**Supplementary file 2.** Four optimal models of landscape context, environment factors, and plant diversity affecting above-ground biomass.

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| Ranking | Model | R2 | AICc |
| 1 | AGB~HL+SWT+GSR+WR | 0.47\*\* | 1213.7 |
| 2 | AGB~HL+FPS+SWT+GSR+WR | 0.47\*\* | 1215.2 |
| 3 | AGB~HL+LST+SWT+GSR+WR | 0.47\*\* | 1215.3 |
| 4 | AGB~FPS+SWT+GSR+WR | 0.46\*\* | 1215.3 |

Note: AGB: above-ground biomass; HL: habitat loss; FPS: fragmentation per se; SWT: soil water content; LST: land surface temperature; GSR: grassland specialist richness; WR: weed richness; \*\*: significance at the 0.01 level.