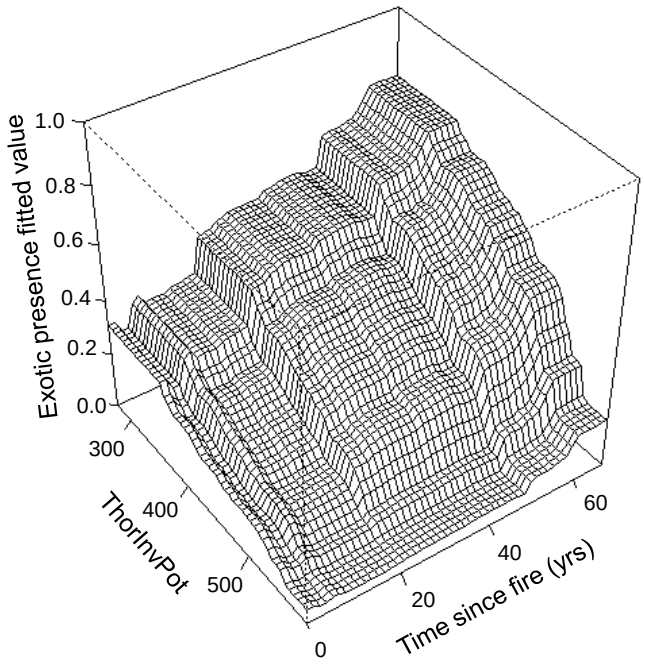

Figure S2 Interaction plot showing combined effect of Thorium-inverse Potassium and time since last fire on the fitted value of all exotic species occupancy.