**Supplemental Table 1.** Environmental covariates’ group name, data source, original resolution, and individual covariate names and descriptions.These covariates were evaluated to model environmental suitability for *Linaria dalmatica*, *Linaria vulgaris*, and hybrid *Linaria* in Montana, Wyoming, and Colorado. A seasonal covariate is suffixed by \* and implies four covariates – winter, spring, summer, and autumn.

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| **Climate** | | | |
| Source: ClimateWNA. Original resolution: 1 km. | | | |
| MAT | Mean annual temperature (°C) | MWMT | Mean warmest month temperature (°C) |
| MCMT | Mean coldest month temperature (°C) | TD | Temperature difference between MWMT and MCMT, or continentality (°C) |
| NFFD | The number of frost-free days | FFP | Frost-free period |
| bFFP | The day of the year on which FFP begins | eFFP | The day of the year on which FFP ends |
| Tave\* | Seasonal mean temperature (°C) | Tmax\* | Seasonal mean maximum temperature (°C) |
| Tmin\* | Seasonal mean minimum temperature (°C) | DD\_0\* | Seasonal degree-days below 0°C |
| DD18\* | Seasonal degree-days above 18°C | NFFD\* | Seasonal number of frost-free days |
| MAP | Mean annual precipitation (mm) | MSP | Mean annual summer (May to Sept.) precipitation (mm) |
| AHM | Annual heat-moisture index | SHM | Summer heat-moisture index |
| PAS | Precipitation as snow (mm) between August in previous year and July in current year | Eref | Hargreaves reference evaporation (mm) |
| CMD | Hargreaves climatic moisture deficit (mm) | PPT\* | Seasonal precipitation (mm) |
| PAS\* | Winter and spring precipitation as snow (mm) | MAR | Mean annual solar radiation (MJ m‐2 d‐1) |
| RH | Mean annual relative humidity (%) |  |  |
| **Land use/cover** | | | |
| Source: Multi-Resolution Land Characteristics Consortium (MRLC) National Land Cover Database 2011. Original resolution: 30 m. | | | |
| luc | Land use/cover |  |  |
| **Phenology metrics** | | | |
| Source: USGS Earth Explorer. Original resolution: 250 m. | | | |
| AMP | Amplitude - Maximum increase in canopy photosynthetic activity above the baseline (scaled NDVI). | EOSN | End of Season NDVI - Level of photosynthetic activity at the end of measurable photosynthesis (NDVI value). |
| MAXN | Maximum NDVI - Maximum level of photosynthetic activity in the canopy (NDVI value). | SOSN | Start of Season NDVI - Level of photosynthetic activity at the beginning of measurable photosynthesis (NDVI value). |
| TIN | Time-Integrated NDVI - Canopy photosynthetic activity across the entire growing season (interpolated NDVI). |  |  |
| **Soils** | | | |
| Source: ISRIC - World Soil Information SoilGrids Collection. Original resolution: 1 km. | | | |
| %clay\_0-5cm | Proportion of clay in the soil at 0-5 cm depth | %clay\_5-15cm | Proportion of clay in the soil at 5-15 cm depth |
| **Topography** | | | |
| Souce: USGS Earth Explorer Global 30 Arc-Second Elevation GTOPO30 DEM product. Original resolution: 830 m. | | | |
| dem Elevation (Digital Elevation Model) | | | |
| Souce: Derived from GTOPO30 DEM product. Original resolution: 830 m. | | | |
| slope | The percent slope of each cell | aspect | The compass direction (in degrees) the slope faces in each cell |
| Euclidean distance to water | Straight-line distance from a cell to a water source |  |  |

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| **Vegetation Indices** | | | |
| NDVI, EVI Source: USGS, NASA; Land Processes Distributed Active Archive Center; MRTWeb. Original resolution: 250 m. | | | |
| NDVI | NDVI mean for 2010 - 2015 | NDVI SD | NDVI standard deviation for 2010 - 2015 |
| EVI | EVI mean for 2010 - 2015 | EVI SD | EVI standard deviation data for 2010 - 2015 |
| VegDRI Source: USGS Earth Explorer. Original resolution: 1 km. | | | |
| VegDRI | Mean of the annual means of VegDRI data from 2010 – 2015 | VegDRI SD | Standard deviation of the VegDRI data from 2010 – 2015 |

NDVI is Normalized Difference Vegetation Index; EVI is Enhanced Vegetation Index; VegDRI is Vegetation Drought Response Index. All three are remotely-sensed data describing the health of vegetation.