Drivers of tundra shrub abundance in SW Greenland - supplementary material

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## Study species overview

| **species name** | **canopy persistence** | **PC1 (resource economics)** a | **PC2 (plant size)** a |
| --- | --- | --- | --- |
| *Empetrum nigrum* L. | evergreen | -3.59 | 0.79 |
| *Cassiope tetragona* L. | evergreen | -3.46 | 0.66 |
| *Phyllodoce caerulea* (L.) Bab. | evergreen | -3.27 | 0.28 |
| *Rhododendron groenlandicum* (Oeder) Kron & Judd | evergreen | -3.22 b | 0.46 b |
| *Rhododendron tomentosum* (Stokes) Harmaja | evergreen | -3.22 b | 0.46 b |
| *Betula nana* L. | deciduous | -1.47 | 0.64 |
| *Vaccinium uliginosum* L. | deciduous | -1.33 | 0.23 |
| *Salix arctophila* Cockerell | deciduous | -0.93 c | 1.71 c |
| *Salix glauca* L. | deciduous | -0.93 c | 1.71 c |

## Correlation matrix

|  | **summer (JJA) temperature** | **annual maximum temperature** | **annual minimum temperature** | **annual temperature variability** | **summer (JJA) precipitation** | **winter-spring (JFMAM) precipitation** | **spring (MAM) precipitation** | **slope inclination** | **solar radiation (SRI)** | **terrain ruggedness (TRI)** | **wetness (TWI)** | **wetness (TCWS)** | **diff. to CWM acquisitiveness** | **total shrub abundance** | **graminoid abundance** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| summer (JJA) temperature | 1.00 | 1.00 | 0.50 |  | 0.42 |  |  |  |  |  |  |  |  |  |  |
| annual maximum temperature | 1.00 | 1.00 | 0.47 |  | 0.41 |  |  |  |  |  |  |  |  |  |  |
| annual minimum temperature | 0.50 | 0.47 | 1.00 | -0.83 | 0.71 | 0.83 | 0.68 |  |  |  |  |  |  |  |  |
| annual temperature variability |  |  | -0.83 | 1.00 | -0.54 | -0.74 | -0.64 |  |  |  |  |  |  |  |  |
| summer (JJA) precipitation | 0.42 | 0.41 | 0.71 | -0.54 | 1.00 | 0.94 | 0.92 |  |  |  | -0.57 |  |  |  |  |
| winter-spring (JFMAM) precipitation |  |  | 0.83 | -0.74 | 0.94 | 1.00 | 0.97 |  |  |  | -0.49 |  |  |  |  |
| spring (MAM) precipitation |  |  | 0.68 | -0.64 | 0.92 | 0.97 | 1.00 |  |  |  | -0.45 |  |  |  |  |
| slope inclination |  |  |  |  |  |  |  | 1.00 | -0.96 | 0.67 | -0.41 |  |  |  |  |
| solar radiation (SRI) |  |  |  |  |  |  |  | -0.96 | 1.00 | -0.64 |  |  |  |  |  |
| terrain ruggedness (TRI) |  |  |  |  |  |  |  | 0.67 | -0.64 | 1.00 | -0.45 |  |  |  |  |
| wetness (TWI) |  |  |  |  | -0.57 | -0.49 | -0.45 | -0.41 |  | -0.45 | 1.00 |  |  |  |  |
| wetness (TCWS) |  |  |  |  |  |  |  |  |  |  |  | 1.00 |  | 0.42 |  |
| diff. to CWM acquisitiveness |  |  |  |  |  |  |  |  |  |  |  |  | 1 |  |  |
| total shrub abundance |  |  |  |  |  |  |  |  |  |  |  | 0.42 |  | 1.00 |  |
| graminoid abundance |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 1 |

## Variable selection (TWI)

| **variable** | **VIF (step 1)** | **VIF (step 2)** | **VIF (step 3)** | **VIF (step 4)** | **VIF (step 5)** | **VIF (step 6)** |
| --- | --- | --- | --- | --- | --- | --- |
| summer (JJA) temperature | 51,274.0 | 5.1e+04 | 5.4 | 1.9 | 1.8 | 1.6 |
| annual maximum temperature | Inf |  |  |  |  |  |
| annual minimum temperature | Inf | 1.7e+05 |  |  |  |  |
| annual temperature variability | Inf | 1.2e+05 | 17.8 | 2.1 | 2.1 | 1.8 |
| summer (JJA) precipitation | 21.3 | 2.1e+01 | 20.1 | 12.2 | 12.0 | 2.5 |
| winter-spring (JFMAM) precipitation | 697.1 | 7.0e+02 | 211.8 |  |  |  |
| spring (MAM) precipitation | 246.1 | 2.5e+02 | 83.2 | 10.9 | 10.6 |  |
| slope inclination | 14.5 | 1.4e+01 | 14.3 | 13.7 |  |  |
| solar radiation (SRI) | 13.2 | 1.3e+01 | 13.1 | 12.7 | 1.8 | 1.8 |
| terrain ruggedness (TRI) | 2.1 | 2.1e+00 | 2.1 | 2.1 | 2.0 | 2.0 |
| wetness (TWI) | 2.0 | 2.0e+00 | 1.9 | 1.9 | 1.9 | 1.9 |
| diff. to CWM acquisitiveness | 1.0 | 1.0e+00 | 1.0 | 1.0 | 1.0 | 1.0 |
| total shrub abundance | 1.2 | 1.2e+00 | 1.1 | 1.1 | 1.1 | 1.1 |
| graminoid abundance | 1.4 | 1.4e+00 | 1.3 | 1.3 | 1.3 | 1.2 |

## Variable selection (TCWS)

| **variable** | **VIF (step 1)** | **VIF (step 2)** | **VIF (step 3)** | **VIF (step 4)** | **VIF (step 5)** | **VIF (step 6)** |
| --- | --- | --- | --- | --- | --- | --- |
| summer (JJA) temperature | 48,176.1 | 4.8e+04 | 5.4 | 1.9 | 1.9 | 1.6 |
| annual maximum temperature | Inf |  |  |  |  |  |
| annual minimum temperature | Inf | 1.6e+05 |  |  |  |  |
| annual temperature variability | Inf | 1.1e+05 | 19.1 | 2.1 | 2.1 | 1.8 |
| summer (JJA) precipitation | 23.4 | 2.3e+01 | 22.0 | 12.3 | 12.2 | 2.5 |
| winter-spring (JFMAM) precipitation | 690.7 | 6.9e+02 | 226.4 |  |  |  |
| spring (MAM) precipitation | 243.8 | 2.4e+02 | 87.1 | 10.9 | 10.7 |  |
| slope inclination | 15.0 | 1.5e+01 | 14.8 | 14.5 |  |  |
| solar radiation (SRI) | 13.7 | 1.4e+01 | 13.6 | 13.4 | 1.8 | 1.8 |
| terrain ruggedness (TRI) | 2.0 | 2.0e+00 | 2.0 | 2.0 | 1.9 | 1.9 |
| wetness (TCWS) | 1.8 | 1.8e+00 | 1.8 | 1.7 | 1.6 | 1.6 |
| diff. to CWM acquisitiveness | 1.0 | 1.0e+00 | 1.0 | 1.0 | 1.0 | 1.0 |
| total shrub abundance | 1.3 | 1.3e+00 | 1.3 | 1.3 | 1.3 | 1.3 |
| graminoid abundance | 1.4 | 1.4e+00 | 1.3 | 1.3 | 1.3 | 1.2 |

## Model output tables (TWI)

### All shrubs

| **param** | **mean** | **sd** | **l95** | **l90** | **u90** | **u95** | **Rhat** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| intercept | -0.93 | 0.07 | -1.07 | -1.34 | -0.83 | -0.80 | 1.001 |
| summer temperature | -0.06 | 0.09 | -0.23 | -0.20 | 0.08 | 0.10 | 1.001 |
| summer temperature ^2 | -0.17 | 0.06 | -0.29 | -0.27 | -0.08 | -0.07 | 1.001 |
| temperature variability | 0.14 | 0.07 | 0.00 | 0.02 | 0.25 | 0.28 | 1.001 |
| summer precipitation | -0.03 | 0.08 | -0.18 | -0.16 | 0.09 | 0.12 | 1.001 |
| solar radiation | 0.05 | 0.05 | -0.04 | -0.02 | 0.12 | 0.14 | 1.001 |
| terrain ruggedness | 0.00 | 0.05 | -0.11 | -0.09 | 0.09 | 0.10 | 1.001 |
| topographic wetness | 0.00 | 0.08 | -0.15 | -0.12 | 0.13 | 0.15 | 1.001 |
| summer temp. X wetness | 0.05 | 0.08 | -0.11 | -0.08 | 0.18 | 0.20 | 1.001 |
| summer temp. ^2 X wetness | 0.03 | 0.06 | -0.09 | -0.08 | 0.13 | 0.15 | 1.001 |
| graminoid abundance | -0.19 | 0.05 | -0.29 | -0.27 | -0.10 | -0.09 | 1.001 |
| sigma.plotgroup | 0.30 | 0.06 | 0.19 | NA | NA | 0.42 | 1.001 |

### All evergreens

| **param** | **mean** | **sd** | **l95** | **l90** | **u90** | **u95** | **Rhat** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| intercept | -1.43 | 0.13 | -1.70 | -2.12 | -1.33 | -1.17 | 1.001 |
| summer temperature | -0.08 | 0.18 | -0.43 | -0.37 | 0.23 | 0.30 | 1.001 |
| summer temperature ^2 | -0.87 | 0.26 | -1.43 | -1.33 | -0.48 | -0.42 | 1.002 |
| temperature variability | -0.01 | 0.11 | -0.23 | -0.19 | 0.16 | 0.20 | 1.001 |
| summer precipitation | 0.02 | 0.13 | -0.23 | -0.19 | 0.24 | 0.28 | 1.001 |
| solar radiation | 0.09 | 0.06 | -0.03 | -0.01 | 0.20 | 0.22 | 1.001 |
| terrain ruggedness | 0.07 | 0.08 | -0.10 | -0.07 | 0.19 | 0.22 | 1.001 |
| topographic wetness | 0.09 | 0.14 | -0.19 | -0.15 | 0.33 | 0.38 | 1.004 |
| summer temp. X wetness | 0.25 | 0.18 | -0.10 | -0.04 | 0.55 | 0.61 | 1.001 |
| summer temp. ^2 X wetness | -0.52 | 0.33 | -1.19 | -1.07 | 0.02 | 0.11 | 1.003 |
| graminoid abundance | -0.24 | 0.09 | -0.43 | -0.39 | -0.10 | -0.08 | 1.001 |
| sigma.plotgroup | 0.52 | 0.10 | 0.34 | NA | NA | 0.74 | 1.001 |

### All deciduous

| **param** | **mean** | **sd** | **l95** | **l90** | **u90** | **u95** | **Rhat** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| intercept | -1.43 | 0.24 | -1.88 | -2.22 | -1.19 | -0.94 | 1.131 |
| summer temperature | 0.16 | 0.13 | -0.09 | -0.05 | 0.38 | 0.43 | 1.089 |
| temperature variability | 0.65 | 0.27 | 0.15 | 0.23 | 1.12 | 1.22 | 1.037 |
| temperature variability ^2 | -1.33 | 0.85 | -3.31 | -2.80 | -0.11 | -0.03 | 1.221 |
| summer precipitation | -0.00 | 0.13 | -0.26 | -0.22 | 0.21 | 0.26 | 1.014 |
| solar radiation | 0.09 | 0.06 | -0.03 | -0.01 | 0.19 | 0.21 | 1.001 |
| terrain ruggedness | -0.06 | 0.07 | -0.21 | -0.18 | 0.05 | 0.07 | 1.001 |
| topographic wetness | 0.11 | 0.09 | -0.06 | -0.03 | 0.26 | 0.29 | 1.004 |
| summer temp. X wetness | 0.04 | 0.08 | -0.12 | -0.10 | 0.17 | 0.20 | 1.007 |
| graminoid abundance | -0.19 | 0.06 | -0.31 | -0.29 | -0.09 | -0.07 | 1.003 |
| sigma.plotgroup | 0.47 | 0.08 | 0.34 | NA | NA | 0.65 | 1.001 |

### Betula nana

| **param** | **mean** | **sd** | **l95** | **l90** | **u90** | **u95** | **Rhat** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| intercept | -2.22 | 0.25 | -2.74 | -3.01 | -1.73 | -1.74 | 1.003 |
| summer temperature | -0.16 | 0.22 | -0.59 | -0.52 | 0.20 | 0.27 | 1.001 |
| temperature variability | 0.75 | 0.21 | 0.35 | 0.41 | 1.11 | 1.19 | 1.001 |
| summer precipitation | 0.08 | 0.17 | -0.26 | -0.21 | 0.36 | 0.42 | 1.001 |
| solar radiation | -0.02 | 0.10 | -0.21 | -0.18 | 0.14 | 0.17 | 1.001 |
| terrain ruggedness | -0.02 | 0.12 | -0.26 | -0.22 | 0.17 | 0.20 | 1.001 |
| topographic wetness | 0.18 | 0.13 | -0.08 | -0.03 | 0.40 | 0.44 | 1.001 |
| summer temp. X wetness | 0.03 | 0.12 | -0.19 | -0.15 | 0.22 | 0.26 | 1.001 |
| dCWA | 0.66 | 0.21 | 0.27 | 0.33 | 1.01 | 1.08 | 1.003 |
| other shrub abundance | -0.07 | 0.09 | -0.24 | -0.21 | 0.08 | 0.11 | 1.002 |
| graminoid abundance | -0.34 | 0.11 | -0.56 | -0.52 | -0.17 | -0.14 | 1.001 |
| summer temp. X dCWA | 0.07 | 0.16 | -0.25 | -0.20 | 0.33 | 0.37 | 1.001 |
| phi | 6.56 | 0.71 | 5.25 | NA | NA | 8.04 | 1.001 |
| sigma.plotgroup | 0.62 | 0.12 | 0.41 | NA | NA | 0.87 | 1.001 |

### Cassiope tetragona

| **param** | **mean** | **sd** | **l95** | **l90** | **u90** | **u95** | **Rhat** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| intercept | -46.20 | 17.44 | -85.99 | -83.94 | -21.39 | -18.32 | 1.042 |
| summer temperature | -7.99 | 6.76 | -22.64 | -19.64 | 1.98 | 4.31 | 1.010 |
| summer temperature ^2 | -6.98 | 6.56 | -21.80 | -18.92 | 2.17 | 3.68 | 1.010 |
| temperature variability | 49.43 | 19.48 | 15.04 | 19.99 | 82.96 | 90.94 | 1.035 |
| temperature variability ^2 | 3.88 | 13.33 | -23.59 | -20.79 | 23.83 | 27.68 | 1.003 |
| summer precipitation | -0.48 | 4.52 | -11.13 | -8.32 | 5.60 | 7.27 | 1.019 |
| summer precipitation ^2 | -1.02 | 4.84 | -12.51 | -9.41 | 5.44 | 7.00 | 1.019 |
| solar radiation | -2.18 | 0.99 | -4.20 | -3.83 | -0.60 | -0.36 | 1.018 |
| terrain ruggedness | -0.36 | 0.76 | -1.92 | -1.63 | 0.86 | 1.14 | 1.003 |
| topographic wetness | -3.97 | 3.39 | -10.93 | -9.69 | 1.09 | 2.04 | 1.032 |
| summer temp. X wetness | -2.61 | 4.78 | -12.08 | -10.36 | 5.28 | 7.01 | 1.016 |
| summer temp. ^2 X wetness | -2.89 | 5.87 | -15.78 | -13.26 | 5.84 | 7.91 | 1.017 |
| dCWA | 0.57 | 1.67 | -2.64 | -2.11 | 3.39 | 4.04 | 1.006 |
| other shrub abundance | 0.77 | 0.81 | -0.78 | -0.54 | 2.09 | 2.39 | 1.009 |
| graminoid abundance | -0.34 | 0.71 | -1.96 | -1.65 | 0.67 | 0.83 | 1.005 |
| summer temp. X dCWA | -0.21 | 2.09 | -4.10 | -3.50 | 3.33 | 4.06 | 1.013 |
| summer temp. ^2 X dCWA | 4.04 | 4.04 | -2.87 | -1.87 | 11.25 | 13.19 | 1.007 |
| phi | 11.17 | 5.03 | 4.08 | NA | NA | 23.43 | 1.003 |
| sigma.plotgroup | 9.07 | 6.68 | 0.96 | NA | NA | 26.98 | 1.042 |

### Empetrum nigrum

| **param** | **mean** | **sd** | **l95** | **l90** | **u90** | **u95** | **Rhat** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| intercept | -0.68 | 0.37 | -1.41 | -1.71 | -0.41 | 0.04 | 1.045 |
| summer temperature | -0.03 | 0.20 | -0.41 | -0.35 | 0.30 | 0.36 | 1.001 |
| temperature variability | -0.23 | 0.10 | -0.44 | -0.41 | -0.07 | -0.03 | 1.002 |
| summer precipitation | 0.22 | 0.13 | -0.03 | 0.02 | 0.43 | 0.47 | 1.003 |
| solar radiation | 0.05 | 0.10 | -0.13 | -0.11 | 0.21 | 0.24 | 1.001 |
| terrain ruggedness | 0.00 | 0.11 | -0.21 | -0.17 | 0.17 | 0.21 | 1.001 |
| topographic wetness | -0.08 | 0.12 | -0.32 | -0.28 | 0.11 | 0.14 | 1.002 |
| summer temp. X wetness | 0.13 | 0.11 | -0.09 | -0.05 | 0.31 | 0.34 | 1.001 |
| dCWA | 0.46 | 0.42 | -0.32 | -0.20 | 1.17 | 1.30 | 1.042 |
| other shrub abundance | 0.36 | 0.22 | -0.06 | 0.01 | 0.73 | 0.80 | 1.033 |
| graminoid abundance | -0.13 | 0.11 | -0.35 | -0.32 | 0.06 | 0.09 | 1.001 |
| summer temp. X dCWA | -0.08 | 0.21 | -0.49 | -0.43 | 0.25 | 0.32 | 1.001 |
| phi | 3.95 | 0.39 | 3.23 | NA | NA | 4.75 | 1.001 |
| sigma.plotgroup | 0.28 | 0.15 | 0.02 | NA | NA | 0.57 | 1.027 |

### Phyllodoce caerulea

| **param** | **mean** | **sd** | **l95** | **l90** | **u90** | **u95** | **Rhat** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| intercept | -52.78 | 33.78 | -131.96 | -151.78 | -1.89 | -7.38 | 1.046 |
| summer temperature | -6.21 | 12.45 | -32.00 | -26.99 | 14.35 | 19.61 | 1.009 |
| summer temperature ^2 | 7.75 | 8.65 | -9.47 | -5.78 | 22.65 | 26.41 | 1.012 |
| temperature variability | -6.75 | 15.39 | -40.43 | -33.71 | 17.82 | 24.07 | 1.008 |
| temperature variability ^2 | -9.73 | 10.09 | -33.31 | -28.43 | 4.08 | 7.41 | 1.019 |
| summer precipitation | 11.71 | 12.54 | -6.78 | -3.62 | 35.54 | 41.74 | 1.019 |
| summer precipitation ^2 | 5.17 | 10.11 | -15.13 | -10.30 | 22.68 | 27.57 | 1.013 |
| solar radiation | -4.58 | 2.04 | -9.24 | -8.41 | -1.69 | -1.32 | 1.095 |
| terrain ruggedness | -1.48 | 2.33 | -6.79 | -5.68 | 2.00 | 2.50 | 1.152 |
| topographic wetness | 0.84 | 9.43 | -17.40 | -13.36 | 17.32 | 23.45 | 1.212 |
| summer temp. X wetness | 17.92 | 12.52 | -1.20 | 1.20 | 41.43 | 46.56 | 1.471 |
| summer temp. ^2 X wetness | 4.89 | 8.57 | -8.96 | -7.16 | 20.79 | 23.31 | 1.424 |
| dCWA | 13.21 | 7.36 | 0.24 | 1.79 | 25.65 | 27.05 | 1.017 |
| other shrub abundance | 0.73 | 1.62 | -2.59 | -1.96 | 3.42 | 4.08 | 1.087 |
| graminoid abundance | 0.47 | 1.44 | -2.63 | -2.03 | 2.68 | 3.08 | 1.010 |
| summer temp. X dCWA | -38.24 | 16.25 | -71.32 | -66.03 | -12.50 | -9.10 | 1.052 |
| summer temp. ^2 X dCWA | 19.70 | 12.55 | -2.41 | 0.16 | 41.31 | 45.13 | 1.030 |
| phi | 20.30 | 10.61 | 5.93 | NA | NA | 46.79 | 1.001 |
| sigma.plotgroup | 36.27 | 21.89 | 5.23 | NA | NA | 87.45 | 1.049 |

### Rhododendron groenlandicum

| **param** | **mean** | **sd** | **l95** | **l90** | **u90** | **u95** | **Rhat** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| intercept | -2.17 | 0.32 | -2.85 | -2.41 | -1.06 | -1.61 | 1.010 |
| summer temperature | -0.23 | 0.36 | -0.95 | -0.83 | 0.37 | 0.47 | 1.005 |
| summer temperature ^2 | -0.91 | 0.33 | -1.59 | -1.47 | -0.39 | -0.30 | 1.012 |
| temperature variability | 0.91 | 0.38 | 0.28 | 0.36 | 1.57 | 1.73 | 1.007 |
| summer precipitation | -0.28 | 0.17 | -0.63 | -0.56 | -0.01 | 0.04 | 1.001 |
| solar radiation | 0.15 | 0.13 | -0.10 | -0.06 | 0.36 | 0.41 | 1.001 |
| terrain ruggedness | 0.13 | 0.13 | -0.13 | -0.09 | 0.35 | 0.39 | 1.001 |
| topographic wetness | 0.26 | 0.19 | -0.13 | -0.06 | 0.57 | 0.63 | 1.001 |
| summer temp. X wetness | -0.15 | 0.22 | -0.59 | -0.52 | 0.20 | 0.27 | 1.001 |
| summer temp. ^2 X wetness | 0.04 | 0.20 | -0.36 | -0.29 | 0.37 | 0.43 | 1.003 |
| dCWA | 0.09 | 0.31 | -0.52 | -0.42 | 0.61 | 0.71 | 1.007 |
| other shrub abundance | 0.12 | 0.14 | -0.15 | -0.11 | 0.36 | 0.40 | 1.002 |
| graminoid abundance | -0.34 | 0.18 | -0.71 | -0.65 | -0.06 | -0.01 | 1.001 |
| summer temp. X dCWA | -0.24 | 0.34 | -0.90 | -0.79 | 0.32 | 0.42 | 1.005 |
| summer temp. ^2 X dCWA | -0.49 | 0.32 | -1.10 | -1.01 | 0.05 | 0.15 | 1.012 |
| phi | 7.81 | 1.16 | 5.74 | NA | NA | 10.25 | 1.001 |
| sigma.plotgroup | 0.37 | 0.18 | 0.05 | NA | NA | 0.75 | 1.050 |

### Rhododendron tomentosum

| **param** | **mean** | **sd** | **l95** | **l90** | **u90** | **u95** | **Rhat** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| intercept | -15.66 | 10.14 | -41.50 | -22.08 | 8.78 | -2.59 | 1.084 |
| summer temperature | 8.60 | 5.13 | -0.07 | 1.38 | 17.47 | 19.92 | 1.067 |
| summer temperature ^2 | -0.85 | 3.66 | -8.57 | -6.93 | 4.72 | 6.09 | 1.033 |
| temperature variability | -1.86 | 6.72 | -15.93 | -12.77 | 8.30 | 11.67 | 1.027 |
| temperature variability ^2 | -9.01 | 8.33 | -31.47 | -24.57 | -0.13 | 0.86 | 1.082 |
| summer precipitation | -4.56 | 4.18 | -14.58 | -12.08 | 0.61 | 1.65 | 1.048 |
| summer precipitation ^2 | 1.03 | 3.60 | -5.94 | -4.32 | 6.80 | 8.63 | 1.031 |
| solar radiation | -0.26 | 0.46 | -1.25 | -1.06 | 0.45 | 0.58 | 1.034 |
| terrain ruggedness | 0.17 | 1.04 | -2.00 | -1.60 | 1.82 | 2.17 | 1.007 |
| topographic wetness | -8.82 | 4.43 | -19.03 | -16.72 | -2.50 | -1.60 | 1.186 |
| summer temp. X wetness | 4.22 | 4.58 | -3.15 | -1.96 | 13.11 | 15.15 | 1.204 |
| summer temp. ^2 X wetness | 7.73 | 3.74 | 2.16 | 2.79 | 15.96 | 17.49 | 1.282 |
| dCWA | -1.31 | 2.66 | -6.48 | -5.69 | 3.24 | 4.24 | 1.021 |
| other shrub abundance | 0.35 | 0.52 | -0.56 | -0.42 | 1.28 | 1.51 | 1.001 |
| graminoid abundance | -0.48 | 0.75 | -2.11 | -1.80 | 0.65 | 0.86 | 1.007 |
| summer temp. X dCWA | 4.17 | 3.52 | -2.15 | -1.21 | 10.51 | 11.94 | 1.006 |
| summer temp. ^2 X dCWA | 2.50 | 2.42 | -2.01 | -1.30 | 6.78 | 7.61 | 1.006 |
| phi | 19.10 | 9.92 | 6.22 | NA | NA | 43.49 | 1.002 |
| sigma.plotgroup | 9.72 | 6.11 | 2.87 | NA | NA | 26.11 | 1.117 |

### Salix arctophila

| **param** | **mean** | **sd** | **l95** | **l90** | **u90** | **u95** | **Rhat** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| intercept | -7.47 | 2.56 | -14.34 | -20.41 | -6.16 | -4.02 | 1.084 |
| summer temperature | 0.87 | 1.42 | -1.74 | -1.27 | 3.48 | 4.02 | 1.001 |
| summer temperature ^2 | -0.05 | 1.13 | -2.37 | -1.89 | 1.84 | 2.32 | 1.033 |
| temperature variability | 0.88 | 1.28 | -1.60 | -1.07 | 2.84 | 3.42 | 1.017 |
| temperature variability ^2 | 0.60 | 0.67 | -0.59 | -0.35 | 1.69 | 2.04 | 1.019 |
| summer precipitation | 1.16 | 1.02 | -0.45 | -0.18 | 2.98 | 3.51 | 1.016 |
| summer precipitation ^2 | -0.84 | 0.73 | -2.61 | -2.10 | 0.06 | 0.20 | 1.034 |
| solar radiation | 0.64 | 0.50 | -0.24 | -0.11 | 1.52 | 1.74 | 1.007 |
| terrain ruggedness | 0.18 | 0.46 | -0.80 | -0.61 | 0.89 | 1.03 | 1.004 |
| topographic wetness | -0.41 | 0.72 | -2.11 | -1.72 | 0.61 | 0.80 | 1.021 |
| summer temp. X wetness | 0.20 | 0.74 | -1.11 | -0.90 | 1.47 | 1.86 | 1.022 |
| summer temp. ^2 X wetness | 0.21 | 0.53 | -0.70 | -0.55 | 1.14 | 1.43 | 1.017 |
| dCWA | 1.32 | 1.00 | -0.37 | -0.14 | 3.14 | 3.58 | 1.048 |
| other shrub abundance | 0.40 | 0.36 | -0.29 | -0.17 | 0.99 | 1.13 | 1.005 |
| graminoid abundance | 0.22 | 0.42 | -0.63 | -0.48 | 0.91 | 1.05 | 1.007 |
| summer temp. X dCWA | -0.30 | 0.90 | -2.25 | -1.90 | 1.11 | 1.38 | 1.003 |
| summer temp. ^2 X dCWA | 0.27 | 0.68 | -1.01 | -0.79 | 1.46 | 1.76 | 1.018 |
| phi | 27.96 | 11.09 | 11.64 | NA | NA | 54.72 | 1.001 |
| sigma.plotgroup | 1.17 | 1.23 | 0.04 | NA | NA | 4.64 | 1.067 |

### Salix glauca

| **param** | **mean** | **sd** | **l95** | **l90** | **u90** | **u95** | **Rhat** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| intercept | -3.70 | 0.41 | -4.54 | -4.71 | -2.93 | -2.94 | 1.007 |
| summer temperature | 0.42 | 0.37 | -0.29 | -0.19 | 1.04 | 1.16 | 1.007 |
| temperature variability | 0.50 | 0.21 | 0.10 | 0.17 | 0.86 | 0.93 | 1.002 |
| summer precipitation | 0.05 | 0.21 | -0.36 | -0.29 | 0.40 | 0.46 | 1.002 |
| solar radiation | -0.08 | 0.11 | -0.30 | -0.27 | 0.11 | 0.14 | 1.001 |
| terrain ruggedness | 0.21 | 0.14 | -0.06 | -0.02 | 0.43 | 0.48 | 1.001 |
| topographic wetness | 0.37 | 0.17 | 0.04 | 0.09 | 0.65 | 0.71 | 1.003 |
| summer temp. X wetness | -0.08 | 0.16 | -0.41 | -0.35 | 0.19 | 0.24 | 1.002 |
| dCWA | 1.30 | 0.25 | 0.84 | 0.91 | 1.72 | 1.81 | 1.005 |
| other shrub abundance | 0.22 | 0.11 | 0.02 | 0.05 | 0.40 | 0.44 | 1.002 |
| graminoid abundance | -0.11 | 0.11 | -0.34 | -0.30 | 0.07 | 0.11 | 1.002 |
| summer temp. X dCWA | -0.31 | 0.23 | -0.76 | -0.69 | 0.07 | 0.14 | 1.007 |
| phi | 8.06 | 1.18 | 5.92 | NA | NA | 10.54 | 1.002 |
| sigma.plotgroup | 0.74 | 0.15 | 0.46 | NA | NA | 1.06 | 1.005 |

### Vaccinium uliginosum

| **param** | **mean** | **sd** | **l95** | **l90** | **u90** | **u95** | **Rhat** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| intercept | -3.12 | 0.33 | -3.82 | -4.27 | -2.79 | -2.52 | 1.005 |
| summer temperature | 0.27 | 0.34 | -0.36 | -0.26 | 0.84 | 0.97 | 1.007 |
| temperature variability | 0.26 | 0.18 | -0.09 | -0.03 | 0.56 | 0.62 | 1.001 |
| summer precipitation | 0.23 | 0.20 | -0.17 | -0.10 | 0.55 | 0.62 | 1.001 |
| solar radiation | 0.03 | 0.14 | -0.24 | -0.20 | 0.27 | 0.33 | 1.001 |
| terrain ruggedness | -0.06 | 0.14 | -0.34 | -0.30 | 0.17 | 0.22 | 1.001 |
| topographic wetness | 0.28 | 0.17 | -0.07 | -0.01 | 0.55 | 0.60 | 1.001 |
| summer temp. X wetness | 0.25 | 0.19 | -0.11 | -0.05 | 0.58 | 0.65 | 1.001 |
| dCWA | 1.13 | 0.26 | 0.65 | 0.72 | 1.57 | 1.66 | 1.004 |
| other shrub abundance | 0.12 | 0.10 | -0.08 | -0.05 | 0.28 | 0.32 | 1.001 |
| graminoid abundance | 0.18 | 0.15 | -0.11 | -0.06 | 0.42 | 0.46 | 1.001 |
| summer temp. X dCWA | 0.04 | 0.28 | -0.54 | -0.44 | 0.50 | 0.58 | 1.007 |
| phi | 8.51 | 1.36 | 6.10 | NA | NA | 11.43 | 1.001 |
| sigma.plotgroup | 0.67 | 0.17 | 0.35 | NA | NA | 1.02 | 1.004 |

## Model output tables (TCWS)

### All shrubs

| **param** | **mean** | **sd** | **l95** | **l90** | **u90** | **u95** | **Rhat** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| intercept | -1.12 | 0.05 | -1.22 | -1.48 | -1.02 | -1.04 | 1.002 |
| summer temperature | 0.02 | 0.05 | -0.08 | -0.07 | 0.11 | 0.13 | 1.001 |
| temperature variability | 0.03 | 0.06 | -0.08 | -0.07 | 0.13 | 0.14 | 1.001 |
| summer precipitation | 0.08 | 0.06 | -0.04 | -0.02 | 0.18 | 0.20 | 1.001 |
| solar radiation | 0.04 | 0.04 | -0.04 | -0.03 | 0.11 | 0.12 | 1.001 |
| terrain ruggedness | -0.07 | 0.05 | -0.16 | -0.15 | 0.01 | 0.02 | 1.001 |
| Tasseled-cap wetness | 0.37 | 0.05 | 0.27 | 0.29 | 0.46 | 0.48 | 1.002 |
| summer temp. X wetness | 0.06 | 0.05 | -0.05 | -0.03 | 0.14 | 0.16 | 1.001 |
| graminoid abundance | -0.15 | 0.05 | -0.24 | -0.23 | -0.08 | -0.07 | 1.001 |
| sigma.plotgroup | 0.21 | 0.06 | 0.09 | NA | NA | 0.32 | 1.026 |

### All evergreens

| **param** | **mean** | **sd** | **l95** | **l90** | **u90** | **u95** | **Rhat** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| intercept | -1.91 | 0.15 | -2.21 | -2.49 | -1.73 | -1.64 | 1.002 |
| summer temperature | 0.20 | 0.18 | -0.12 | -0.07 | 0.52 | 0.59 | 1.002 |
| summer temperature ^2 | -0.34 | 0.19 | -0.75 | -0.68 | -0.07 | -0.03 | 1.002 |
| temperature variability | -0.30 | 0.11 | -0.52 | -0.48 | -0.13 | -0.10 | 1.002 |
| summer precipitation | 0.11 | 0.11 | -0.10 | -0.07 | 0.29 | 0.32 | 1.001 |
| solar radiation | 0.06 | 0.06 | -0.05 | -0.04 | 0.16 | 0.18 | 1.001 |
| terrain ruggedness | -0.04 | 0.07 | -0.19 | -0.16 | 0.07 | 0.10 | 1.001 |
| Tasseled-cap wetness | 0.73 | 0.14 | 0.46 | 0.50 | 0.98 | 1.03 | 1.003 |
| summer temp. X wetness | -0.18 | 0.16 | -0.52 | -0.45 | 0.06 | 0.11 | 1.002 |
| summer temp. ^2 X wetness | -0.08 | 0.16 | -0.36 | -0.32 | 0.20 | 0.28 | 1.002 |
| graminoid abundance | -0.19 | 0.08 | -0.35 | -0.32 | -0.07 | -0.05 | 1.001 |
| sigma.plotgroup | 0.39 | 0.09 | 0.23 | NA | NA | 0.59 | 1.001 |

### All deciduous

| **param** | **mean** | **sd** | **l95** | **l90** | **u90** | **u95** | **Rhat** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| intercept | -1.17 | 0.23 | -1.62 | -1.94 | -1.00 | -0.72 | 1.113 |
| summer temperature | 0.26 | 0.13 | -0.00 | 0.04 | 0.48 | 0.52 | 1.088 |
| temperature variability | 0.71 | 0.28 | 0.17 | 0.26 | 1.19 | 1.30 | 1.056 |
| temperature variability ^2 | -2.51 | 0.89 | -4.30 | -4.02 | -1.13 | -0.79 | 1.207 |
| summer precipitation | 0.06 | 0.12 | -0.16 | -0.12 | 0.26 | 0.30 | 1.007 |
| solar radiation | 0.09 | 0.06 | -0.01 | 0.01 | 0.19 | 0.21 | 1.003 |
| terrain ruggedness | -0.12 | 0.07 | -0.25 | -0.23 | -0.01 | 0.01 | 1.001 |
| Tasseled-cap wetness | 0.36 | 0.08 | 0.20 | 0.22 | 0.49 | 0.52 | 1.018 |
| summer temp. X wetness | 0.17 | 0.08 | 0.02 | 0.04 | 0.30 | 0.32 | 1.002 |
| graminoid abundance | -0.17 | 0.06 | -0.29 | -0.27 | -0.08 | -0.07 | 1.004 |
| sigma.plotgroup | 0.45 | 0.07 | 0.31 | NA | NA | 0.61 | 1.003 |

### Betula nana

| **param** | **mean** | **sd** | **l95** | **l90** | **u90** | **u95** | **Rhat** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| intercept | -2.21 | 0.25 | -2.72 | -2.90 | -1.67 | -1.75 | 1.001 |
| summer temperature | -0.18 | 0.22 | -0.60 | -0.54 | 0.18 | 0.25 | 1.002 |
| temperature variability | 0.68 | 0.21 | 0.29 | 0.35 | 1.04 | 1.11 | 1.001 |
| summer precipitation | 0.04 | 0.17 | -0.29 | -0.23 | 0.31 | 0.37 | 1.001 |
| solar radiation | -0.00 | 0.10 | -0.19 | -0.16 | 0.16 | 0.19 | 1.001 |
| terrain ruggedness | -0.07 | 0.12 | -0.30 | -0.26 | 0.12 | 0.15 | 1.001 |
| Tasseled-cap wetness | 0.10 | 0.12 | -0.13 | -0.09 | 0.30 | 0.34 | 1.001 |
| summer temp. X wetness | 0.08 | 0.11 | -0.15 | -0.11 | 0.25 | 0.29 | 1.003 |
| dCWA | 0.65 | 0.20 | 0.26 | 0.32 | 0.99 | 1.06 | 1.001 |
| other shrub abundance | -0.09 | 0.09 | -0.27 | -0.24 | 0.06 | 0.09 | 1.001 |
| graminoid abundance | -0.32 | 0.11 | -0.54 | -0.51 | -0.14 | -0.11 | 1.001 |
| summer temp. X dCWA | 0.09 | 0.16 | -0.24 | -0.18 | 0.35 | 0.40 | 1.002 |
| phi | 6.55 | 0.71 | 5.24 | NA | NA | 8.02 | 1.001 |
| sigma.plotgroup | 0.62 | 0.12 | 0.40 | NA | NA | 0.88 | 1.002 |

### Cassiope tetragona

| **param** | **mean** | **sd** | **l95** | **l90** | **u90** | **u95** | **Rhat** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| intercept | -48.30 | 16.21 | -84.43 | -82.16 | -24.30 | -22.13 | 1.042 |
| summer temperature | -6.92 | 5.92 | -19.30 | -16.73 | 2.31 | 4.51 | 1.009 |
| summer temperature ^2 | -7.03 | 6.98 | -23.65 | -19.99 | 2.09 | 3.48 | 1.021 |
| temperature variability | 56.72 | 18.22 | 24.20 | 28.43 | 88.35 | 94.61 | 1.030 |
| temperature variability ^2 | 9.96 | 13.10 | -16.63 | -11.98 | 30.75 | 34.74 | 1.054 |
| summer precipitation | 1.18 | 3.62 | -6.66 | -4.51 | 6.53 | 8.22 | 1.006 |
| summer precipitation ^2 | 0.40 | 4.03 | -9.24 | -6.37 | 5.90 | 7.20 | 1.004 |
| solar radiation | -1.96 | 0.93 | -3.95 | -3.60 | -0.53 | -0.29 | 1.030 |
| terrain ruggedness | 0.12 | 0.91 | -1.75 | -1.42 | 1.58 | 1.91 | 1.010 |
| Tasseled-cap wetness | -5.45 | 3.02 | -11.88 | -10.63 | -0.64 | 0.37 | 1.015 |
| summer temp. X wetness | -1.19 | 3.28 | -8.01 | -6.95 | 3.86 | 4.59 | 1.036 |
| summer temp. ^2 X wetness | 6.17 | 4.69 | -1.81 | -0.64 | 14.77 | 16.67 | 1.033 |
| dCWA | 0.75 | 1.63 | -2.29 | -1.83 | 3.51 | 4.08 | 1.008 |
| other shrub abundance | 1.04 | 0.75 | -0.36 | -0.14 | 2.30 | 2.56 | 1.008 |
| graminoid abundance | -0.63 | 0.78 | -2.36 | -2.03 | 0.48 | 0.63 | 1.001 |
| summer temp. X dCWA | -1.06 | 2.08 | -5.10 | -4.40 | 2.40 | 3.15 | 1.006 |
| summer temp. ^2 X dCWA | 4.81 | 4.07 | -2.18 | -1.16 | 12.02 | 13.84 | 1.001 |
| phi | 11.54 | 4.86 | 4.46 | NA | NA | 23.18 | 1.003 |
| sigma.plotgroup | 8.08 | 5.99 | 1.12 | NA | NA | 24.64 | 1.109 |

### Empetrum nigrum

| **param** | **mean** | **sd** | **l95** | **l90** | **u90** | **u95** | **Rhat** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| intercept | -1.05 | 0.39 | -1.77 | -2.22 | -0.85 | -0.32 | 1.005 |
| summer temperature | -0.05 | 0.20 | -0.42 | -0.36 | 0.30 | 0.36 | 1.005 |
| temperature variability | -0.31 | 0.09 | -0.50 | -0.47 | -0.16 | -0.13 | 1.002 |
| summer precipitation | 0.30 | 0.11 | 0.09 | 0.12 | 0.48 | 0.52 | 1.002 |
| solar radiation | 0.03 | 0.09 | -0.15 | -0.12 | 0.18 | 0.21 | 1.001 |
| terrain ruggedness | -0.11 | 0.10 | -0.32 | -0.29 | 0.05 | 0.09 | 1.001 |
| Tasseled-cap wetness | 0.42 | 0.10 | 0.23 | 0.26 | 0.59 | 0.62 | 1.002 |
| summer temp. X wetness | -0.20 | 0.11 | -0.41 | -0.37 | -0.03 | 0.01 | 1.001 |
| dCWA | 0.13 | 0.44 | -0.68 | -0.58 | 0.84 | 0.96 | 1.005 |
| other shrub abundance | 0.11 | 0.23 | -0.34 | -0.28 | 0.49 | 0.55 | 1.004 |
| graminoid abundance | -0.13 | 0.11 | -0.34 | -0.31 | 0.04 | 0.07 | 1.002 |
| summer temp. X dCWA | -0.11 | 0.21 | -0.52 | -0.45 | 0.24 | 0.30 | 1.003 |
| phi | 4.06 | 0.39 | 3.33 | NA | NA | 4.87 | 1.001 |
| sigma.plotgroup | 0.19 | 0.13 | 0.00 | NA | NA | 0.46 | 1.053 |

### Phyllodoce caerulea

| **param** | **mean** | **sd** | **l95** | **l90** | **u90** | **u95** | **Rhat** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| intercept | -20.33 | 14.94 | -58.97 | -63.11 | -3.55 | -3.05 | 1.016 |
| summer temperature | -5.74 | 6.29 | -21.15 | -17.59 | 2.21 | 4.14 | 1.063 |
| summer temperature ^2 | 3.59 | 4.21 | -5.14 | -3.09 | 10.68 | 12.79 | 1.022 |
| temperature variability | -5.38 | 7.53 | -22.79 | -18.64 | 5.11 | 8.63 | 1.010 |
| temperature variability ^2 | -4.10 | 4.82 | -16.15 | -13.07 | 1.59 | 3.06 | 1.016 |
| summer precipitation | 4.09 | 5.32 | -3.88 | -2.23 | 14.14 | 17.64 | 1.030 |
| summer precipitation ^2 | 0.87 | 4.36 | -6.96 | -5.16 | 8.58 | 11.27 | 1.015 |
| solar radiation | -3.06 | 1.61 | -6.76 | -6.15 | -0.86 | -0.60 | 1.014 |
| terrain ruggedness | -0.48 | 1.65 | -4.34 | -3.64 | 1.89 | 2.33 | 1.042 |
| Tasseled-cap wetness | 5.30 | 3.38 | -0.43 | 0.33 | 11.66 | 12.89 | 1.022 |
| summer temp. X wetness | 0.35 | 3.27 | -5.89 | -4.67 | 6.51 | 7.89 | 1.175 |
| summer temp. ^2 X wetness | -3.86 | 3.35 | -11.00 | -9.92 | 0.65 | 1.48 | 1.087 |
| dCWA | 13.76 | 7.25 | 1.48 | 3.27 | 26.88 | 29.81 | 1.232 |
| other shrub abundance | 0.46 | 1.09 | -1.60 | -1.25 | 2.36 | 2.77 | 1.003 |
| graminoid abundance | 0.37 | 1.24 | -2.08 | -1.65 | 2.44 | 2.84 | 1.015 |
| summer temp. X dCWA | -37.05 | 18.13 | -74.31 | -68.78 | -11.38 | -9.03 | 1.190 |
| summer temp. ^2 X dCWA | 21.41 | 11.63 | 3.77 | 5.62 | 43.32 | 48.99 | 1.088 |
| phi | 20.18 | 10.23 | 6.27 | NA | NA | 45.40 | 1.001 |
| sigma.plotgroup | 12.08 | 8.87 | 1.22 | NA | NA | 34.10 | 1.057 |

### Rhododendron groenlandicum

| **param** | **mean** | **sd** | **l95** | **l90** | **u90** | **u95** | **Rhat** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| intercept | -2.98 | 0.28 | -3.57 | -3.42 | -2.00 | -2.44 | 1.015 |
| summer temperature | 0.13 | 0.28 | -0.40 | -0.32 | 0.60 | 0.70 | 1.029 |
| temperature variability | 0.71 | 0.38 | 0.02 | 0.11 | 1.36 | 1.55 | 1.020 |
| summer precipitation | -0.16 | 0.17 | -0.53 | -0.45 | 0.11 | 0.15 | 1.021 |
| solar radiation | 0.11 | 0.13 | -0.13 | -0.10 | 0.33 | 0.37 | 1.002 |
| terrain ruggedness | -0.15 | 0.13 | -0.41 | -0.37 | 0.06 | 0.10 | 1.002 |
| Tasseled-cap wetness | 0.71 | 0.18 | 0.37 | 0.42 | 1.02 | 1.08 | 1.002 |
| summer temp. X wetness | 0.03 | 0.19 | -0.34 | -0.28 | 0.33 | 0.38 | 1.003 |
| dCWA | -0.37 | 0.27 | -0.89 | -0.81 | 0.07 | 0.16 | 1.001 |
| other shrub abundance | -0.02 | 0.14 | -0.30 | -0.25 | 0.20 | 0.25 | 1.001 |
| graminoid abundance | -0.31 | 0.18 | -0.69 | -0.62 | -0.02 | 0.03 | 1.001 |
| summer temp. X dCWA | 0.13 | 0.30 | -0.47 | -0.36 | 0.62 | 0.72 | 1.027 |
| phi | 7.26 | 1.05 | 5.37 | NA | NA | 9.50 | 1.001 |
| sigma.plotgroup | 0.21 | 0.16 | 0.00 | NA | NA | 0.57 | 1.025 |

### Rhododendron tomentosum

| **param** | **mean** | **sd** | **l95** | **l90** | **u90** | **u95** | **Rhat** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| intercept | -32.93 | 24.75 | -91.96 | -78.51 | -1.49 | -3.77 | 1.362 |
| summer temperature | 6.02 | 8.15 | -8.26 | -4.60 | 20.98 | 24.88 | 1.120 |
| summer temperature ^2 | 0.37 | 5.49 | -12.71 | -9.41 | 8.72 | 10.97 | 1.056 |
| temperature variability | -1.95 | 12.45 | -28.49 | -23.14 | 18.50 | 24.75 | 1.064 |
| temperature variability ^2 | -11.55 | 12.54 | -43.48 | -36.11 | 2.06 | 4.98 | 1.197 |
| summer precipitation | -2.55 | 7.31 | -19.88 | -15.94 | 7.80 | 10.92 | 1.085 |
| summer precipitation ^2 | 0.07 | 7.20 | -15.61 | -11.77 | 11.91 | 15.51 | 1.063 |
| solar radiation | -0.17 | 0.52 | -1.28 | -1.08 | 0.62 | 0.75 | 1.080 |
| terrain ruggedness | -0.48 | 1.72 | -4.73 | -3.88 | 1.93 | 2.40 | 1.045 |
| Tasseled-cap wetness | 13.76 | 8.80 | 0.65 | 1.16 | 29.24 | 32.00 | 1.844 |
| summer temp. X wetness | -0.44 | 3.32 | -7.83 | -6.52 | 4.23 | 5.30 | 1.131 |
| summer temp. ^2 X wetness | -5.97 | 4.88 | -16.20 | -14.22 | 0.93 | 1.27 | 1.692 |
| dCWA | 0.37 | 2.77 | -5.58 | -4.51 | 4.82 | 5.82 | 1.012 |
| other shrub abundance | 0.19 | 0.59 | -0.88 | -0.71 | 1.20 | 1.47 | 1.031 |
| graminoid abundance | -1.33 | 1.30 | -4.19 | -3.69 | 0.55 | 0.91 | 1.142 |
| summer temp. X dCWA | 3.42 | 3.57 | -2.02 | -1.29 | 10.35 | 12.26 | 1.034 |
| summer temp. ^2 X dCWA | 0.77 | 2.36 | -3.58 | -2.83 | 4.98 | 6.08 | 1.025 |
| phi | 19.50 | 10.45 | 6.19 | NA | NA | 46.16 | 1.006 |
| sigma.plotgroup | 20.37 | 14.92 | 0.99 | NA | NA | 53.88 | 1.664 |

### Salix arctophila

| **param** | **mean** | **sd** | **l95** | **l90** | **u90** | **u95** | **Rhat** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| intercept | -7.79 | 2.21 | -12.82 | -19.02 | -7.10 | -4.17 | 1.060 |
| summer temperature | 1.80 | 1.66 | -1.25 | -0.66 | 4.59 | 5.15 | 1.024 |
| summer temperature ^2 | -0.19 | 1.42 | -3.12 | -2.67 | 1.95 | 2.29 | 1.094 |
| temperature variability | 0.64 | 1.12 | -1.65 | -1.15 | 2.41 | 2.83 | 1.004 |
| temperature variability ^2 | 0.63 | 0.59 | -0.48 | -0.28 | 1.59 | 1.86 | 1.004 |
| summer precipitation | 1.27 | 0.89 | -0.12 | 0.08 | 2.80 | 3.30 | 1.017 |
| summer precipitation ^2 | -0.89 | 0.60 | -2.17 | -1.89 | -0.05 | 0.08 | 1.021 |
| solar radiation | 0.54 | 0.48 | -0.34 | -0.22 | 1.38 | 1.55 | 1.001 |
| terrain ruggedness | 0.00 | 0.48 | -1.00 | -0.82 | 0.74 | 0.87 | 1.001 |
| Tasseled-cap wetness | 1.25 | 0.88 | -0.23 | -0.03 | 2.83 | 3.26 | 1.008 |
| summer temp. X wetness | -0.30 | 0.52 | -1.36 | -1.15 | 0.54 | 0.71 | 1.003 |
| summer temp. ^2 X wetness | -0.35 | 0.44 | -1.22 | -1.06 | 0.38 | 0.54 | 1.006 |
| dCWA | 1.37 | 1.09 | -0.47 | -0.23 | 3.34 | 3.77 | 1.052 |
| other shrub abundance | 0.20 | 0.38 | -0.55 | -0.42 | 0.81 | 0.93 | 1.009 |
| graminoid abundance | 0.24 | 0.40 | -0.59 | -0.44 | 0.88 | 1.00 | 1.004 |
| summer temp. X dCWA | -0.71 | 0.99 | -2.69 | -2.35 | 0.85 | 1.19 | 1.019 |
| summer temp. ^2 X dCWA | 0.48 | 0.85 | -0.94 | -0.76 | 1.98 | 2.28 | 1.102 |
| phi | 26.12 | 10.03 | 11.20 | NA | NA | 50.21 | 1.002 |
| sigma.plotgroup | 0.79 | 0.74 | 0.01 | NA | NA | 2.68 | 1.072 |

### Salix glauca

| **param** | **mean** | **sd** | **l95** | **l90** | **u90** | **u95** | **Rhat** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| intercept | -3.57 | 0.38 | -4.36 | -4.42 | -2.76 | -2.85 | 1.004 |
| summer temperature | 0.38 | 0.37 | -0.33 | -0.22 | 1.00 | 1.12 | 1.002 |
| temperature variability | 0.45 | 0.20 | 0.07 | 0.12 | 0.79 | 0.86 | 1.001 |
| summer precipitation | -0.01 | 0.20 | -0.39 | -0.33 | 0.32 | 0.38 | 1.001 |
| solar radiation | -0.05 | 0.11 | -0.27 | -0.24 | 0.14 | 0.17 | 1.001 |
| terrain ruggedness | 0.10 | 0.13 | -0.15 | -0.11 | 0.31 | 0.36 | 1.001 |
| Tasseled-cap wetness | 0.17 | 0.15 | -0.11 | -0.07 | 0.42 | 0.47 | 1.001 |
| summer temp. X wetness | 0.18 | 0.15 | -0.11 | -0.06 | 0.44 | 0.49 | 1.001 |
| dCWA | 1.23 | 0.23 | 0.78 | 0.85 | 1.62 | 1.70 | 1.003 |
| other shrub abundance | 0.18 | 0.11 | -0.04 | -0.00 | 0.36 | 0.39 | 1.002 |
| graminoid abundance | -0.05 | 0.12 | -0.28 | -0.24 | 0.14 | 0.18 | 1.001 |
| summer temp. X dCWA | -0.33 | 0.24 | -0.79 | -0.72 | 0.06 | 0.13 | 1.002 |
| phi | 8.01 | 1.22 | 5.82 | NA | NA | 10.57 | 1.001 |
| sigma.plotgroup | 0.76 | 0.17 | 0.44 | NA | NA | 1.11 | 1.002 |

### Vaccinium uliginosum

| **param** | **mean** | **sd** | **l95** | **l90** | **u90** | **u95** | **Rhat** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| intercept | -3.10 | 0.32 | -3.77 | -4.22 | -2.82 | -2.52 | 1.001 |
| summer temperature | 0.22 | 0.34 | -0.41 | -0.31 | 0.80 | 0.93 | 1.002 |
| temperature variability | 0.14 | 0.18 | -0.21 | -0.15 | 0.44 | 0.49 | 1.001 |
| summer precipitation | 0.24 | 0.19 | -0.13 | -0.07 | 0.54 | 0.60 | 1.001 |
| solar radiation | 0.04 | 0.14 | -0.22 | -0.18 | 0.28 | 0.34 | 1.001 |
| terrain ruggedness | -0.20 | 0.14 | -0.49 | -0.44 | 0.03 | 0.07 | 1.001 |
| Tasseled-cap wetness | 0.45 | 0.16 | 0.14 | 0.19 | 0.73 | 0.78 | 1.001 |
| summer temp. X wetness | -0.00 | 0.16 | -0.32 | -0.27 | 0.25 | 0.31 | 1.001 |
| dCWA | 0.98 | 0.25 | 0.51 | 0.58 | 1.42 | 1.51 | 1.001 |
| other shrub abundance | 0.01 | 0.11 | -0.19 | -0.16 | 0.19 | 0.22 | 1.001 |
| graminoid abundance | 0.16 | 0.14 | -0.12 | -0.08 | 0.39 | 0.43 | 1.001 |
| summer temp. X dCWA | 0.10 | 0.29 | -0.47 | -0.38 | 0.56 | 0.65 | 1.002 |
| phi | 8.96 | 1.40 | 6.47 | NA | NA | 11.98 | 1.001 |
| sigma.plotgroup | 0.67 | 0.15 | 0.40 | NA | NA | 0.98 | 1.001 |