Online Supporting Information

Dynamic spatiotemporal modeling of a habitat defining plant species to support wildlife management at regional scales

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Contents

Potential scale reduction factors

Potential scale reduction factors ($\hat{R}$) help diagnose MCMC convergence. MCMC algorithms have reached convergence when $\hat{R} < 1.1$.

Table S1: Potential scale reduction factors ($\hat{R}$) for all parameters in the model for the Bear River core area.

	Point est.	Upper C.I.
Beta[1]	1.01	1.03
Beta[2]	1.01	1.03
Beta[3]	1.00	1.00
Beta[4]	1.00	1.00
gamma[1]	1.00	1.00
gamma[2]	1.00	1.00
gamma[3]	1.00	1.01
gamma[4]	1.00	1.00
gamma[5]	1.00	1.01
gamma[6]	1.00	1.00
gamma[7]	1.00	1.01
gamma[8]	1.01	1.01
gamma[9]	1.00	1.00
gamma[10]	1.00	1.00
gamma[11]	1.00	1.00
gamma[12]	1.00	1.00
gamma[13]	1.00	1.01
gamma[14]	1.00	1.01
gamma[15]	1.00	1.00
gamma[16]	1.00	1.00
gamma[17]	1.01	1.01
gamma[18]	1.00	1.00
gamma[19]	1.00	1.00
gamma[20]	1.00	1.00
gamma[21]	1.00	1.00
gamma[22]	1.00	1.00
gamma[23]	1.00	1.00
gamma[24]	1.00	1.00
gamma[25]	1.00	1.00
gamma[26]	1.00	1.00
gamma[27]	1.00	1.00
gamma[28]	1.00	1.00
gamma[29]	1.00	1.00
gamma[30]	1.00	1.00
gamma[31]	1.00	1.00
gamma[32]	1.00	1.00
sigma__y	1.01	1.03
lp___	1.00	1.02

Table S2: Potential scale reduction factors ($\hat{R}$) for all parameters in the model for the Blacks Fork core area.

	Point est.	Upper C.I.
Beta[1]	1.00	1.00
Beta[2]	1.00	1.01
Beta[3]	1.01	1.03
Beta[4]	1.02	1.05
gamma[1]	1.01	1.02
gamma[2]	1.00	1.01
gamma[3]	1.00	1.01
gamma[4]	1.01	1.02
gamma[5]	1.01	1.03
gamma[6]	1.01	1.02
gamma[7]	1.01	1.04
gamma[8]	1.01	1.03
gamma[9]	1.01	1.03
gamma[10]	1.01	1.03
gamma[11]	1.02	1.05
gamma[12]	1.00	1.00
gamma[13]	1.01	1.05
gamma[14]	1.01	1.04
gamma[15]	1.01	1.03
gamma[16]	1.01	1.02
gamma[17]	1.01	1.03
gamma[18]	1.00	1.01
gamma[19]	1.00	1.01
gamma[20]	1.00	1.00
gamma[21]	1.00	1.01
gamma[22]	1.01	1.04
gamma[23]	1.02	1.07
gamma[24]	1.01	1.02
gamma[25]	1.01	1.03
gamma[26]	1.01	1.03
gamma[27]	1.01	1.04
gamma[28]	1.01	1.04
gamma[29]	1.00	1.00
gamma[30]	1.01	1.01
gamma[31]	1.00	1.01
gamma[32]	1.01	1.02
sigma__y	1.00	1.01
lp___	1.00	1.00

Table S3: Potential scale reduction factors ($\hat{R}$) for all parameters in the model for the Buffalo core area.

	Point est.	Upper C.I.
Beta[1]	1.01	1.03
Beta[2]	1.01	1.03
Beta[3]	1.01	1.02
Beta[4]	1.00	1.00
gamma[1]	1.00	1.00
gamma[2]	1.00	1.01
gamma[3]	1.00	1.00
gamma[4]	1.01	1.01
gamma[5]	1.00	1.01
gamma[6]	1.00	1.00
gamma[7]	1.00	1.00
gamma[8]	1.00	1.00
gamma[9]	1.00	1.01
gamma[10]	1.01	1.02
gamma[11]	1.00	1.01
gamma[12]	1.00	1.00
gamma[13]	1.00	1.01
gamma[14]	1.00	1.01
gamma[15]	1.00	1.01
gamma[16]	1.00	1.00
gamma[17]	1.00	1.01
gamma[18]	1.00	1.00
gamma[19]	1.00	1.01
gamma[20]	1.00	1.01
gamma[21]	1.01	1.03
gamma[22]	1.01	1.02
gamma[23]	1.00	1.00
gamma[24]	1.01	1.01
gamma[25]	1.00	1.00
gamma[26]	1.00	1.01
gamma[27]	1.00	1.01
gamma[28]	1.00	1.01
gamma[29]	1.00	1.01
gamma[30]	1.00	1.01
gamma[31]	1.00	1.00
gamma[32]	1.00	1.01
sigma_y	1.01	1.01
lp__	1.00	1.02

Table S4: Potential scale reduction factors ($\hat{R}$) for all parameters in the model for the Continental Divide core area.

	Point est.	Upper C.I.
Beta[1]	1	1.00
Beta[2]	1	1.00
Beta[3]	1	1.01
Beta[4]	1	1.00
gamma[1]	1	1.01
gamma[2]	1	1.00
gamma[3]	1	1.00
gamma[4]	1	1.01
gamma[5]	1	1.00
gamma[6]	1	1.00
gamma[7]	1	1.01
gamma[8]	1	1.00
gamma[9]	1	1.00
gamma[10]	1	1.01
gamma[11]	1	1.01
gamma[12]	1	1.00
gamma[13]	1	1.00
gamma[14]	1	1.01
gamma[15]	1	1.00
gamma[16]	1	1.00
gamma[17]	1	1.01
gamma[18]	1	1.01
gamma[19]	1	1.00
gamma[20]	1	1.00
gamma[21]	1	1.00
gamma[22]	1	1.01
gamma[23]	1	1.00
gamma[24]	1	1.00
gamma[25]	1	1.00
gamma[26]	1	1.01
gamma[27]	1	1.00
gamma[28]	1	1.00
gamma[29]	1	1.01
gamma[30]	1	1.01
gamma[31]	1	1.00
gamma[32]	1	1.00
sigma_y	1	1.00
lp__	1	1.00

Table S5: Potential scale reduction factors ($\hat{R}$) for all parameters in the model for the Crowheart core area.

	Point est.	Upper C.I.
Beta[1]	1.01	1.03
Beta[2]	1.01	1.03
Beta[3]	1.01	1.01
Beta[4]	1.00	1.00
gamma[1]	1.01	1.01
gamma[2]	1.00	1.00
gamma[3]	1.00	1.00
gamma[4]	1.00	1.01
gamma[5]	1.00	1.00
gamma[6]	1.00	1.00
gamma[7]	1.00	1.00
gamma[8]	1.00	1.01
gamma[9]	1.01	1.02
gamma[10]	1.00	1.01
gamma[11]	1.00	1.01
gamma[12]	1.00	1.00
gamma[13]	1.00	1.00
gamma[14]	1.00	1.00
gamma[15]	1.00	1.00
gamma[16]	1.00	1.00
gamma[17]	1.00	1.02
gamma[18]	1.00	1.01
gamma[19]	1.01	1.02
gamma[20]	1.00	1.00
gamma[21]	1.00	1.00
gamma[22]	1.00	1.00
gamma[23]	1.00	1.00
gamma[24]	1.00	1.00
gamma[25]	1.00	1.00
gamma[26]	1.00	1.00
gamma[27]	1.00	1.01
gamma[28]	1.00	1.00
gamma[29]	1.00	1.00
gamma[30]	1.01	1.02
gamma[31]	1.00	1.01
gamma[32]	1.00	1.01
sigma_y	1.00	1.01
lp__	1.01	1.02

Table S6: Potential scale reduction factors ($\hat{R}$) for all parameters in the model for the Daniel core area.

	Point est.	Upper C.I.
Beta[1]	1.01	1.04
Beta[2]	1.01	1.04
Beta[3]	1.00	1.00
Beta[4]	1.00	1.00
gamma[1]	1.00	1.00
gamma[2]	1.00	1.00
gamma[3]	1.00	1.00
gamma[4]	1.00	1.00
gamma[5]	1.00	1.00
gamma[6]	1.01	1.01
gamma[7]	1.00	1.00
gamma[8]	1.00	1.00
gamma[9]	1.00	1.00
gamma[10]	1.00	1.00
gamma[11]	1.00	1.00
gamma[12]	1.00	1.00
gamma[13]	1.00	1.00
gamma[14]	1.00	1.00
gamma[15]	1.00	1.00
gamma[16]	1.00	1.00
gamma[17]	1.00	1.00
gamma[18]	1.00	1.00
gamma[19]	1.00	1.00
gamma[20]	1.00	1.00
gamma[21]	1.00	1.00
gamma[22]	1.00	1.00
gamma[23]	1.00	1.00
gamma[24]	1.00	1.00
gamma[25]	1.00	1.00
gamma[26]	1.00	1.01
gamma[27]	1.00	1.00
gamma[28]	1.00	1.00
gamma[29]	1.00	1.00
gamma[30]	1.00	1.01
gamma[31]	1.00	1.00
gamma[32]	1.01	1.01
sigma_y	1.03	1.11
lp__	1.00	1.01

Table S7: Potential scale reduction factors ($\hat{R}$) for all parameters in the model for the Douglas core area.

	Point est.	Upper C.I.
Beta[1]	1.00	1.00
Beta[2]	1.00	1.00
Beta[3]	1.00	1.01
Beta[4]	1.01	1.02
gamma[1]	1.00	1.01
gamma[2]	1.00	1.01
gamma[3]	1.00	1.01
gamma[4]	1.00	1.01
gamma[5]	1.00	1.00
gamma[6]	1.00	1.00
gamma[7]	1.00	1.00
gamma[8]	1.01	1.02
gamma[9]	1.00	1.01
gamma[10]	1.00	1.01
gamma[11]	1.00	1.01
gamma[12]	1.00	1.01
gamma[13]	1.00	1.02
gamma[14]	1.00	1.01
gamma[15]	1.00	1.00
gamma[16]	1.00	1.01
gamma[17]	1.00	1.01
gamma[18]	1.00	1.00
gamma[19]	1.00	1.00
gamma[20]	1.00	1.00
gamma[21]	1.00	1.00
gamma[22]	1.01	1.02
gamma[23]	1.01	1.02
gamma[24]	1.00	1.01
gamma[25]	1.01	1.02
gamma[26]	1.00	1.01
gamma[27]	1.00	1.01
gamma[28]	1.00	1.00
gamma[29]	1.00	1.00
gamma[30]	1.00	1.00
gamma[31]	1.00	1.00
gamma[32]	1.00	1.00
sigma__y	1.01	1.02
lp___	1.00	1.00

Table S8: Potential scale reduction factors ($\hat{R}$) for all parameters in the model for the Elk Basin East core area.

	Point est.	Upper C.I.
Beta[1]	1.01	1.01
Beta[2]	1.01	1.01
Beta[3]	1.02	1.06
Beta[4]	1.01	1.01
gamma[1]	1.01	1.03
gamma[2]	1.01	1.03
gamma[3]	1.01	1.04
gamma[4]	1.01	1.02
gamma[5]	1.00	1.00
gamma[6]	1.00	1.00
gamma[7]	1.00	1.01
gamma[8]	1.01	1.03
gamma[9]	1.01	1.04
gamma[10]	1.01	1.03
gamma[11]	1.00	1.01
gamma[12]	1.01	1.02
gamma[13]	1.02	1.05
gamma[14]	1.00	1.01
gamma[15]	1.00	1.01
gamma[16]	1.00	1.01
gamma[17]	1.00	1.01
gamma[18]	1.01	1.02
gamma[19]	1.01	1.03
gamma[20]	1.01	1.02
gamma[21]	1.02	1.05
gamma[22]	1.02	1.06
gamma[23]	1.01	1.02
gamma[24]	1.00	1.01
gamma[25]	1.01	1.02
gamma[26]	1.01	1.01
gamma[27]	1.01	1.03
gamma[28]	1.00	1.00
gamma[29]	1.00	1.01
gamma[30]	1.00	1.01
gamma[31]	1.01	1.02
gamma[32]	1.01	1.02
sigma_y	1.00	1.00
lp__	1.00	1.00

Table S9: Potential scale reduction factors ($\hat{R}$) for all parameters in the model for the Elk Basin West core area.

	Point est.	Upper C.I.
Beta[1]	1.00	1.01
Beta[2]	1.00	1.01
Beta[3]	1.04	1.14
Beta[4]	1.15	1.44
gamma[1]	1.00	1.00
gamma[2]	1.05	1.15
gamma[3]	1.06	1.20
gamma[4]	1.11	1.33
gamma[5]	1.04	1.14
gamma[6]	1.00	1.00
gamma[7]	1.03	1.09
gamma[8]	1.06	1.19
gamma[9]	1.05	1.16
gamma[10]	1.02	1.07
gamma[11]	1.10	1.31
gamma[12]	1.11	1.32
gamma[13]	1.00	1.00
gamma[14]	1.03	1.11
gamma[15]	1.01	1.03
gamma[16]	1.05	1.17
gamma[17]	1.05	1.15
gamma[18]	1.12	1.36
gamma[19]	1.01	1.03
gamma[20]	1.03	1.09
gamma[21]	1.02	1.07
gamma[22]	1.02	1.07
gamma[23]	1.12	1.34
gamma[24]	1.10	1.31
gamma[25]	1.11	1.33
gamma[26]	1.05	1.16
gamma[27]	1.04	1.13
gamma[28]	1.00	1.00
gamma[29]	1.03	1.11
gamma[30]	1.05	1.16
gamma[31]	1.06	1.19
gamma[32]	1.06	1.18
sigma_y	1.04	1.11
lp__	1.00	1.02

Table S10: Potential scale reduction factors ($\hat{R}$) for all parameters in the model for the Fontenelle core area.

	Point est.	Upper C.I.
Beta[1]	1.00	1.00
Beta[2]	1.00	1.00
Beta[3]	1.01	1.02
Beta[4]	1.01	1.03
gamma[1]	1.00	1.01
gamma[2]	1.00	1.01
gamma[3]	1.00	1.00
gamma[4]	1.00	1.00
gamma[5]	1.00	1.00
gamma[6]	1.01	1.01
gamma[7]	1.00	1.00
gamma[8]	1.00	1.00
gamma[9]	1.00	1.01
gamma[10]	1.00	1.01
gamma[11]	1.00	1.00
gamma[12]	1.00	1.01
gamma[13]	1.00	1.00
gamma[14]	1.00	1.01
gamma[15]	1.00	1.00
gamma[16]	1.00	1.00
gamma[17]	1.00	1.00
gamma[18]	1.00	1.00
gamma[19]	1.00	1.00
gamma[20]	1.00	1.00
gamma[21]	1.00	1.00
gamma[22]	1.00	1.00
gamma[23]	1.01	1.02
gamma[24]	1.01	1.02
gamma[25]	1.00	1.00
gamma[26]	1.00	1.01
gamma[27]	1.01	1.02
gamma[28]	1.00	1.00
gamma[29]	1.00	1.00
gamma[30]	1.00	1.01
gamma[31]	1.00	1.01
gamma[32]	1.01	1.02
sigma_y	1.01	1.04
lp__	1.00	1.01

Table S11: Potential scale reduction factors ($\hat{R}$) for all parameters in the model for the Grass Creek core area.

	Point est.	Upper C.I.
Beta[1]	1.00	1.00
Beta[2]	1.00	1.00
Beta[3]	1.01	1.02
Beta[4]	1.00	1.01
gamma[1]	1.00	1.01
gamma[2]	1.00	1.01
gamma[3]	1.00	1.01
gamma[4]	1.00	1.00
gamma[5]	1.00	1.00
gamma[6]	1.00	1.01
gamma[7]	1.00	1.01
gamma[8]	1.01	1.02
gamma[9]	1.00	1.01
gamma[10]	1.00	1.01
gamma[11]	1.00	1.01
gamma[12]	1.00	1.01
gamma[13]	1.00	1.00
gamma[14]	1.00	1.00
gamma[15]	1.00	1.00
gamma[16]	1.00	1.00
gamma[17]	1.00	1.00
gamma[18]	1.00	1.01
gamma[19]	1.00	1.01
gamma[20]	1.00	1.01
gamma[21]	1.00	1.01
gamma[22]	1.01	1.02
gamma[23]	1.00	1.00
gamma[24]	1.00	1.00
gamma[25]	1.00	1.01
gamma[26]	1.00	1.01
gamma[27]	1.00	1.01
gamma[28]	1.00	1.00
gamma[29]	1.00	1.00
gamma[30]	1.00	1.00
gamma[31]	1.00	1.00
gamma[32]	1.00	1.00
sigma_y	1.00	1.01
lp__	1.01	1.03

Table S12: Potential scale reduction factors ($\hat{R}$) for all parameters in the model for the Greater South Pass 1 core area.

	Point est.	Upper C.I.
Beta[1]	1.00	1.00
Beta[2]	1.00	1.00
Beta[3]	1.00	1.00
Beta[4]	1.00	1.01
gamma[1]	1.00	1.00
gamma[2]	1.00	1.00
gamma[3]	1.00	1.00
gamma[4]	1.00	1.01
gamma[5]	1.00	1.01
gamma[6]	1.00	1.00
gamma[7]	1.00	1.00
gamma[8]	1.00	1.00
gamma[9]	1.00	1.00
gamma[10]	1.00	1.00
gamma[11]	1.00	1.00
gamma[12]	1.00	1.00
gamma[13]	1.00	1.01
gamma[14]	1.00	1.00
gamma[15]	1.00	1.00
gamma[16]	1.00	1.00
gamma[17]	1.00	1.00
gamma[18]	1.00	1.00
gamma[19]	1.00	1.00
gamma[20]	1.00	1.00
gamma[21]	1.00	1.00
gamma[22]	1.00	1.00
gamma[23]	1.00	1.01
gamma[24]	1.00	1.02
gamma[25]	1.00	1.00
gamma[26]	1.00	1.00
gamma[27]	1.00	1.00
gamma[28]	1.00	1.00
gamma[29]	1.00	1.00
gamma[30]	1.00	1.00
gamma[31]	1.00	1.01
gamma[32]	1.01	1.01
sigma_y	1.07	1.18
lp__	1.01	1.05

Table S13: Potential scale reduction factors ($\hat{R}$) for all parameters in the model for the Greater South Pass 2 core area.

	Point est.	Upper C.I.
Beta[1]	1.00	1.00
Beta[2]	1.00	1.00
Beta[3]	1.01	1.05
Beta[4]	1.00	1.01
gamma[1]	1.01	1.02
gamma[2]	1.00	1.01
gamma[3]	1.00	1.01
gamma[4]	1.01	1.03
gamma[5]	1.00	1.01
gamma[6]	1.00	1.00
gamma[7]	1.01	1.03
gamma[8]	1.00	1.00
gamma[9]	1.01	1.02
gamma[10]	1.00	1.02
gamma[11]	1.01	1.04
gamma[12]	1.00	1.01
gamma[13]	1.00	1.01
gamma[14]	1.01	1.02
gamma[15]	1.01	1.02
gamma[16]	1.00	1.01
gamma[17]	1.01	1.02
gamma[18]	1.00	1.01
gamma[19]	1.00	1.01
gamma[20]	1.00	1.00
gamma[21]	1.00	1.00
gamma[22]	1.01	1.04
gamma[23]	1.00	1.01
gamma[24]	1.00	1.01
gamma[25]	1.00	1.02
gamma[26]	1.00	1.01
gamma[27]	1.00	1.01
gamma[28]	1.01	1.03
gamma[29]	1.00	1.00
gamma[30]	1.01	1.02
gamma[31]	1.01	1.04
gamma[32]	1.00	1.00
sigma_y	1.01	1.03
lp__	1.01	1.03

Table S14: Potential scale reduction factors ($\hat{R}$) for all parameters in the model for the Greater South Pass 3 core area.

	Point est.	Upper C.I.
Beta[1]	1.00	1.00
Beta[2]	1.00	1.00
Beta[3]	1.00	1.01
Beta[4]	1.00	1.00
gamma[1]	1.00	1.00
gamma[2]	1.00	1.01
gamma[3]	1.00	1.01
gamma[4]	1.00	1.00
gamma[5]	1.00	1.00
gamma[6]	1.00	1.00
gamma[7]	1.00	1.00
gamma[8]	1.00	1.00
gamma[9]	1.00	1.01
gamma[10]	1.00	1.01
gamma[11]	1.00	1.01
gamma[12]	1.00	1.00
gamma[13]	1.00	1.00
gamma[14]	1.00	1.00
gamma[15]	1.00	1.00
gamma[16]	1.00	1.00
gamma[17]	1.00	1.01
gamma[18]	1.00	1.01
gamma[19]	1.00	1.00
gamma[20]	1.01	1.01
gamma[21]	1.00	1.00
gamma[22]	1.00	1.01
gamma[23]	1.00	1.00
gamma[24]	1.00	1.00
gamma[25]	1.00	1.00
gamma[26]	1.00	1.00
gamma[27]	1.00	1.00
gamma[28]	1.00	1.00
gamma[29]	1.00	1.00
gamma[30]	1.00	1.00
gamma[31]	1.00	1.00
gamma[32]	1.00	1.00
sigma_y	1.05	1.15
lp__	1.00	1.00

Table S15: Potential scale reduction factors ($\hat{R}$) for all parameters in the model for the Greater South Pass 4 core area.

	Point est.	Upper C.I.
Beta[1]	1.00	1.02
Beta[2]	1.01	1.02
Beta[3]	1.01	1.02
Beta[4]	1.00	1.01
gamma[1]	1.01	1.01
gamma[2]	1.00	1.00
gamma[3]	1.00	1.00
gamma[4]	1.01	1.02
gamma[5]	1.00	1.00
gamma[6]	1.00	1.00
gamma[7]	1.00	1.00
gamma[8]	1.00	1.00
gamma[9]	1.00	1.02
gamma[10]	1.00	1.01
gamma[11]	1.00	1.01
gamma[12]	1.00	1.01
gamma[13]	1.01	1.01
gamma[14]	1.01	1.01
gamma[15]	1.00	1.00
gamma[16]	1.00	1.00
gamma[17]	1.01	1.02
gamma[18]	1.00	1.00
gamma[19]	1.00	1.01
gamma[20]	1.00	1.00
gamma[21]	1.00	1.00
gamma[22]	1.01	1.02
gamma[23]	1.00	1.01
gamma[24]	1.00	1.00
gamma[25]	1.00	1.01
gamma[26]	1.00	1.01
gamma[27]	1.00	1.00
gamma[28]	1.01	1.02
gamma[29]	1.00	1.00
gamma[30]	1.00	1.01
gamma[31]	1.00	1.01
gamma[32]	1.00	1.01
sigma_y	1.01	1.02
lp__	1.00	1.00

Table S16: Potential scale reduction factors ($\hat{R}$) for all parameters in the model for the Greater South Pass 5 core area.

	Point est.	Upper C.I.
Beta[1]	1.00	1.01
Beta[2]	1.00	1.01
Beta[3]	1.01	1.03
Beta[4]	1.00	1.01
gamma[1]	1.00	1.01
gamma[2]	1.00	1.01
gamma[3]	1.00	1.00
gamma[4]	1.00	1.01
gamma[5]	1.00	1.00
gamma[6]	1.00	1.00
gamma[7]	1.00	1.00
gamma[8]	1.00	1.00
gamma[9]	1.00	1.00
gamma[10]	1.00	1.01
gamma[11]	1.00	1.01
gamma[12]	1.00	1.00
gamma[13]	1.00	1.01
gamma[14]	1.00	1.00
gamma[15]	1.00	1.00
gamma[16]	1.00	1.00
gamma[17]	1.00	1.00
gamma[18]	1.00	1.01
gamma[19]	1.00	1.01
gamma[20]	1.00	1.00
gamma[21]	1.00	1.01
gamma[22]	1.00	1.00
gamma[23]	1.00	1.00
gamma[24]	1.00	1.01
gamma[25]	1.01	1.02
gamma[26]	1.00	1.01
gamma[27]	1.00	1.00
gamma[28]	1.00	1.01
gamma[29]	1.00	1.00
gamma[30]	1.00	1.01
gamma[31]	1.00	1.01
gamma[32]	1.00	1.00
sigma_y	1.03	1.08
lp__	1.00	1.01

Table S17: Potential scale reduction factors ($\hat{R}$) for all parameters in the model for the Hanna core area.

	Point est.	Upper C.I.
Beta[1]	1.00	1.00
Beta[2]	1.00	1.00
Beta[3]	1.00	1.01
Beta[4]	1.00	1.01
gamma[1]	1.00	1.00
gamma[2]	1.00	1.00
gamma[3]	1.00	1.01
gamma[4]	1.01	1.02
gamma[5]	1.00	1.00
gamma[6]	1.00	1.00
gamma[7]	1.00	1.01
gamma[8]	1.00	1.00
gamma[9]	1.00	1.00
gamma[10]	1.00	1.00
gamma[11]	1.00	1.01
gamma[12]	1.00	1.00
gamma[13]	1.00	1.00
gamma[14]	1.00	1.00
gamma[15]	1.00	1.00
gamma[16]	1.00	1.00
gamma[17]	1.00	1.00
gamma[18]	1.00	1.01
gamma[19]	1.01	1.01
gamma[20]	1.00	1.01
gamma[21]	1.00	1.00
gamma[22]	1.00	1.00
gamma[23]	1.00	1.02
gamma[24]	1.00	1.01
gamma[25]	1.00	1.00
gamma[26]	1.00	1.00
gamma[27]	1.00	1.01
gamma[28]	1.00	1.01
gamma[29]	1.00	1.00
gamma[30]	1.00	1.01
gamma[31]	1.00	1.00
gamma[32]	1.00	1.01
sigma_y	1.04	1.13
lp__	1.00	1.00

Table S18: Potential scale reduction factors ($\hat{R}$) for all parameters in the model for the Heart Mountain core area.

	Point est.	Upper C.I.
Beta[1]	1.00	1.01
Beta[2]	1.01	1.01
Beta[3]	1.01	1.03
Beta[4]	1.01	1.04
gamma[1]	1.00	1.02
gamma[2]	1.00	1.01
gamma[3]	1.01	1.02
gamma[4]	1.00	1.01
gamma[5]	1.00	1.00
gamma[6]	1.00	1.01
gamma[7]	1.00	1.00
gamma[8]	1.01	1.03
gamma[9]	1.00	1.00
gamma[10]	1.00	1.00
gamma[11]	1.00	1.01
gamma[12]	1.00	1.01
gamma[13]	1.00	1.00
gamma[14]	1.00	1.01
gamma[15]	1.00	1.00
gamma[16]	1.00	1.00
gamma[17]	1.00	1.01
gamma[18]	1.00	1.01
gamma[19]	1.00	1.00
gamma[20]	1.00	1.02
gamma[21]	1.00	1.00
gamma[22]	1.00	1.01
gamma[23]	1.00	1.01
gamma[24]	1.00	1.01
gamma[25]	1.00	1.00
gamma[26]	1.00	1.01
gamma[27]	1.00	1.02
gamma[28]	1.00	1.00
gamma[29]	1.00	1.02
gamma[30]	1.00	1.01
gamma[31]	1.00	1.01
gamma[32]	1.00	1.01
sigma_y	1.00	1.02
lp__	1.01	1.03

Table S19: Potential scale reduction factors ($\hat{R}$) for all parameters in the model for the Hyattville core area.

	Point est.	Upper C.I.
Beta[1]	1.00	1.00
Beta[2]	1.00	1.00
Beta[3]	1.00	1.00
Beta[4]	1.00	1.00
gamma[1]	1.00	1.00
gamma[2]	1.00	1.00
gamma[3]	1.00	1.00
gamma[4]	1.00	1.01
gamma[5]	1.00	1.00
gamma[6]	1.00	1.01
gamma[7]	1.00	1.02
gamma[8]	1.00	1.00
gamma[9]	1.00	1.01
gamma[10]	1.00	1.00
gamma[11]	1.00	1.00
gamma[12]	1.00	1.00
gamma[13]	1.00	1.00
gamma[14]	1.01	1.01
gamma[15]	1.00	1.01
gamma[16]	1.01	1.01
gamma[17]	1.01	1.01
gamma[18]	1.00	1.01
gamma[19]	1.00	1.01
gamma[20]	1.00	1.00
gamma[21]	1.00	1.00
gamma[22]	1.00	1.00
gamma[23]	1.00	1.00
gamma[24]	1.00	1.00
gamma[25]	1.00	1.00
gamma[26]	1.00	1.00
gamma[27]	1.00	1.00
gamma[28]	1.00	1.00
gamma[29]	1.00	1.00
gamma[30]	1.00	1.00
gamma[31]	1.00	1.00
gamma[32]	1.00	1.01
sigma_y	1.01	1.02
lp__	1.00	1.01

Table S20: Potential scale reduction factors ($\hat{R}$) for all parameters in the model for the Jackson core area.

	Point est.	Upper C.I.
Beta[1]	1.00	1.01
Beta[2]	1.00	1.01
Beta[3]	1.00	1.01
Beta[4]	1.00	1.00
gamma[1]	1.00	1.00
gamma[2]	1.00	1.00
gamma[3]	1.00	1.00
gamma[4]	1.00	1.00
gamma[5]	1.00	1.01
gamma[6]	1.00	1.00
gamma[7]	1.00	1.00
gamma[8]	1.00	1.00
gamma[9]	1.00	1.00
gamma[10]	1.00	1.00
gamma[11]	1.00	1.00
gamma[12]	1.00	1.00
gamma[13]	1.00	1.00
gamma[14]	1.00	1.00
gamma[15]	1.00	1.00
gamma[16]	1.00	1.00
gamma[17]	1.00	1.00
gamma[18]	1.00	1.01
gamma[19]	1.00	1.00
gamma[20]	1.00	1.01
gamma[21]	1.00	1.00
gamma[22]	1.00	1.00
gamma[23]	1.00	1.01
gamma[24]	1.00	1.01
gamma[25]	1.00	1.00
gamma[26]	1.00	1.00
gamma[27]	1.00	1.00
gamma[28]	1.00	1.00
gamma[29]	1.00	1.00
gamma[30]	1.00	1.00
gamma[31]	1.00	1.00
gamma[32]	1.00	1.01
sigma_y	1.02	1.05
lp__	1.00	1.02

Table S21: Potential scale reduction factors ($\hat{R}$) for all parameters in the model for the Little Mountain core area.

	Point est.	Upper C.I.
Beta[1]	1.00	1.00
Beta[2]	1.00	1.00
Beta[3]	1.01	1.03
Beta[4]	1.00	1.01
gamma[1]	1.00	1.00
gamma[2]	1.00	1.01
gamma[3]	1.00	1.01
gamma[4]	1.00	1.00
gamma[5]	1.00	1.00
gamma[6]	1.00	1.01
gamma[7]	1.00	1.00
gamma[8]	1.01	1.02
gamma[9]	1.00	1.01
gamma[10]	1.00	1.00
gamma[11]	1.00	1.00
gamma[12]	1.00	1.01
gamma[13]	1.00	1.00
gamma[14]	1.00	1.00
gamma[15]	1.00	1.00
gamma[16]	1.00	1.00
gamma[17]	1.01	1.03
gamma[18]	1.00	1.01
gamma[19]	1.00	1.00
gamma[20]	1.00	1.01
gamma[21]	1.00	1.01
gamma[22]	1.00	1.00
gamma[23]	1.00	1.01
gamma[24]	1.00	1.00
gamma[25]	1.00	1.01
gamma[26]	1.00	1.01
gamma[27]	1.01	1.02
gamma[28]	1.00	1.00
gamma[29]	1.00	1.00
gamma[30]	1.00	1.00
gamma[31]	1.01	1.01
gamma[32]	1.00	1.00
sigma_y	1.00	1.00
lp__	1.00	1.01

Table S22: Potential scale reduction factors ($\hat{R}$) for all parameters in the model for the Natrona 1 core area.

	Point est.	Upper C.I.
Beta[1]	1.00	1.00
Beta[2]	1.00	1.00
Beta[3]	1.00	1.00
Beta[4]	1.00	1.00
gamma[1]	1.00	1.00
gamma[2]	1.00	1.00
gamma[3]	1.00	1.01
gamma[4]	1.00	1.00
gamma[5]	1.00	1.00
gamma[6]	1.00	1.00
gamma[7]	1.00	1.01
gamma[8]	1.00	1.00
gamma[9]	1.00	1.01
gamma[10]	1.00	1.00
gamma[11]	1.00	1.01
gamma[12]	1.00	1.00
gamma[13]	1.00	1.00
gamma[14]	1.00	1.00
gamma[15]	1.00	1.00
gamma[16]	1.00	1.01
gamma[17]	1.00	1.00
gamma[18]	1.01	1.01
gamma[19]	1.00	1.01
gamma[20]	1.00	1.00
gamma[21]	1.00	1.00
gamma[22]	1.00	1.01
gamma[23]	1.00	1.00
gamma[24]	1.00	1.00
gamma[25]	1.00	1.00
gamma[26]	1.00	1.00
gamma[27]	1.00	1.00
gamma[28]	1.00	1.00
gamma[29]	1.00	1.00
gamma[30]	1.00	1.00
gamma[31]	1.00	1.00
gamma[32]	1.00	1.00
sigma_y	1.01	1.02
lp__	1.00	1.01

Table S23: Potential scale reduction factors ($\hat{R}$) for all parameters in the model for the Natrona 2 core area.

	Point est.	Upper C.I.
Beta[1]	1.01	1.02
Beta[2]	1.01	1.02
Beta[3]	1.00	1.02
Beta[4]	1.01	1.02
gamma[1]	1.00	1.00
gamma[2]	1.00	1.01
gamma[3]	1.00	1.01
gamma[4]	1.00	1.00
gamma[5]	1.00	1.01
gamma[6]	1.00	1.00
gamma[7]	1.00	1.00
gamma[8]	1.00	1.00
gamma[9]	1.00	1.00
gamma[10]	1.00	1.00
gamma[11]	1.00	1.00
gamma[12]	1.00	1.01
gamma[13]	1.00	1.00
gamma[14]	1.00	1.00
gamma[15]	1.00	1.01
gamma[16]	1.00	1.00
gamma[17]	1.00	1.01
gamma[18]	1.00	1.01
gamma[19]	1.00	1.01
gamma[20]	1.00	1.01
gamma[21]	1.00	1.00
gamma[22]	1.00	1.01
gamma[23]	1.00	1.02
gamma[24]	1.00	1.00
gamma[25]	1.00	1.00
gamma[26]	1.00	1.00
gamma[27]	1.00	1.00
gamma[28]	1.00	1.00
gamma[29]	1.00	1.01
gamma[30]	1.00	1.01
gamma[31]	1.00	1.01
gamma[32]	1.00	1.01
sigma_y	1.02	1.07
lp__	1.01	1.01

Table S24: Potential scale reduction factors ($\hat{R}$) for all parameters in the model for the Natrona 3 core area.

	Point est.	Upper C.I.
Beta[1]	1.00	1.01
Beta[2]	1.00	1.01
Beta[3]	1.00	1.00
Beta[4]	1.00	1.01
gamma[1]	1.00	1.00
gamma[2]	1.01	1.01
gamma[3]	1.00	1.00
gamma[4]	1.01	1.03
gamma[5]	1.00	1.01
gamma[6]	1.01	1.01
gamma[7]	1.00	1.00
gamma[8]	1.00	1.00
gamma[9]	1.00	1.01
gamma[10]	1.00	1.01
gamma[11]	1.00	1.00
gamma[12]	1.00	1.00
gamma[13]	1.00	1.00
gamma[14]	1.00	1.00
gamma[15]	1.00	1.00
gamma[16]	1.00	1.00
gamma[17]	1.00	1.01
gamma[18]	1.00	1.01
gamma[19]	1.00	1.00
gamma[20]	1.00	1.00
gamma[21]	1.00	1.00
gamma[22]	1.00	1.00
gamma[23]	1.00	1.00
gamma[24]	1.00	1.00
gamma[25]	1.01	1.02
gamma[26]	1.00	1.01
gamma[27]	1.00	1.01
gamma[28]	1.00	1.01
gamma[29]	1.00	1.00
gamma[30]	1.00	1.00
gamma[31]	1.00	1.00
gamma[32]	1.00	1.00
sigma_y	1.02	1.07
lp__	1.01	1.02

Table S25: Potential scale reduction factors ($\hat{R}$) for all parameters in the model for the Newcastle core area.

	Point est.	Upper C.I.
Beta[1]	1.00	1.02
Beta[2]	1.00	1.01
Beta[3]	1.00	1.01
Beta[4]	1.01	1.04
gamma[1]	1.00	1.01
gamma[2]	1.00	1.00
gamma[3]	1.00	1.01
gamma[4]	1.01	1.03
gamma[5]	1.00	1.00
gamma[6]	1.00	1.00
gamma[7]	1.00	1.00
gamma[8]	1.00	1.00
gamma[9]	1.00	1.01
gamma[10]	1.00	1.00
gamma[11]	1.00	1.01
gamma[12]	1.01	1.03
gamma[13]	1.00	1.01
gamma[14]	1.01	1.02
gamma[15]	1.00	1.00
gamma[16]	1.00	1.02
gamma[17]	1.00	1.01
gamma[18]	1.00	1.01
gamma[19]	1.00	1.01
gamma[20]	1.00	1.00
gamma[21]	1.00	1.01
gamma[22]	1.00	1.02
gamma[23]	1.01	1.02
gamma[24]	1.00	1.01
gamma[25]	1.00	1.01
gamma[26]	1.00	1.00
gamma[27]	1.00	1.00
gamma[28]	1.00	1.02
gamma[29]	1.00	1.01
gamma[30]	1.00	1.01
gamma[31]	1.00	1.00
gamma[32]	1.00	1.00
sigma_y	1.01	1.04
lp__	1.00	1.01

Table S26: Potential scale reduction factors ($\hat{R}$) for all parameters in the model for the North Gillette core area.

	Point est.	Upper C.I.
Beta[1]	1.00	1.01
Beta[2]	1.00	1.01
Beta[3]	1.01	1.05
Beta[4]	1.01	1.02
gamma[1]	1.00	1.01
gamma[2]	1.00	1.02
gamma[3]	1.01	1.02
gamma[4]	1.01	1.02
gamma[5]	1.00	1.01
gamma[6]	1.01	1.01
gamma[7]	1.00	1.01
gamma[8]	1.00	1.01
gamma[9]	1.00	1.01
gamma[10]	1.00	1.02
gamma[11]	1.01	1.02
gamma[12]	1.01	1.02
gamma[13]	1.01	1.04
gamma[14]	1.00	1.01
gamma[15]	1.00	1.01
gamma[16]	1.00	1.01
gamma[17]	1.00	1.01
gamma[18]	1.01	1.03
gamma[19]	1.00	1.00
gamma[20]	1.01	1.04
gamma[21]	1.00	1.01
gamma[22]	1.00	1.00
gamma[23]	1.01	1.03
gamma[24]	1.01	1.02
gamma[25]	1.01	1.02
gamma[26]	1.01	1.02
gamma[27]	1.00	1.02
gamma[28]	1.01	1.04
gamma[29]	1.00	1.01
gamma[30]	1.01	1.03
gamma[31]	1.00	1.01
gamma[32]	1.00	1.01
sigma_y	1.01	1.03
lp__	1.00	1.01

Table S27: Potential scale reduction factors ($\hat{R}$) for all parameters in the model for the North Glenrock core area.

	Point est.	Upper C.I.
Beta[1]	1.00	1.00
Beta[2]	1.00	1.00
Beta[3]	1.01	1.02
Beta[4]	1.01	1.01
gamma[1]	1.01	1.01
gamma[2]	1.00	1.00
gamma[3]	1.00	1.01
gamma[4]	1.00	1.02
gamma[5]	1.01	1.03
gamma[6]	1.00	1.00
gamma[7]	1.00	1.01
gamma[8]	1.00	1.00
gamma[9]	1.00	1.00
gamma[10]	1.00	1.01
gamma[11]	1.00	1.01
gamma[12]	1.01	1.01
gamma[13]	1.00	1.00
gamma[14]	1.00	1.00
gamma[15]	1.00	1.00
gamma[16]	1.00	1.00
gamma[17]	1.00	1.01
gamma[18]	1.01	1.02
gamma[19]	1.00	1.00
gamma[20]	1.00	1.01
gamma[21]	1.00	1.00
gamma[22]	1.00	1.01
gamma[23]	1.01	1.01
gamma[24]	1.00	1.01
gamma[25]	1.00	1.00
gamma[26]	1.00	1.01
gamma[27]	1.00	1.01
gamma[28]	1.00	1.00
gamma[29]	1.00	1.00
gamma[30]	1.00	1.01
gamma[31]	1.00	1.01
gamma[32]	1.00	1.01
sigma_y	1.01	1.01
lp__	1.00	1.01

Table S28: Potential scale reduction factors ($\hat{R}$) for all parameters in the model for the North Laramie core area.

	Point est.	Upper C.I.
Beta[1]	1.00	1.01
Beta[2]	1.00	1.01
Beta[3]	1.01	1.02
Beta[4]	1.00	1.02
gamma[1]	1.00	1.01
gamma[2]	1.00	1.00
gamma[3]	1.00	1.00
gamma[4]	1.00	1.01
gamma[5]	1.00	1.01
gamma[6]	1.00	1.00
gamma[7]	1.00	1.01
gamma[8]	1.00	1.00
gamma[9]	1.00	1.00
gamma[10]	1.00	1.00
gamma[11]	1.01	1.01
gamma[12]	1.00	1.00
gamma[13]	1.00	1.00
gamma[14]	1.00	1.01
gamma[15]	1.00	1.00
gamma[16]	1.00	1.00
gamma[17]	1.00	1.01
gamma[18]	1.00	1.00
gamma[19]	1.00	1.02
gamma[20]	1.00	1.00
gamma[21]	1.00	1.00
gamma[22]	1.00	1.00
gamma[23]	1.00	1.01
gamma[24]	1.00	1.00
gamma[25]	1.00	1.00
gamma[26]	1.00	1.01
gamma[27]	1.00	1.01
gamma[28]	1.00	1.00
gamma[29]	1.00	1.00
gamma[30]	1.00	1.01
gamma[31]	1.01	1.01
gamma[32]	1.01	1.01
sigma_y	1.01	1.02
lp__	1.00	1.00

Table S29: Potential scale reduction factors ($\hat{R}$) for all parameters in the model for the Oregon Basin core area.

	Point est.	Upper C.I.
Beta[1]	1.00	1.00
Beta[2]	1.00	1.00
Beta[3]	1.00	1.01
Beta[4]	1.00	1.01
gamma[1]	1.00	1.00
gamma[2]	1.00	1.00
gamma[3]	1.00	1.00
gamma[4]	1.00	1.00
gamma[5]	1.00	1.00
gamma[6]	1.00	1.00
gamma[7]	1.00	1.00
gamma[8]	1.01	1.01
gamma[9]	1.00	1.00
gamma[10]	1.00	1.00
gamma[11]	1.00	1.00
gamma[12]	1.00	1.01
gamma[13]	1.00	1.00
gamma[14]	1.00	1.00
gamma[15]	1.00	1.01
gamma[16]	1.00	1.00
gamma[17]	1.00	1.00
gamma[18]	1.00	1.00
gamma[19]	1.00	1.00
gamma[20]	1.00	1.00
gamma[21]	1.00	1.00
gamma[22]	1.00	1.00
gamma[23]	1.00	1.00
gamma[24]	1.00	1.00
gamma[25]	1.00	1.01
gamma[26]	1.00	1.00
gamma[27]	1.00	1.01
gamma[28]	1.00	1.00
gamma[29]	1.00	1.00
gamma[30]	1.00	1.00
gamma[31]	1.00	1.01
gamma[32]	1.00	1.01
sigma_y	1.01	1.03
lp__	1.00	1.01

Table S30: Potential scale reduction factors ($\hat{R}$) for all parameters in the model for the Powder core area.

	Point est.	Upper C.I.
Beta[1]	1.01	1.01
Beta[2]	1.01	1.02
Beta[3]	1.01	1.05
Beta[4]	1.00	1.00
gamma[1]	1.00	1.02
gamma[2]	1.01	1.04
gamma[3]	1.00	1.01
gamma[4]	1.02	1.05
gamma[5]	1.01	1.05
gamma[6]	1.01	1.02
gamma[7]	1.01	1.02
gamma[8]	1.00	1.01
gamma[9]	1.01	1.03
gamma[10]	1.01	1.03
gamma[11]	1.01	1.04
gamma[12]	1.01	1.03
gamma[13]	1.01	1.02
gamma[14]	1.01	1.02
gamma[15]	1.01	1.04
gamma[16]	1.01	1.03
gamma[17]	1.01	1.02
gamma[18]	1.02	1.05
gamma[19]	1.00	1.01
gamma[20]	1.01	1.03
gamma[21]	1.00	1.00
gamma[22]	1.01	1.03
gamma[23]	1.01	1.02
gamma[24]	1.00	1.02
gamma[25]	1.01	1.04
gamma[26]	1.01	1.02
gamma[27]	1.01	1.04
gamma[28]	1.01	1.03
gamma[29]	1.00	1.00
gamma[30]	1.01	1.03
gamma[31]	1.01	1.03
gamma[32]	1.00	1.02
sigma_y	1.00	1.01
lp__	1.00	1.00

Table S31: Potential scale reduction factors ($\hat{R}$) for all parameters in the model for the Sage core area.

	Point est.	Upper C.I.
Beta[1]	1.01	1.03
Beta[2]	1.01	1.02
Beta[3]	1.01	1.02
Beta[4]	1.01	1.02
gamma[1]	1.00	1.01
gamma[2]	1.00	1.01
gamma[3]	1.00	1.00
gamma[4]	1.00	1.01
gamma[5]	1.00	1.00
gamma[6]	1.00	1.01
gamma[7]	1.00	1.00
gamma[8]	1.00	1.01
gamma[9]	1.00	1.00
gamma[10]	1.00	1.01
gamma[11]	1.00	1.00
gamma[12]	1.00	1.01
gamma[13]	1.00	1.00
gamma[14]	1.00	1.01
gamma[15]	1.00	1.00
gamma[16]	1.00	1.00
gamma[17]	1.00	1.00
gamma[18]	1.00	1.00
gamma[19]	1.00	1.00
gamma[20]	1.00	1.00
gamma[21]	1.00	1.01
gamma[22]	1.00	1.00
gamma[23]	1.00	1.00
gamma[24]	1.01	1.02
gamma[25]	1.00	1.00
gamma[26]	1.00	1.00
gamma[27]	1.00	1.00
gamma[28]	1.00	1.00
gamma[29]	1.00	1.01
gamma[30]	1.00	1.01
gamma[31]	1.00	1.01
gamma[32]	1.00	1.00
sigma_y	1.05	1.18
lp__	1.00	1.01

Table S32: Potential scale reduction factors ($\hat{R}$) for all parameters in the model for the Salt Wells core area.

	Point est.	Upper C.I.
Beta[1]	1.00	1.01
Beta[2]	1.00	1.01
Beta[3]	1.00	1.00
Beta[4]	1.01	1.01
gamma[1]	1.00	1.00
gamma[2]	1.00	1.00
gamma[3]	1.00	1.00
gamma[4]	1.00	1.00
gamma[5]	1.00	1.00
gamma[6]	1.00	1.01
gamma[7]	1.00	1.00
gamma[8]	1.00	1.00
gamma[9]	1.00	1.00
gamma[10]	1.00	1.00
gamma[11]	1.00	1.00
gamma[12]	1.00	1.00
gamma[13]	1.00	1.00
gamma[14]	1.00	1.00
gamma[15]	1.00	1.00
gamma[16]	1.00	1.00
gamma[17]	1.00	1.00
gamma[18]	1.00	1.00
gamma[19]	1.00	1.01
gamma[20]	1.00	1.00
gamma[21]	1.00	1.00
gamma[22]	1.01	1.01
gamma[23]	1.00	1.00
gamma[24]	1.00	1.00
gamma[25]	1.00	1.00
gamma[26]	1.00	1.00
gamma[27]	1.00	1.00
gamma[28]	1.00	1.01
gamma[29]	1.00	1.00
gamma[30]	1.00	1.00
gamma[31]	1.00	1.00
gamma[32]	1.00	1.00
sigma_y	1.02	1.05
lp__	1.00	1.01

Table S33: Potential scale reduction factors ($\hat{R}$) for all parameters in the model for the Seedskadee core area.

	Point est.	Upper C.I.
Beta[1]	1.01	1.01
Beta[2]	1.01	1.01
Beta[3]	1.02	1.07
Beta[4]	1.00	1.00
gamma[1]	1.02	1.08
gamma[2]	1.02	1.06
gamma[3]	1.02	1.06
gamma[4]	1.02	1.06
gamma[5]	1.01	1.05
gamma[6]	1.01	1.02
gamma[7]	1.02	1.06
gamma[8]	1.01	1.03
gamma[9]	1.01	1.04
gamma[10]	1.02	1.07
gamma[11]	1.02	1.06
gamma[12]	1.01	1.05
gamma[13]	1.01	1.04
gamma[14]	1.02	1.06
gamma[15]	1.01	1.04
gamma[16]	1.02	1.06
gamma[17]	1.01	1.05
gamma[18]	1.02	1.07
gamma[19]	1.01	1.02
gamma[20]	1.01	1.02
gamma[21]	1.01	1.03
gamma[22]	1.02	1.07
gamma[23]	1.01	1.04
gamma[24]	1.02	1.07
gamma[25]	1.01	1.05
gamma[26]	1.01	1.03
gamma[27]	1.02	1.06
gamma[28]	1.01	1.05
gamma[29]	1.01	1.03
gamma[30]	1.02	1.07
gamma[31]	1.02	1.07
gamma[32]	1.01	1.03
sigma_y	1.00	1.00
lp__	1.00	1.00

Table S34: Potential scale reduction factors ($\hat{R}$) for all parameters in the model for the Shell core area.

	Point est.	Upper C.I.
Beta[1]	1.00	1.00
Beta[2]	1.00	1.00
Beta[3]	1.02	1.07
Beta[4]	1.02	1.07
gamma[1]	1.00	1.02
gamma[2]	1.00	1.01
gamma[3]	1.02	1.05
gamma[4]	1.00	1.00
gamma[5]	1.01	1.02
gamma[6]	1.00	1.00
gamma[7]	1.00	1.00
gamma[8]	1.01	1.05
gamma[9]	1.01	1.02
gamma[10]	1.01	1.01
gamma[11]	1.00	1.00
gamma[12]	1.00	1.02
gamma[13]	1.01	1.03
gamma[14]	1.00	1.02
gamma[15]	1.00	1.00
gamma[16]	1.00	1.01
gamma[17]	1.01	1.02
gamma[18]	1.01	1.04
gamma[19]	1.00	1.00
gamma[20]	1.01	1.02
gamma[21]	1.01	1.02
gamma[22]	1.01	1.02
gamma[23]	1.01	1.05
gamma[24]	1.00	1.00
gamma[25]	1.00	1.00
gamma[26]	1.00	1.00
gamma[27]	1.01	1.02
gamma[28]	1.01	1.03
gamma[29]	1.01	1.01
gamma[30]	1.00	1.00
gamma[31]	1.00	1.01
gamma[32]	1.01	1.01
sigma_y	1.01	1.03
lp__	1.00	1.01

Table S35: Potential scale reduction factors ($\hat{R}$) for all parameters in the model for the South Rawlins core area.

	Point est.	Upper C.I.
Beta[1]	1.00	1.00
Beta[2]	1.00	1.00
Beta[3]	1.00	1.01
Beta[4]	1.00	1.01
gamma[1]	1.00	1.00
gamma[2]	1.00	1.00
gamma[3]	1.00	1.01
gamma[4]	1.00	1.00
gamma[5]	1.00	1.00
gamma[6]	1.00	1.00
gamma[7]	1.00	1.01
gamma[8]	1.00	1.00
gamma[9]	1.00	1.01
gamma[10]	1.00	1.00
gamma[11]	1.00	1.00
gamma[12]	1.00	1.00
gamma[13]	1.01	1.01
gamma[14]	1.00	1.00
gamma[15]	1.01	1.01
gamma[16]	1.01	1.01
gamma[17]	1.00	1.00
gamma[18]	1.00	1.01
gamma[19]	1.00	1.00
gamma[20]	1.00	1.00
gamma[21]	1.00	1.00
gamma[22]	1.00	1.00
gamma[23]	1.00	1.00
gamma[24]	1.00	1.01
gamma[25]	1.00	1.01
gamma[26]	1.00	1.00
gamma[27]	1.00	1.00
gamma[28]	1.00	1.00
gamma[29]	1.00	1.00
gamma[30]	1.00	1.00
gamma[31]	1.00	1.00
gamma[32]	1.00	1.00
sigma_y	1.01	1.03
lp__	1.00	1.00

Table S36: Potential scale reduction factors ($\hat{R}$) for all parameters in the model for the Thermopolis core area.

	Point est.	Upper C.I.
Beta[1]	1.00	1.00
Beta[2]	1.00	1.00
Beta[3]	1.01	1.03
Beta[4]	1.01	1.02
gamma[1]	1.00	1.01
gamma[2]	1.00	1.01
gamma[3]	1.00	1.00
gamma[4]	1.00	1.00
gamma[5]	1.00	1.01
gamma[6]	1.00	1.00
gamma[7]	1.00	1.02
gamma[8]	1.01	1.03
gamma[9]	1.00	1.00
gamma[10]	1.00	1.01
gamma[11]	1.00	1.00
gamma[12]	1.01	1.03
gamma[13]	1.00	1.01
gamma[14]	1.00	1.01
gamma[15]	1.00	1.00
gamma[16]	1.00	1.01
gamma[17]	1.00	1.01
gamma[18]	1.01	1.02
gamma[19]	1.00	1.00
gamma[20]	1.00	1.00
gamma[21]	1.00	1.01
gamma[22]	1.00	1.01
gamma[23]	1.01	1.01
gamma[24]	1.01	1.01
gamma[25]	1.00	1.01
gamma[26]	1.00	1.01
gamma[27]	1.01	1.02
gamma[28]	1.01	1.02
gamma[29]	1.01	1.02
gamma[30]	1.00	1.02
gamma[31]	1.00	1.01
gamma[32]	1.01	1.03
sigma_y	1.00	1.01
lp__	1.00	1.01

Table S37: Potential scale reduction factors ($\hat{R}$) for all parameters in the model for the Thunder Basin core area.

	Point est.	Upper C.I.
Beta[1]	1.00	1.01
Beta[2]	1.00	1.01
Beta[3]	1.01	1.02
Beta[4]	1.00	1.00
gamma[1]	1.00	1.00
gamma[2]	1.00	1.00
gamma[3]	1.00	1.01
gamma[4]	1.00	1.01
gamma[5]	1.00	1.01
gamma[6]	1.00	1.00
gamma[7]	1.00	1.00
gamma[8]	1.01	1.01
gamma[9]	1.00	1.01
gamma[10]	1.00	1.00
gamma[11]	1.00	1.00
gamma[12]	1.00	1.00
gamma[13]	1.00	1.00
gamma[14]	1.00	1.01
gamma[15]	1.00	1.00
gamma[16]	1.00	1.01
gamma[17]	1.00	1.01
gamma[18]	1.00	1.00
gamma[19]	1.00	1.01
gamma[20]	1.00	1.01
gamma[21]	1.00	1.00
gamma[22]	1.00	1.00
gamma[23]	1.00	1.00
gamma[24]	1.00	1.00
gamma[25]	1.00	1.01
gamma[26]	1.00	1.00
gamma[27]	1.00	1.01
gamma[28]	1.00	1.00
gamma[29]	1.00	1.00
gamma[30]	1.00	1.01
gamma[31]	1.00	1.00
gamma[32]	1.00	1.00
sigma_y	1.01	1.04
lp__	1.00	1.01

Table S38: Potential scale reduction factors ($\hat{R}$) for all parameters in the model for the Uinta core area.

	Point est.	Upper C.I.
Beta[1]	1.00	1.02
Beta[2]	1.01	1.02
Beta[3]	1.02	1.06
Beta[4]	1.01	1.04
gamma[1]	1.01	1.03
gamma[2]	1.01	1.02
gamma[3]	1.00	1.00
gamma[4]	1.00	1.00
gamma[5]	1.00	1.01
gamma[6]	1.00	1.01
gamma[7]	1.00	1.02
gamma[8]	1.00	1.01
gamma[9]	1.00	1.00
gamma[10]	1.01	1.01
gamma[11]	1.00	1.00
gamma[12]	1.00	1.02
gamma[13]	1.00	1.00
gamma[14]	1.00	1.01
gamma[15]	1.00	1.00
gamma[16]	1.00	1.01
gamma[17]	1.00	1.00
gamma[18]	1.01	1.02
gamma[19]	1.00	1.01
gamma[20]	1.00	1.00
gamma[21]	1.00	1.01
gamma[22]	1.00	1.01
gamma[23]	1.00	1.00
gamma[24]	1.01	1.03
gamma[25]	1.00	1.01
gamma[26]	1.00	1.00
gamma[27]	1.01	1.02
gamma[28]	1.00	1.00
gamma[29]	1.00	1.01
gamma[30]	1.01	1.03
gamma[31]	1.00	1.01
gamma[32]	1.00	1.01
sigma_y	1.00	1.02
lp__	1.01	1.02

Table S39: Potential scale reduction factors ($\hat{R}$) for all parameters in the model for the Washakie core area.

	Point est.	Upper C.I.
Beta[1]	1.00	1.00
Beta[2]	1.00	1.00
Beta[3]	1.02	1.05
Beta[4]	1.00	1.02
gamma[1]	1.00	1.01
gamma[2]	1.00	1.00
gamma[3]	1.00	1.01
gamma[4]	1.00	1.01
gamma[5]	1.00	1.01
gamma[6]	1.00	1.00
gamma[7]	1.00	1.01
gamma[8]	1.01	1.02
gamma[9]	1.01	1.03
gamma[10]	1.00	1.01
gamma[11]	1.00	1.00
gamma[12]	1.00	1.01
gamma[13]	1.01	1.01
gamma[14]	1.00	1.00
gamma[15]	1.00	1.01
gamma[16]	1.00	1.00
gamma[17]	1.00	1.02
gamma[18]	1.00	1.01
gamma[19]	1.01	1.04
gamma[20]	1.00	1.01
gamma[21]	1.00	1.00
gamma[22]	1.00	1.01
gamma[23]	1.00	1.00
gamma[24]	1.00	1.01
gamma[25]	1.00	1.00
gamma[26]	1.00	1.01
gamma[27]	1.00	1.02
gamma[28]	1.00	1.02
gamma[29]	1.00	1.00
gamma[30]	1.00	1.00
gamma[31]	1.00	1.00
gamma[32]	1.01	1.03
sigma_y	1.04	1.12
lp__	1.00	1.01

Bayesian P-values

Table S40: Bayesian P-values for each core area. P-values greater than 0.95 or less than 0.05 indicate lack of fit. See main text for description of the P-value calculations.

Core area	Spatial Bayesian P-value	Temporal Bayesian P-value
Bear River	0.71	0.73
Blacks Fork	0.30	0.64
Buffalo	0.42	0.75
Continental Divide	0.50	0.81
Crowheart	0.20	0.81
Daniel	0.34	0.71
Douglas	0.46	0.81
Elk Basin East	0.30	0.92
Elk Basin West	0.91	0.97
Fontenelle	0.30	0.72
Grass Creek	0.49	0.80
Greater South Pass 1	0.35	0.74
Greater South Pass 3	0.22	0.81
Greater South Pass 4	0.19	0.81
Greater South Pass 5	0.68	0.85
Hanna	0.10	0.83
Heart Mountain	0.06	0.66
Hyattville	0.19	0.57
Jackson	0.09	0.60
Little Mountain	0.13	0.27
Natrona 1	0.09	0.73
Natrona 2	0.22	0.90
Natrona 3	0.19	0.78
Newcastle	0.66	0.68
North Gillette	0.25	0.65
North Glenrock	0.55	0.62
North Laramie	0.73	0.76
Oregon Basin	0.12	0.71
Powder	0.04	0.05
Sage	0.00	0.54
Salt Wells	0.07	0.71
Seedskadee	0.02	0.26
Shell	0.06	0.79
South Rawlins	0.09	0.73
Thermopolis	0.59	0.65
Thunder Basin	0.19	0.69
Washakie	0.34	0.64
Greater South Pass 2	0.25	0.76
Uinta	0.02	0.49

Posterior distributions

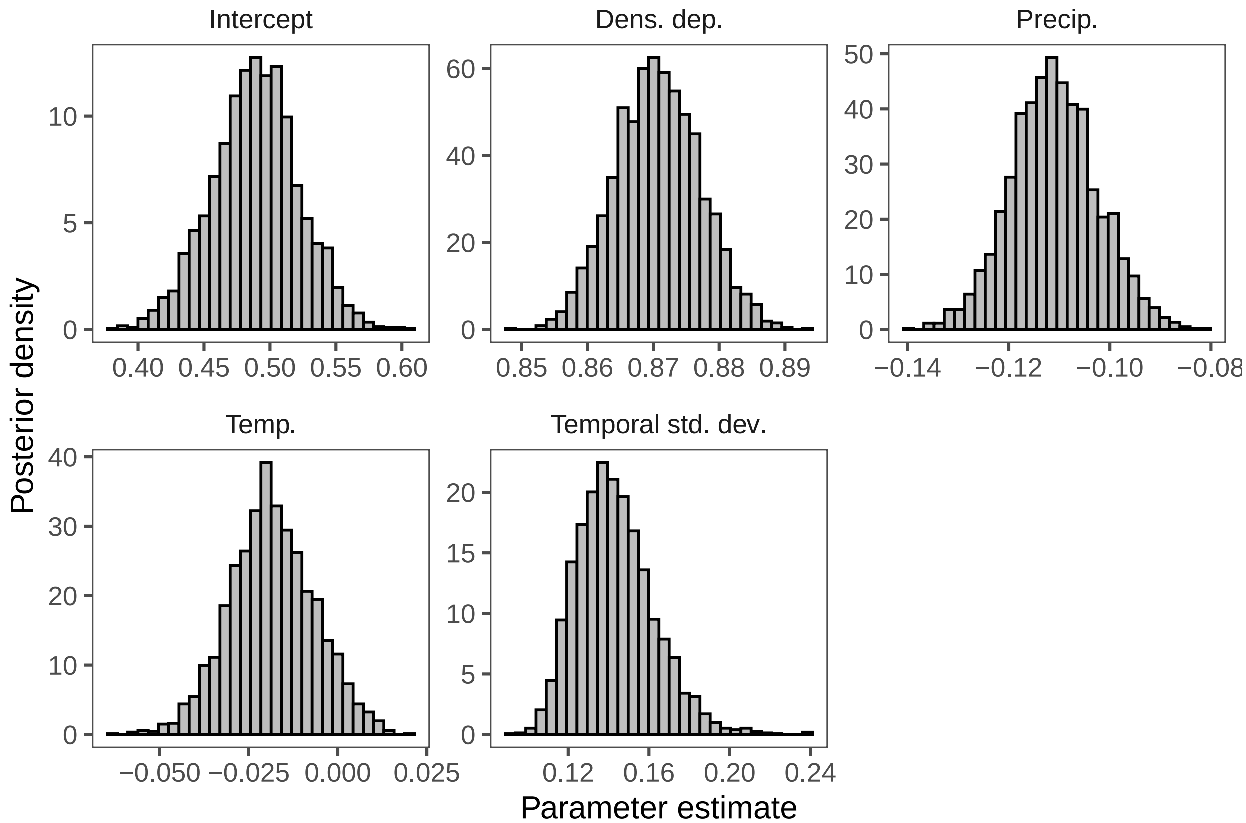

Figure S1: Posterior distributions of key parameters for the Bear River core area.

Table S41: Statistical summaries of posterior distributions of key parameters for the Bear River core area. SD = standard deviation; 2.5% and 97.5% quantiles bound the 95% Bayesian credible interval.

	Mean	Median	SD	2.5%	97.5%
Intercept, β_1	0.49	0.49	0.03	0.42	0.55
Density dependence, β_2	0.87	0.87	0.01	0.86	0.88
Precipitation effect, β_3	-0.11	-0.11	0.01	-0.13	-0.09
Temperature effect, β_4	-0.02	-0.02	0.01	-0.04	0.01
Std. dev. of temporal random effect, σ_y	0.14	0.14	0.02	0.11	0.18

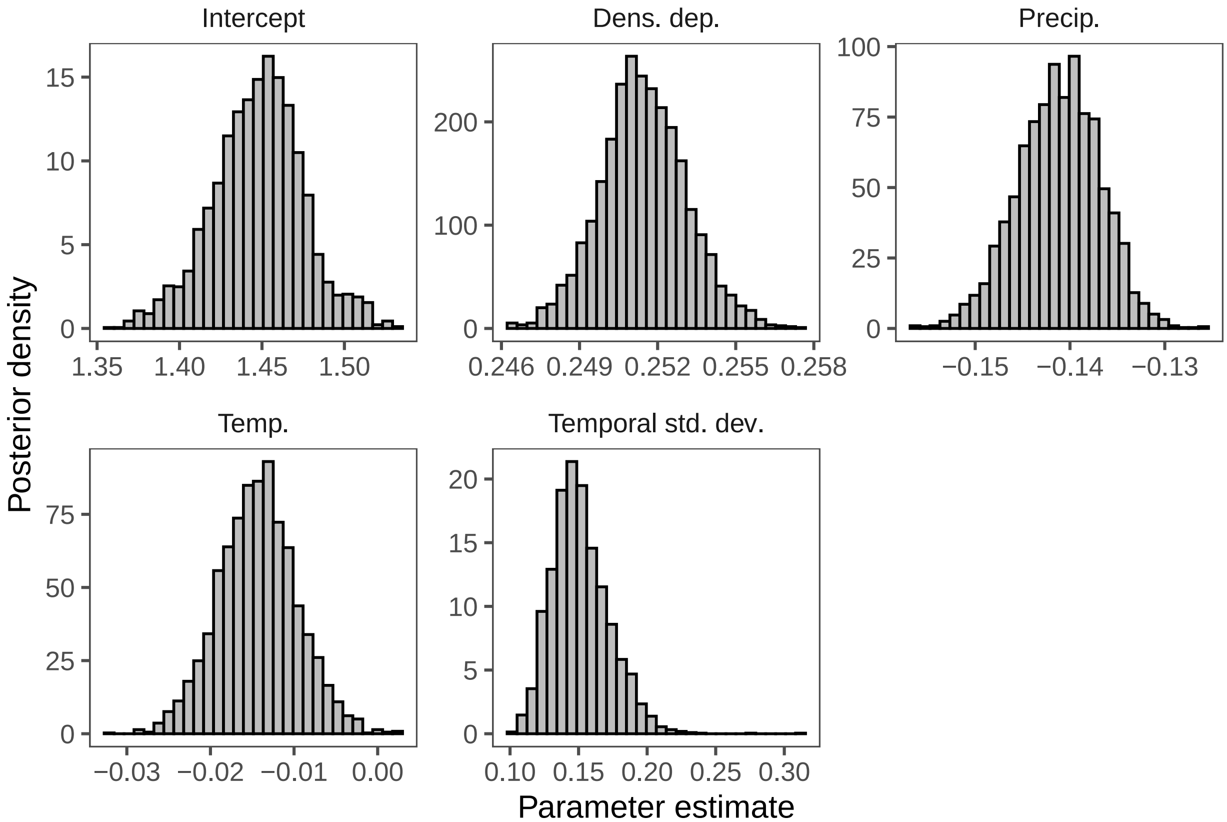

Figure S2: Posterior distributions of key parameters for the Blacks Fork core area.

Table S42: Statistical summaries of posterior distributions of key parameters for the Blacks Fork core area. SD = standard deviation; 2.5% and 97.5% quantiles bound the 95% Bayesian credible interval.

	Mean	Median	SD	2.5%	97.5%
Intercept, β_1	1.45	1.45	0.03	1.39	1.51
Density dependence, β_2	0.25	0.25	0.00	0.25	0.25
Precipitation effect, β_3	-0.14	-0.14	0.00	-0.15	-0.13
Temperature effect, β_4	-0.01	-0.01	0.00	-0.02	0.00
Std. dev. of temporal random effect, σ_y	0.15	0.15	0.02	0.12	0.20

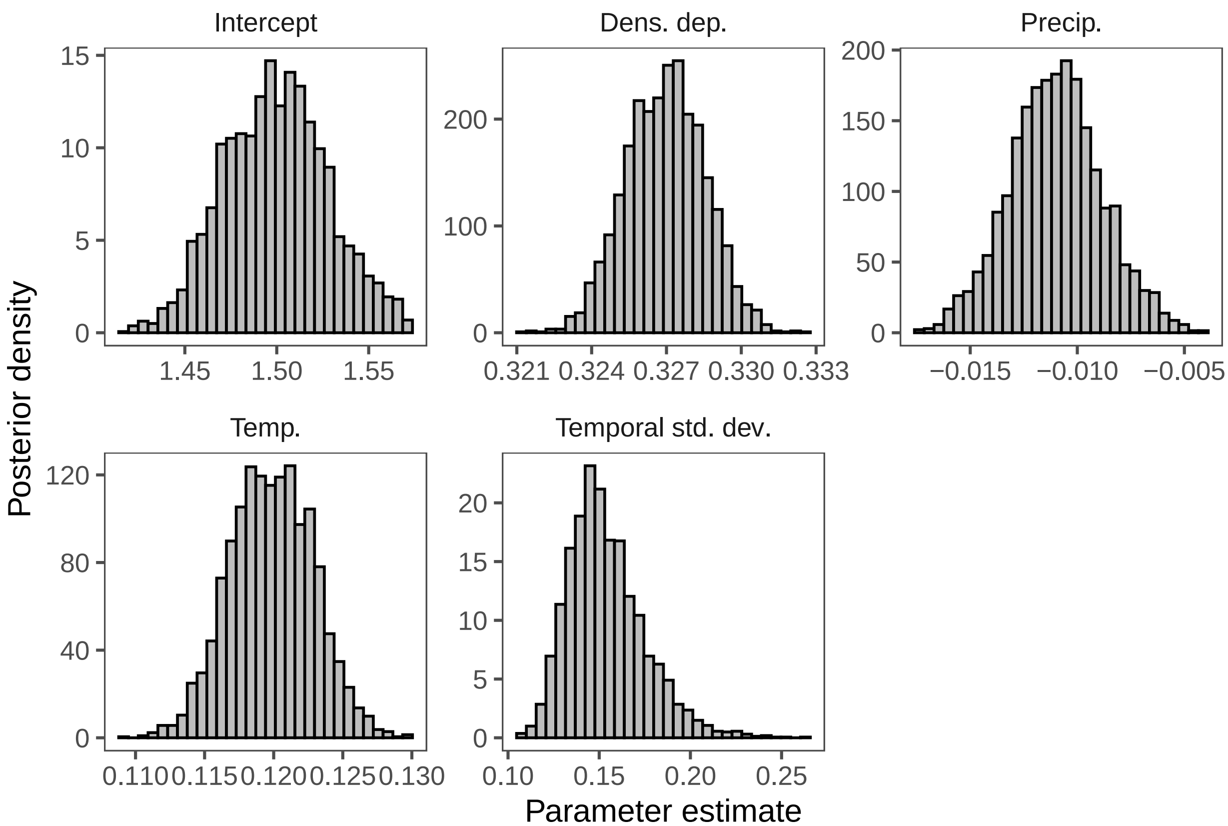

Figure S3: Posterior distributions of key parameters for the Buffalo core area.

Table S43: Statistical summaries of posterior distributions of key parameters for the Buffalo core area. SD = standard deviation; 2.5% and 97.5% quantiles bound the 95% Bayesian credible interval.

	Mean	Median	SD	2.5%	97.5%
Intercept, β_1	1.50	1.50	0.03	1.45	1.56
Density dependence, β_2	0.33	0.33	0.00	0.32	0.33
Precipitation effect, β_3	-0.01	-0.01	0.00	-0.02	-0.01
Temperature effect, β_4	0.12	0.12	0.00	0.11	0.13
Std. dev. of temporal random effect, σ_y	0.15	0.15	0.02	0.12	0.20

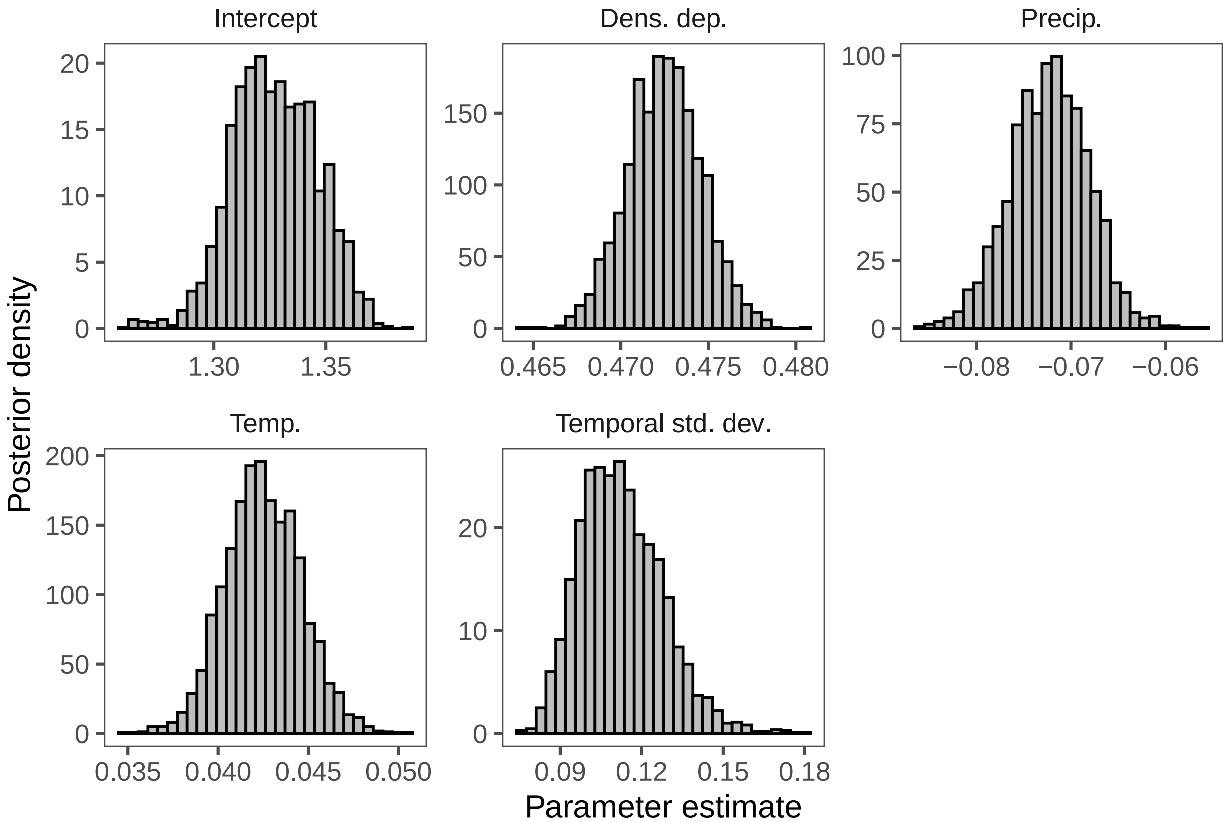

Figure S4: Posterior distributions of key parameters for the Continental Divide core area.

Table S44: Statistical summaries of posterior distributions of key parameters for the Continental Divide core area. SD = standard deviation; 2.5% and 97.5% quantiles bound the 95% Bayesian credible interval.

	Mean	Median	SD	2.5%	97.5%
Intercept, β_1	1.33	1.33	0.02	1.29	1.36
Density dependence, β_2	0.47	0.47	0.00	0.47	0.48
Precipitation effect, β_3	-0.07	-0.07	0.00	-0.08	-0.06
Temperature effect, β_4	0.04	0.04	0.00	0.04	0.05
Std. dev. of temporal random effect, σ_y	0.11	0.11	0.02	0.09	0.15

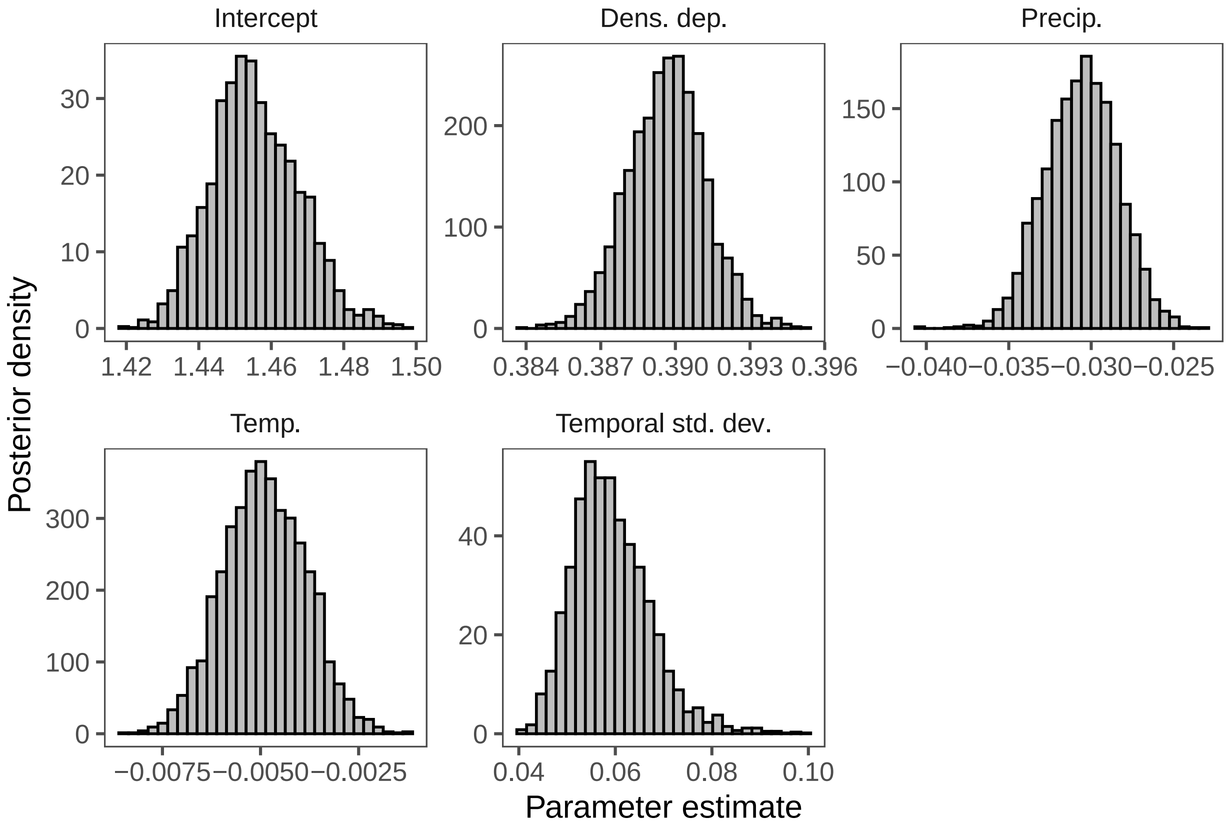

Figure S5: Posterior distributions of key parameters for the Crowheart core area.

Table S45: Statistical summaries of posterior distributions of key parameters for the Crowheart core area. SD = standard deviation; 2.5% and 97.5% quantiles bound the 95% Bayesian credible interval.

	Mean	Median	SD	2.5%	97.5%
Intercept, β_1	1.46	1.45	0.01	1.43	1.48
Density dependence, β_2	0.39	0.39	0.00	0.39	0.39
Precipitation effect, β_3	-0.03	-0.03	0.00	-0.03	-0.03
Temperature effect, β_4	0.00	0.00	0.00	-0.01	0.00
Std. dev. of temporal random effect, σ_y	0.06	0.06	0.01	0.05	0.08

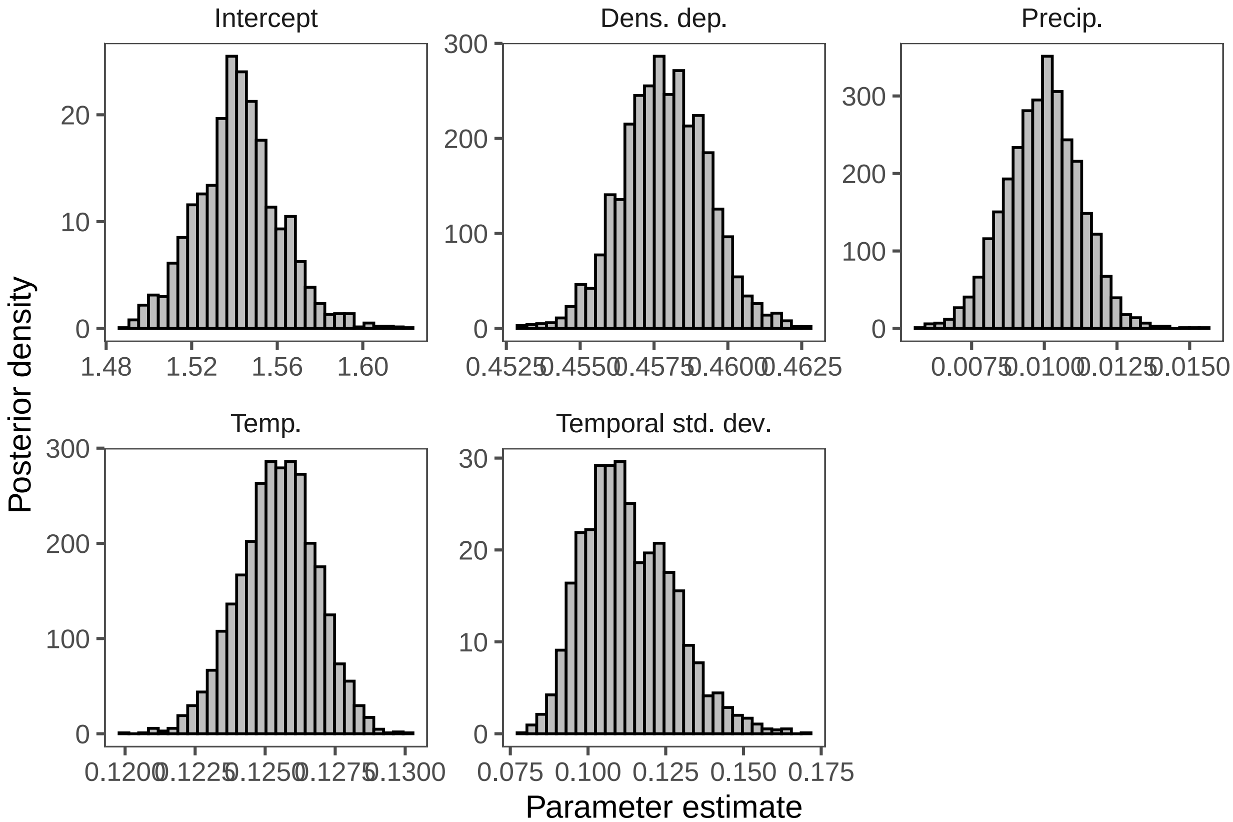

Figure S6: Posterior distributions of key parameters for the Daniel core area.

Table S46: Statistical summaries of posterior distributions of key parameters for the Daniel core area. SD = standard deviation; 2.5% and 97.5% quantiles bound the 95% Bayesian credible interval.

	Mean	Median	SD	2.5%	97.5%
Intercept, β_1	1.54	1.54	0.02	1.50	1.58
Density dependence, β_2	0.46	0.46	0.00	0.46	0.46
Precipitation effect, β_3	0.01	0.01	0.00	0.01	0.01
Temperature effect, β_4	0.13	0.13	0.00	0.12	0.13
Std. dev. of temporal random effect, σ_y	0.11	0.11	0.01	0.09	0.14

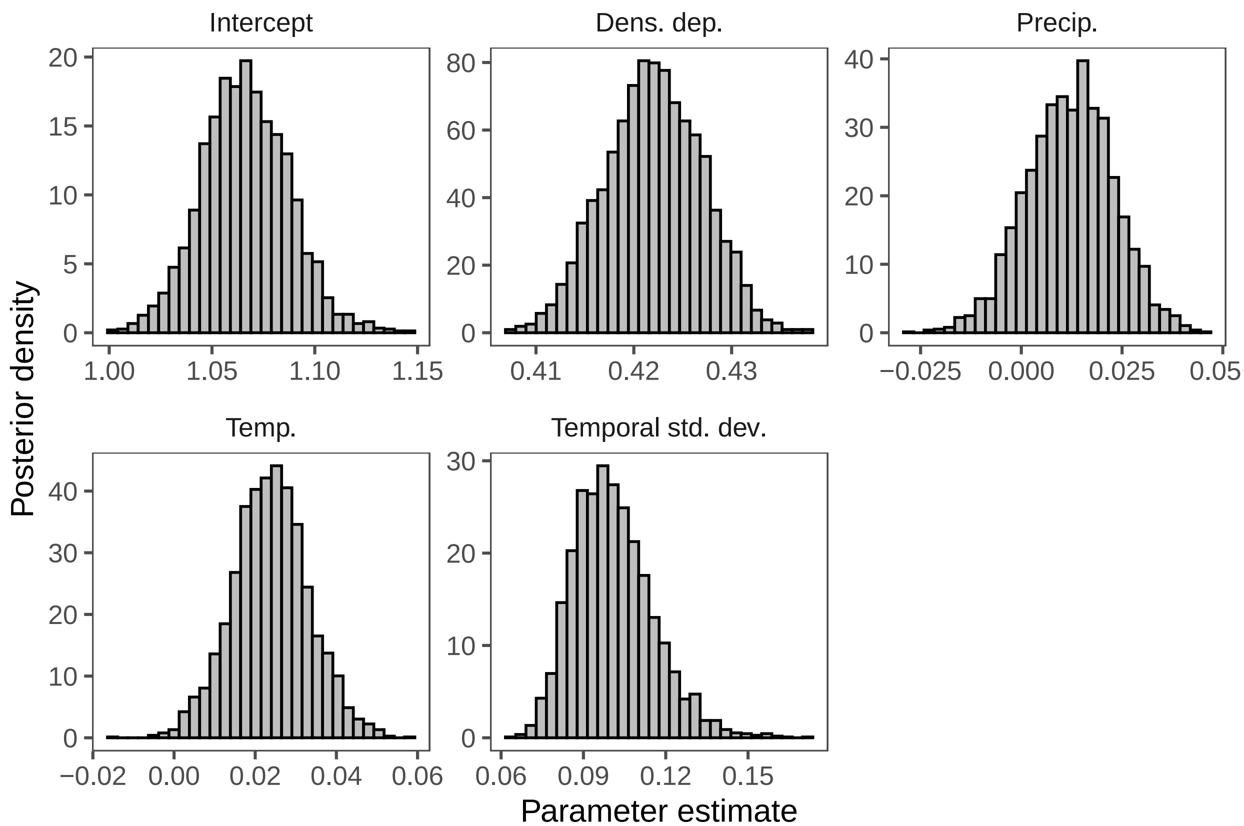

Figure S7: Posterior distributions of key parameters for the Douglas core area.

Table S47: Statistical summaries of posterior distributions of key parameters for the Douglas core area. SD = standard deviation; 2.5% and 97.5% quantiles bound the 95% Bayesian credible interval.

	Mean	Median	SD	2.5%	97.5%
Intercept, β_1	1.07	1.07	0.02	1.03	1.11
Density dependence, β_2	0.42	0.42	0.00	0.41	0.43
Precipitation effect, β_3	0.01	0.01	0.01	-0.01	0.03
Temperature effect, β_4	0.02	0.02	0.01	0.01	0.04
Std. dev. of temporal random effect, σ_y	0.10	0.10	0.01	0.08	0.13

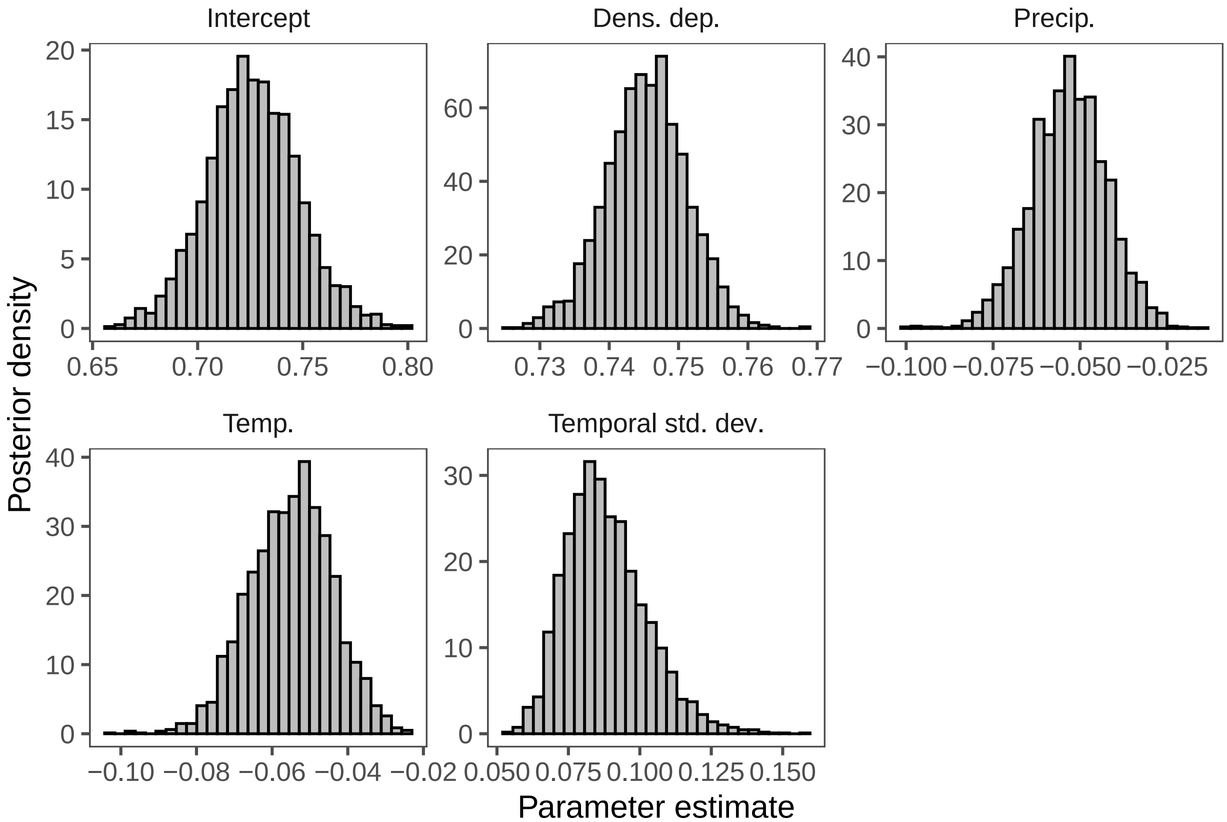

Figure S8: Posterior distributions of key parameters for the Elk Basin East core area.

Table S48: Statistical summaries of posterior distributions of key parameters for the Elk Basin East core area. SD = standard deviation; 2.5% and 97.5% quantiles bound the 95% Bayesian credible interval.

	Mean	Median	SD	2.5%	97.5%
Intercept, β_1	0.73	0.73	0.02	0.68	0.77
Density dependence, β_2	0.75	0.75	0.01	0.73	0.76
Precipitation effect, β_3	-0.05	-0.05	0.01	-0.08	-0.03
Temperature effect, β_4	-0.06	-0.05	0.01	-0.08	-0.03
Std. dev. of temporal random effect, σ_y	0.09	0.09	0.01	0.07	0.12

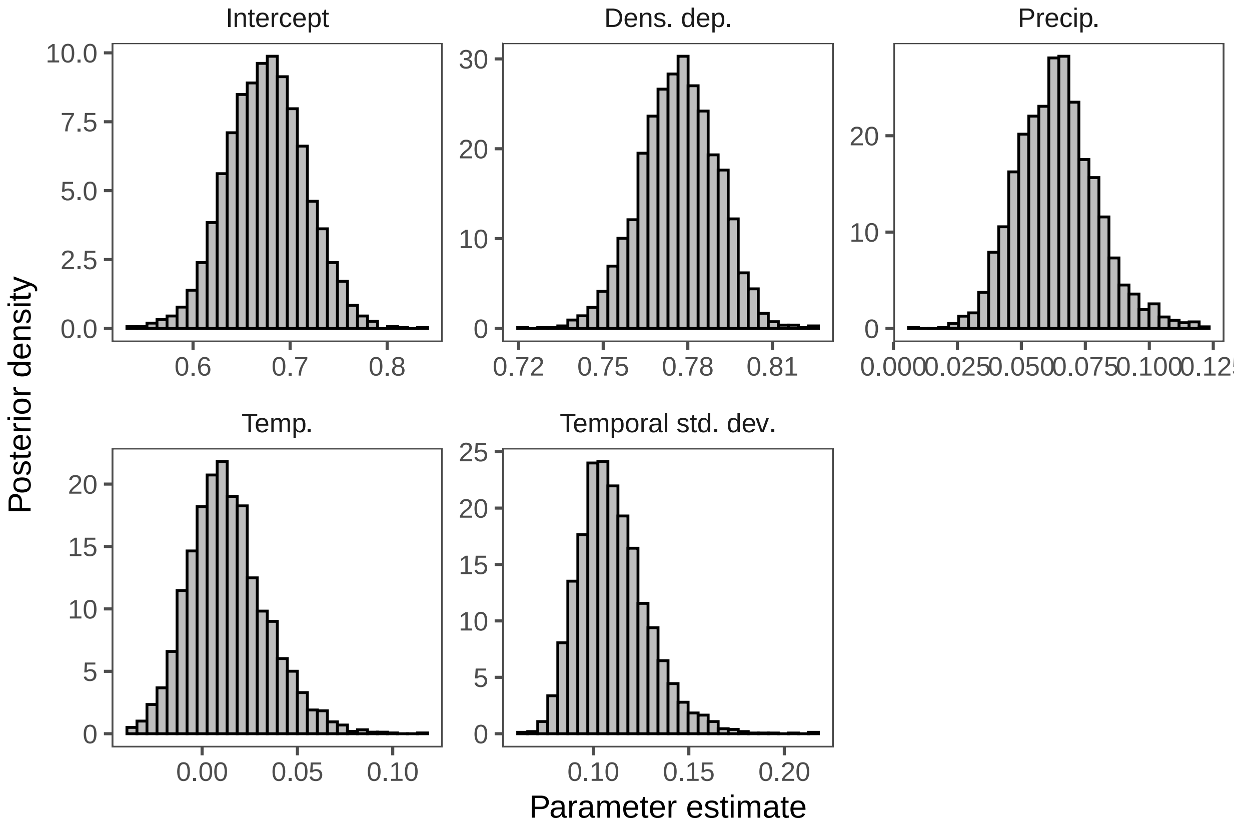

Figure S9: Posterior distributions of key parameters for the Elk Basin West core area.

Table S49: Statistical summaries of posterior distributions of key parameters for the Elk Basin West core area. SD = standard deviation; 2.5% and 97.5% quantiles bound the 95% Bayesian credible interval.

	Mean	Median	SD	2.5%	97.5%
Intercept, β_1	0.68	0.68	0.04	0.60	0.75
Density dependence, β_2	0.78	0.78	0.01	0.75	0.80
Precipitation effect, β_3	0.06	0.06	0.02	0.04	0.10
Temperature effect, β_4	0.01	0.01	0.02	-0.02	0.06
Std. dev. of temporal random effect, σ_y	0.11	0.11	0.02	0.08	0.15

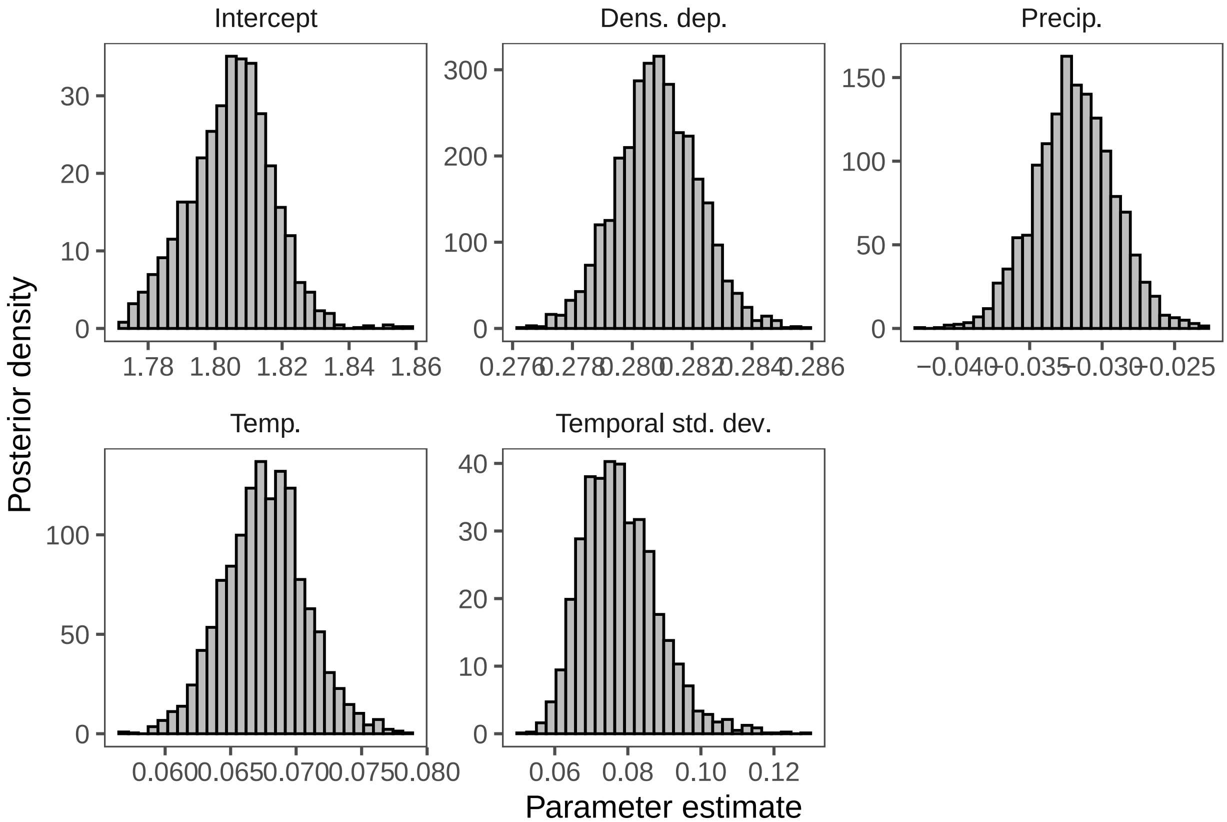

Figure S10: Posterior distributions of key parameters for the Fontenelle core area.

Table S50: Statistical summaries of posterior distributions of key parameters for the Fontenelle core area. SD = standard deviation; 2.5% and 97.5% quantiles bound the 95% Bayesian credible interval.

	Mean	Median	SD	2.5%	97.5%
Intercept, β_1	1.80	1.81	0.01	1.78	1.83
Density dependence, β_2	0.28	0.28	0.00	0.28	0.28
Precipitation effect, β_3	-0.03	-0.03	0.00	-0.04	-0.03
Temperature effect, β_4	0.07	0.07	0.00	0.06	0.07
Std. dev. of temporal random effect, σ_y	0.08	0.08	0.01	0.06	0.10

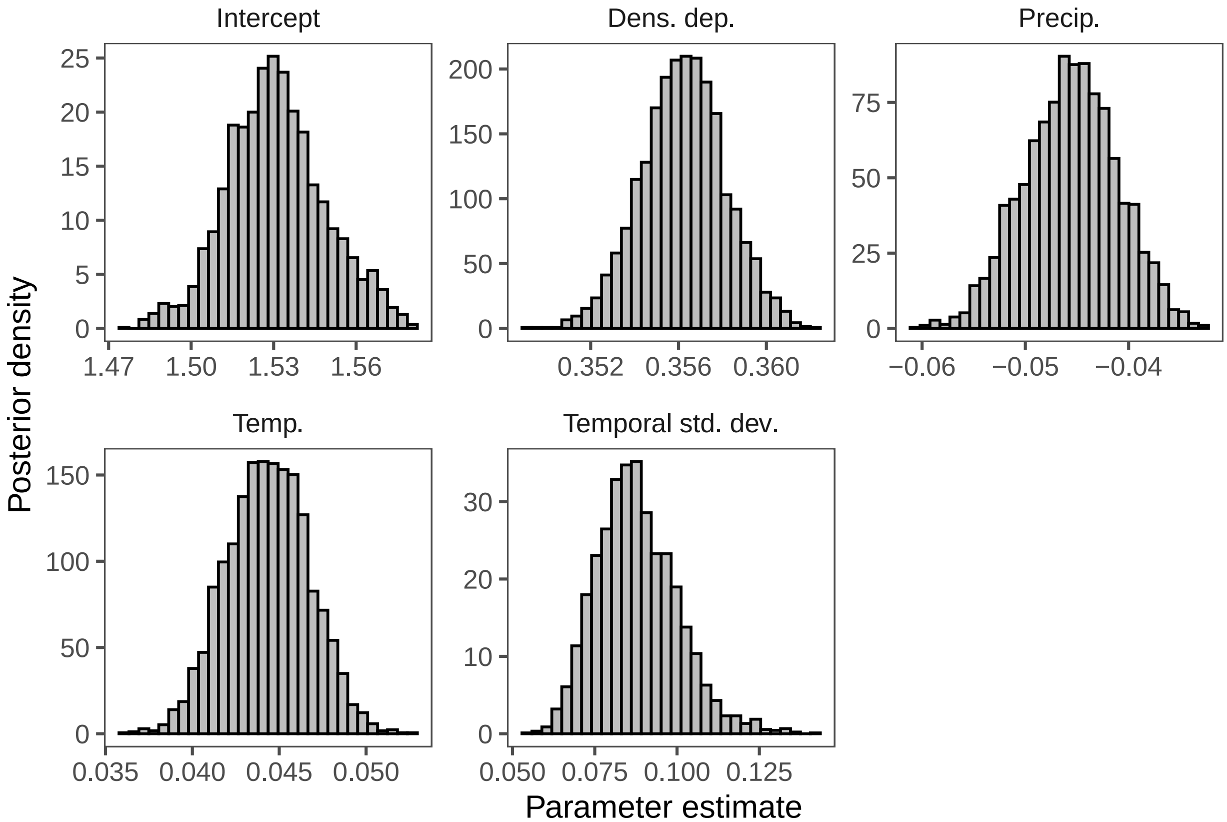

Figure S11: Posterior distributions of key parameters for the Grass Creek core area.

Table S51: Statistical summaries of posterior distributions of key parameters for the Grass Creek core area. SD = standard deviation; 2.5% and 97.5% quantiles bound the 95% Bayesian credible interval.

	Mean	Median	SD	2.5%	97.5%
Intercept, β_1	1.53	1.53	0.02	1.50	1.57
Density dependence, β_2	0.36	0.36	0.00	0.35	0.36
Precipitation effect, β_3	-0.05	-0.05	0.00	-0.05	-0.04
Temperature effect, β_4	0.04	0.04	0.00	0.04	0.05
Std. dev. of temporal random effect, σ_y	0.09	0.09	0.01	0.07	0.12

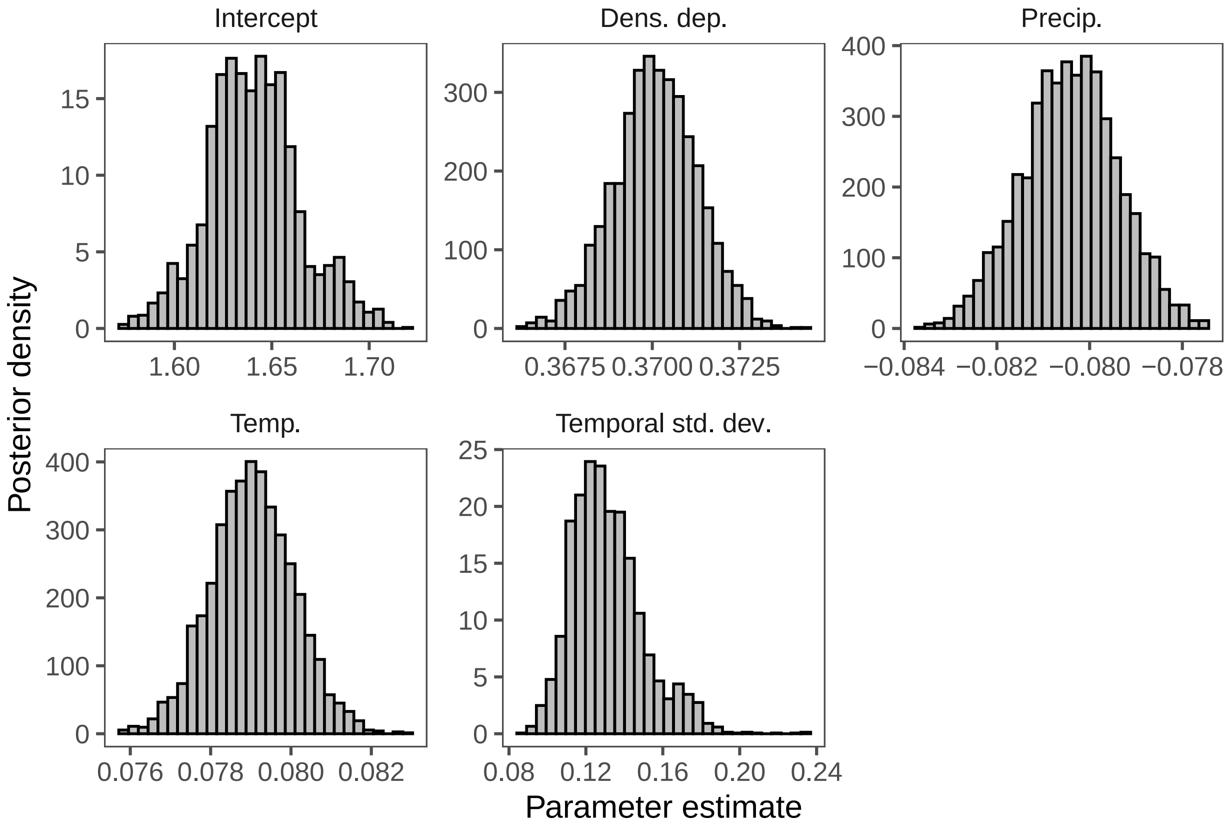

Figure S12: Posterior distributions of key parameters for the Greater South Pass 1 core area.

Table S52: Statistical summaries of posterior distributions of key parameters for the Greater South Pass 1 core area. SD = standard deviation; 2.5% and 97.5% quantiles bound the 95% Bayesian credible interval.

	Mean	Median	SD	2.5%	97.5%
Intercept, β_1	1.64	1.64	0.02	1.60	1.69
Density dependence, β_2	0.37	0.37	0.00	0.37	0.37
Precipitation effect, β_3	-0.08	-0.08	0.00	-0.08	-0.08
Temperature effect, β_4	0.08	0.08	0.00	0.08	0.08
Std. dev. of temporal random effect, σ_y	0.13	0.13	0.02	0.10	0.18

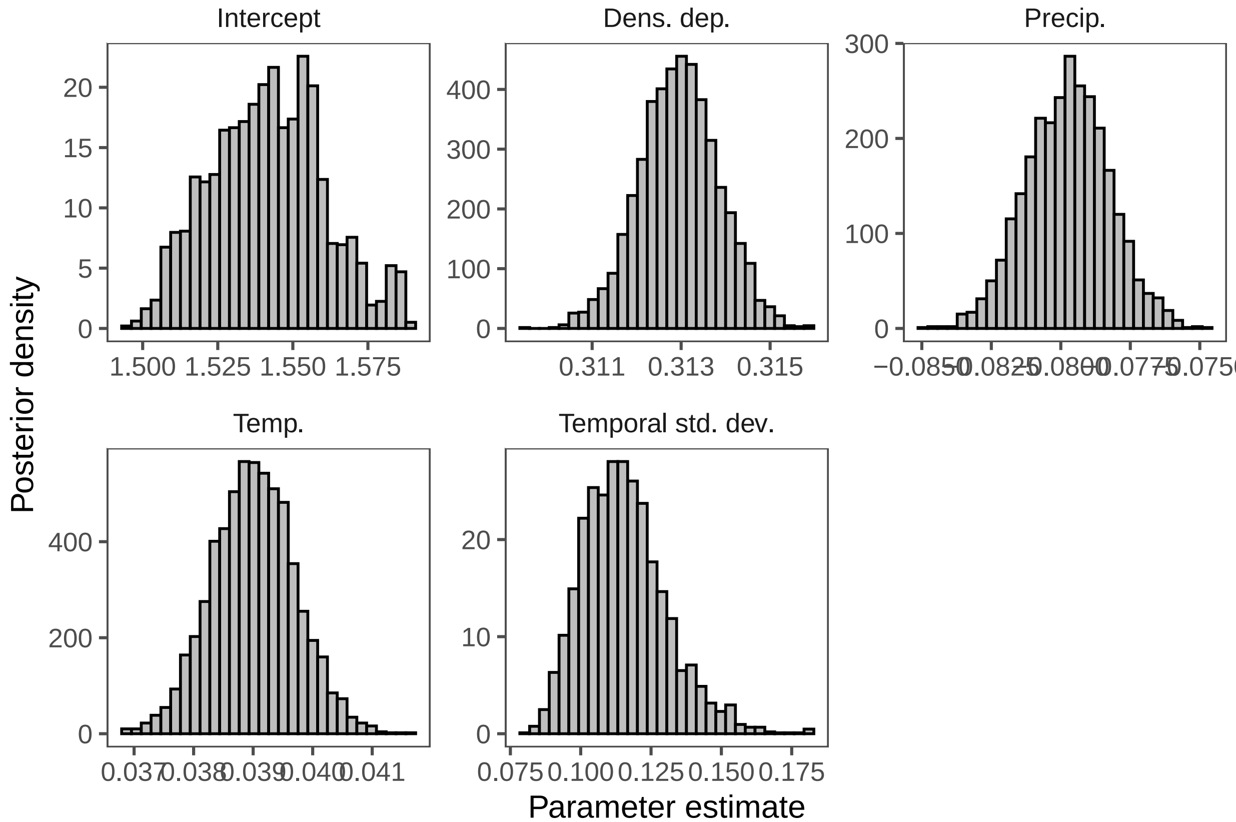

Figure S13: Posterior distributions of key parameters for the Greater South Pass 2 core area.

Table S53: Statistical summaries of posterior distributions of key parameters for the Greater South Pass 2 core area. SD = standard deviation; 2.5% and 97.5% quantiles bound the 95% Bayesian credible interval.

	Mean	Median	SD	2.5%	97.5%
Intercept, β_1	1.54	1.54	0.02	1.51	1.58
Density dependence, β_2	0.31	0.31	0.00	0.31	0.31
Precipitation effect, β_3	-0.08	-0.08	0.00	-0.08	-0.08
Temperature effect, β_4	0.04	0.04	0.00	0.04	0.04
Std. dev. of temporal random effect, σ_y	0.12	0.11	0.01	0.09	0.15

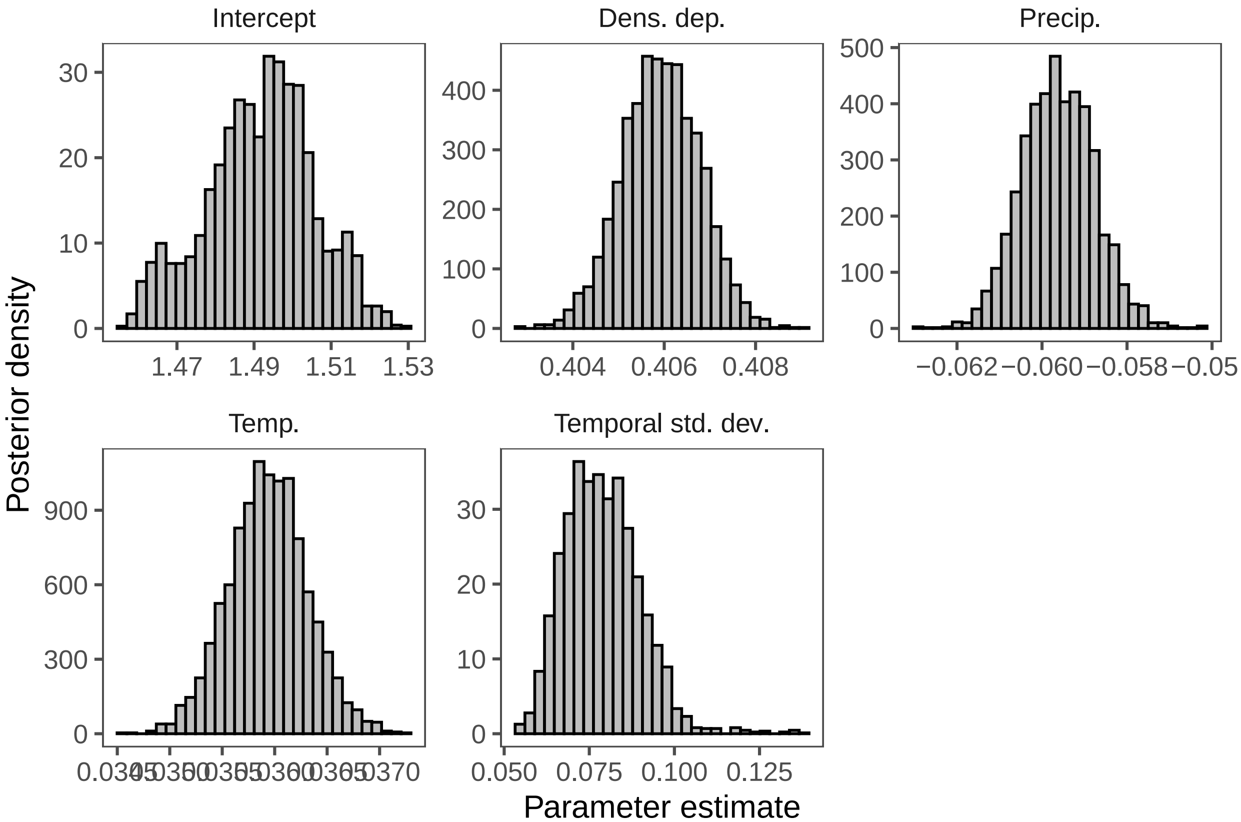

Figure S14: Posterior distributions of key parameters for the Greater South Pass 3 core area.

Table S54: Statistical summaries of posterior distributions of key parameters for the Greater South Pass 3 core area. SD = standard deviation; 2.5% and 97.5% quantiles bound the 95% Bayesian credible interval.

	Mean	Median	SD	2.5%	97.5%
Intercept, β_1	1.49	1.49	0.01	1.46	1.52
Density dependence, β_2	0.41	0.41	0.00	0.40	0.41
Precipitation effect, β_3	-0.06	-0.06	0.00	-0.06	-0.06
Temperature effect, β_4	0.04	0.04	0.00	0.04	0.04
Std. dev. of temporal random effect, σ_y	0.08	0.08	0.01	0.06	0.10

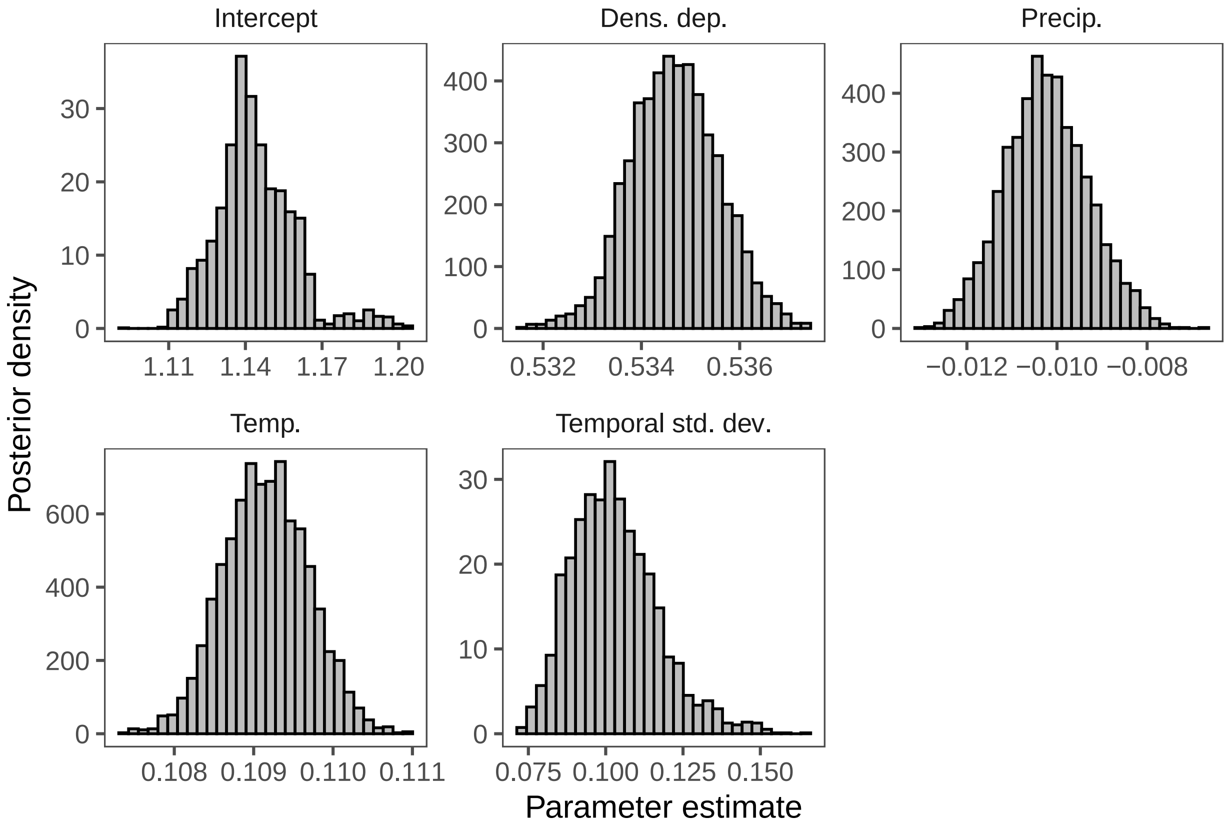

Figure S15: Posterior distributions of key parameters for the Greater South Pass 4 core area.

Table S55: Statistical summaries of posterior distributions of key parameters for the Greater South Pass 4 core area. SD = standard deviation; 2.5% and 97.5% quantiles bound the 95% Bayesian credible interval.

	Mean	Median	SD	2.5%	97.5%
Intercept, β_1	1.14	1.14	0.02	1.12	1.19
Density dependence, β_2	0.53	0.53	0.00	0.53	0.54
Precipitation effect, β_3	-0.01	-0.01	0.00	-0.01	-0.01
Temperature effect, β_4	0.11	0.11	0.00	0.11	0.11
Std. dev. of temporal random effect, σ_y	0.10	0.10	0.01	0.08	0.14

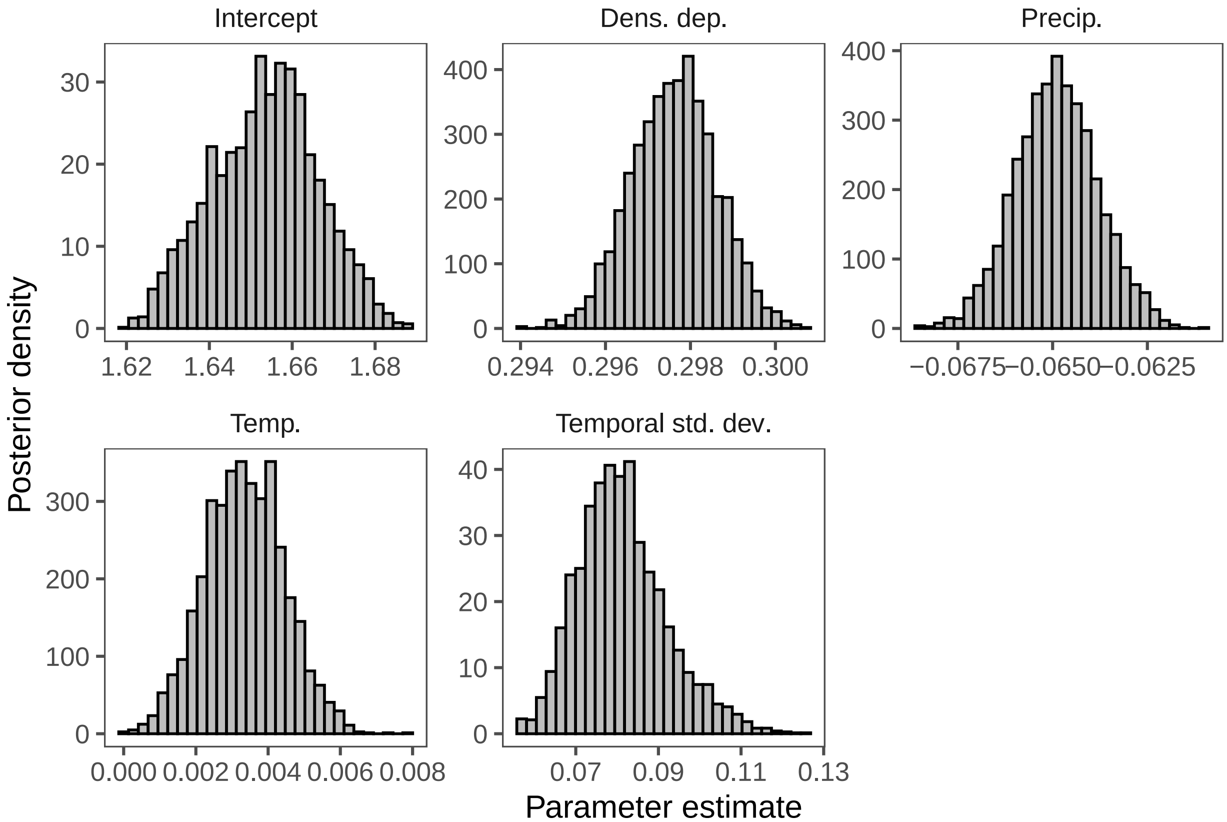

Figure S16: Posterior distributions of key parameters for the Greater South Pass 5 core area.

Table S56: Statistical summaries of posterior distributions of key parameters for the Greater South Pass 5 core area. SD = standard deviation; 2.5% and 97.5% quantiles bound the 95% Bayesian credible interval.

	Mean	Median	SD	2.5%	97.5%
Intercept, β_1	1.65	1.65	0.01	1.63	1.68
Density dependence, β_2	0.30	0.30	0.00	0.30	0.30
Precipitation effect, β_3	-0.06	-0.06	0.00	-0.07	-0.06
Temperature effect, β_4	0.00	0.00	0.00	0.00	0.01
Std. dev. of temporal random effect, σ_y	0.08	0.08	0.01	0.06	0.11

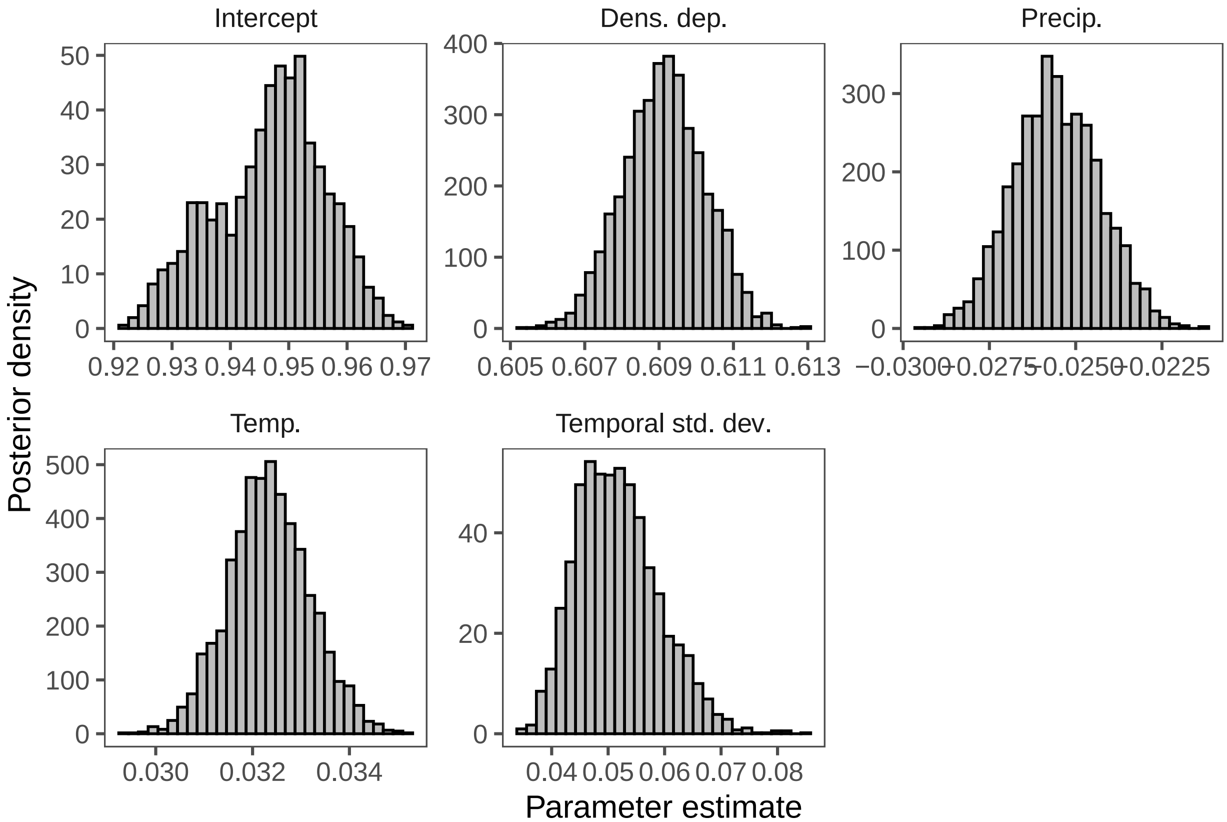

Figure S17: Posterior distributions of key parameters for the Hanna core area.

Table S57: Statistical summaries of posterior distributions of key parameters for the Hanna core area. SD = standard deviation; 2.5% and 97.5% quantiles bound the 95% Bayesian credible interval.

	Mean	Median	SD	2.5%	97.5%
Intercept, β_1	0.95	0.95	0.01	0.93	0.96
Density dependence, β_2	0.61	0.61	0.00	0.61	0.61
Precipitation effect, β_3	-0.03	-0.03	0.00	-0.03	-0.02
Temperature effect, β_4	0.03	0.03	0.00	0.03	0.03
Std. dev. of temporal random effect, σ_y	0.05	0.05	0.01	0.04	0.07

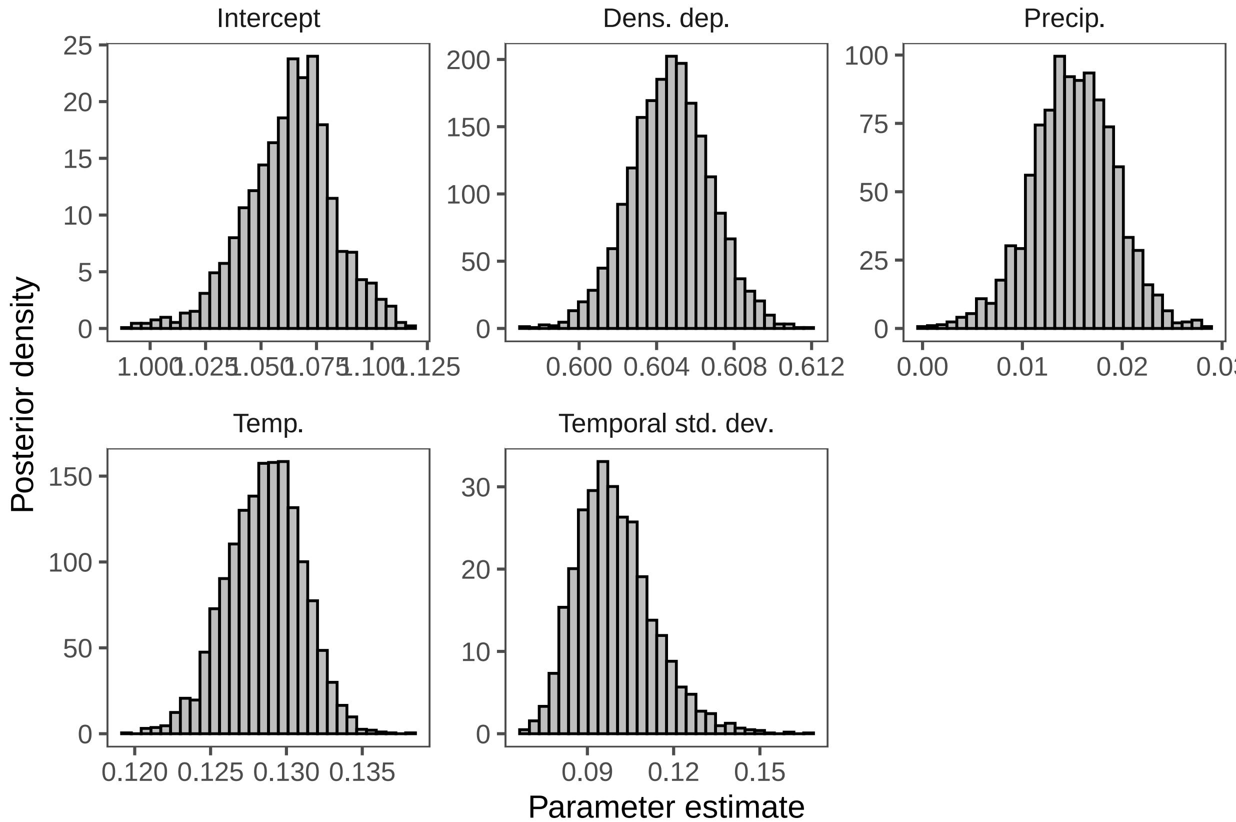

Figure S18: Posterior distributions of key parameters for the Heart Mountain core area.

Table S58: Statistical summaries of posterior distributions of key parameters for the Heart Mountain core area. SD = standard deviation; 2.5% and 97.5% quantiles bound the 95% Bayesian credible interval.

	Mean	Median	SD	2.5%	97.5%
Intercept, β_1	1.06	1.06	0.02	1.02	1.10
Density dependence, β_2	0.60	0.60	0.00	0.60	0.61
Precipitation effect, β_3	0.02	0.02	0.00	0.01	0.02
Temperature effect, β_4	0.13	0.13	0.00	0.12	0.13
Std. dev. of temporal random effect, σ_y	0.10	0.10	0.01	0.08	0.13

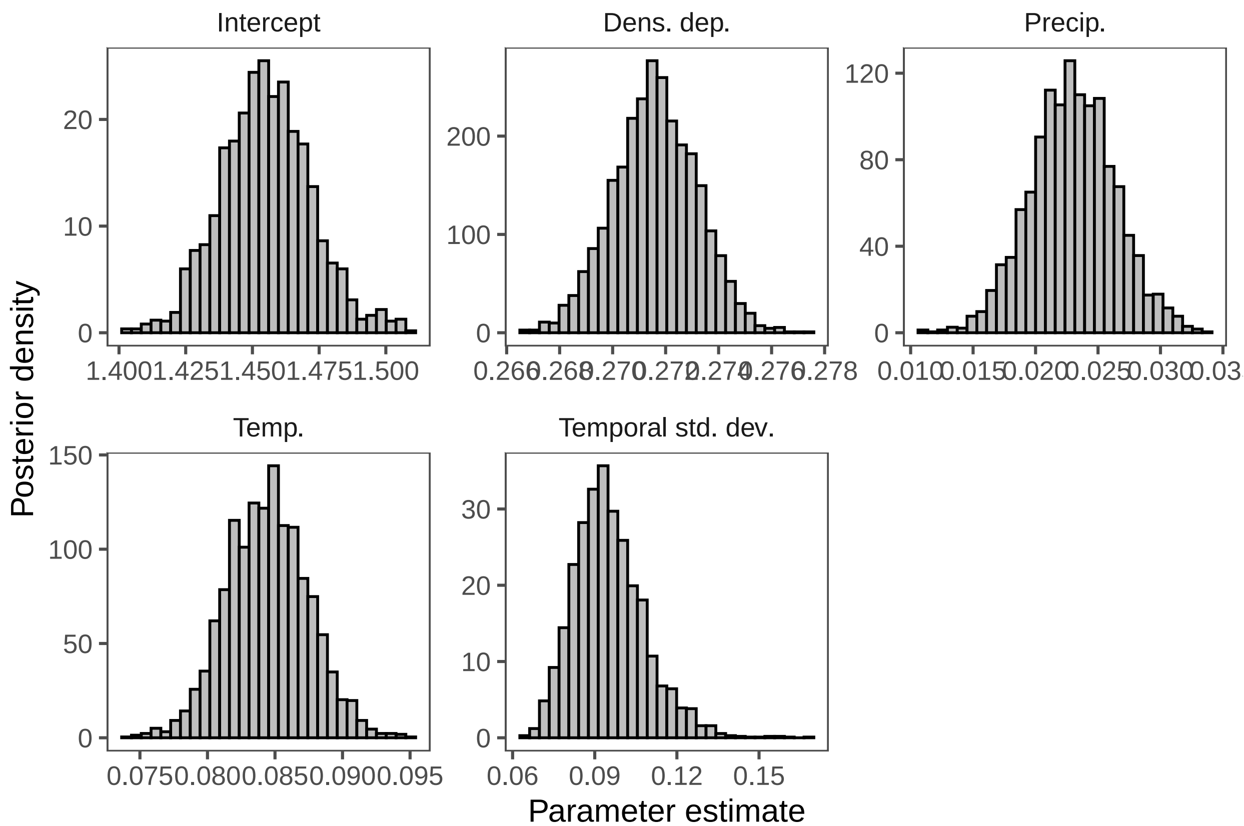

Figure S19: Posterior distributions of key parameters for the Hyattville core area.

Table S59: Statistical summaries of posterior distributions of key parameters for the Hyattville core area. SD = standard deviation; 2.5% and 97.5% quantiles bound the 95% Bayesian credible interval.

	Mean	Median	SD	2.5%	97.5%
Intercept, β_1	1.46	1.45	0.02	1.42	1.49
Density dependence, β_2	0.27	0.27	0.00	0.27	0.27
Precipitation effect, β_3	0.02	0.02	0.00	0.02	0.03
Temperature effect, β_4	0.08	0.08	0.00	0.08	0.09
Std. dev. of temporal random effect, σ_y	0.10	0.09	0.01	0.07	0.12

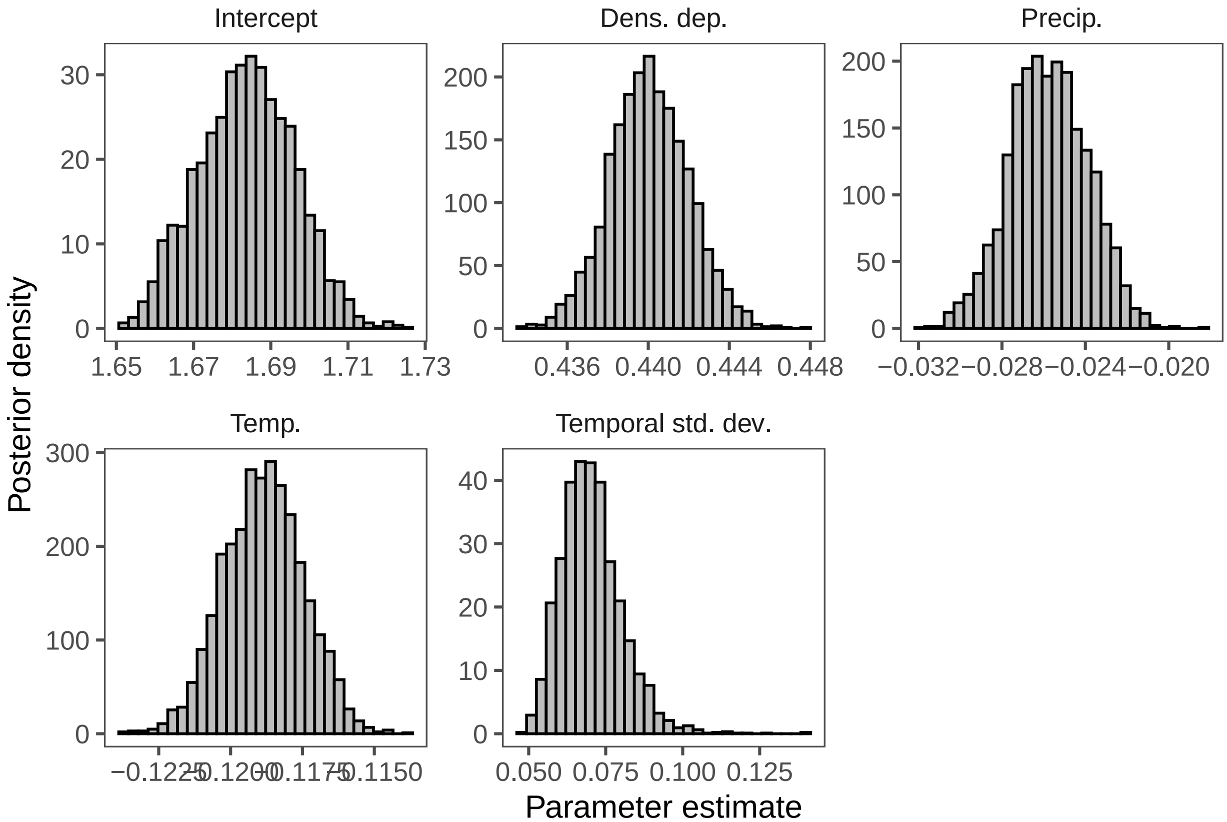

Figure S20: Posterior distributions of key parameters for the Jackson core area.

Table S60: Statistical summaries of posterior distributions of key parameters for the Jackson core area. SD = standard deviation; 2.5% and 97.5% quantiles bound the 95% Bayesian credible interval.

	Mean	Median	SD	2.5%	97.5%
Intercept, β_1	1.68	1.68	0.01	1.66	1.71
Density dependence, β_2	0.44	0.44	0.00	0.44	0.44
Precipitation effect, β_3	-0.03	-0.03	0.00	-0.03	-0.02
Temperature effect, β_4	-0.12	-0.12	0.00	-0.12	-0.12
Std. dev. of temporal random effect, σ_y	0.07	0.07	0.01	0.05	0.09

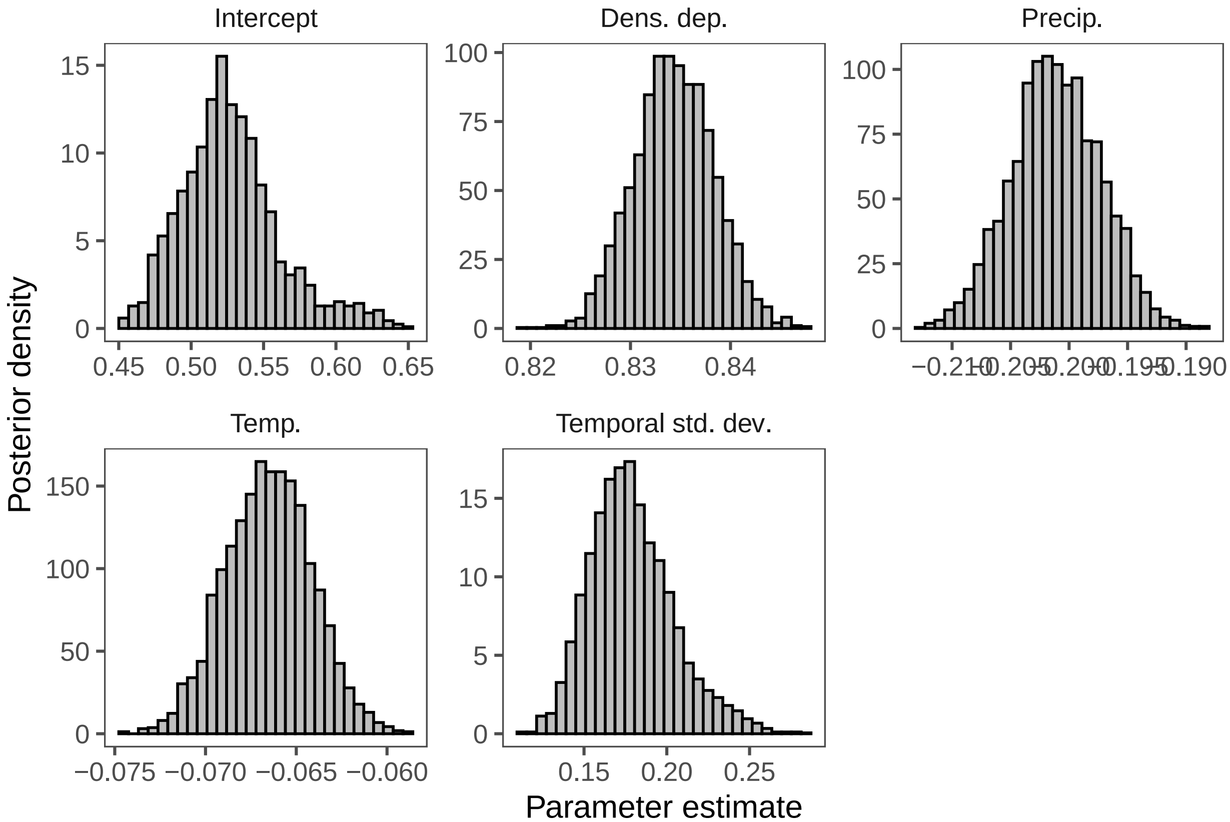

Figure S21: Posterior distributions of key parameters for the Little Mountain core area.

Table S61: Statistical summaries of posterior distributions of key parameters for the Little Mountain core area. SD = standard deviation; 2.5% and 97.5% quantiles bound the 95% Bayesian credible interval.

	Mean	Median	SD	2.5%	97.5%
Intercept, β_1	0.53	0.52	0.03	0.47	0.61
Density dependence, β_2	0.83	0.83	0.00	0.83	0.84
Precipitation effect, β_3	-0.20	-0.20	0.00	-0.21	-0.19
Temperature effect, β_4	-0.07	-0.07	0.00	-0.07	-0.06
Std. dev. of temporal random effect, σ_y	0.18	0.18	0.03	0.14	0.24

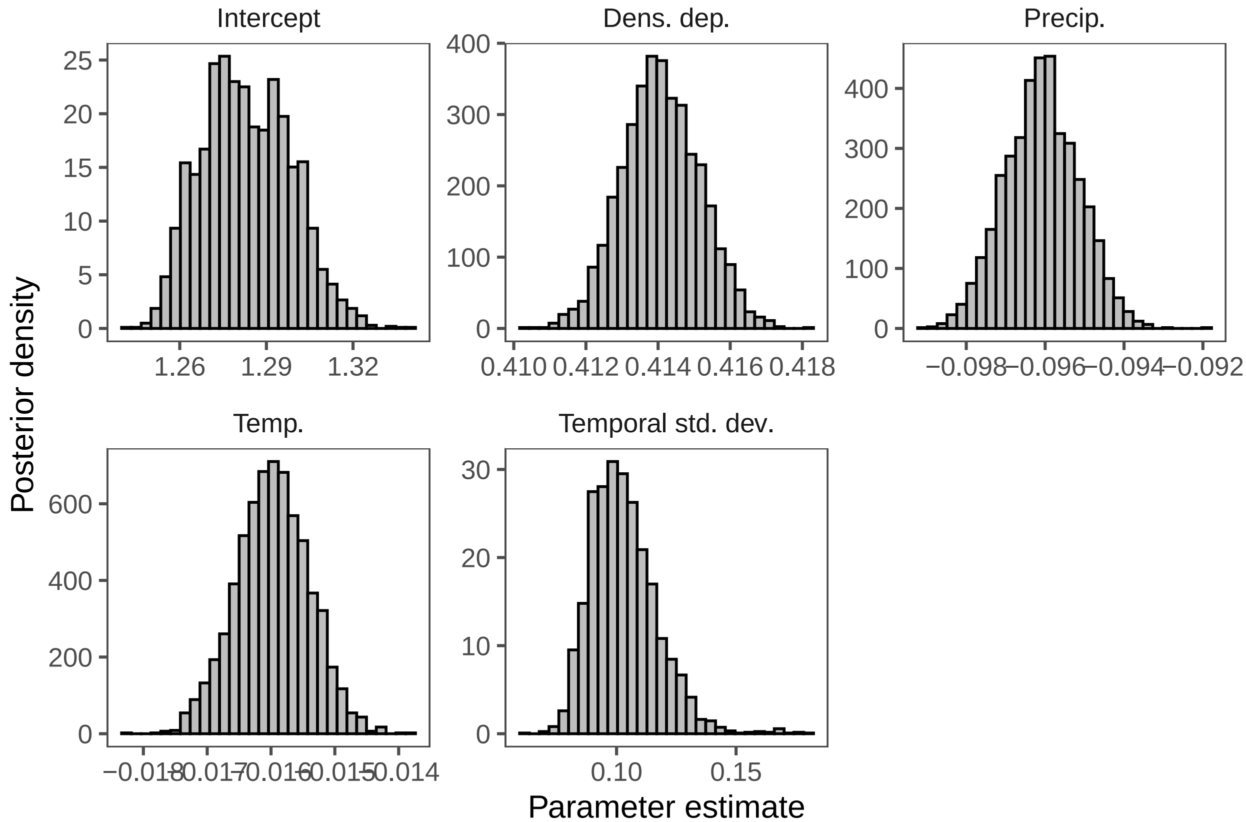

Figure S22: Posterior distributions of key parameters for the Natrona 1 core area.

Table S62: Statistical summaries of posterior distributions of key parameters for the Natrona 1 core area. SD = standard deviation; 2.5% and 97.5% quantiles bound the 95% Bayesian credible interval.

	Mean	Median	SD	2.5%	97.5%
Intercept, β_1	1.28	1.28	0.02	1.26	1.31
Density dependence, β_2	0.41	0.41	0.00	0.41	0.42
Precipitation effect, β_3	-0.10	-0.10	0.00	-0.10	-0.09
Temperature effect, β_4	-0.02	-0.02	0.00	-0.02	-0.01
Std. dev. of temporal random effect, σ_y	0.10	0.10	0.01	0.08	0.13

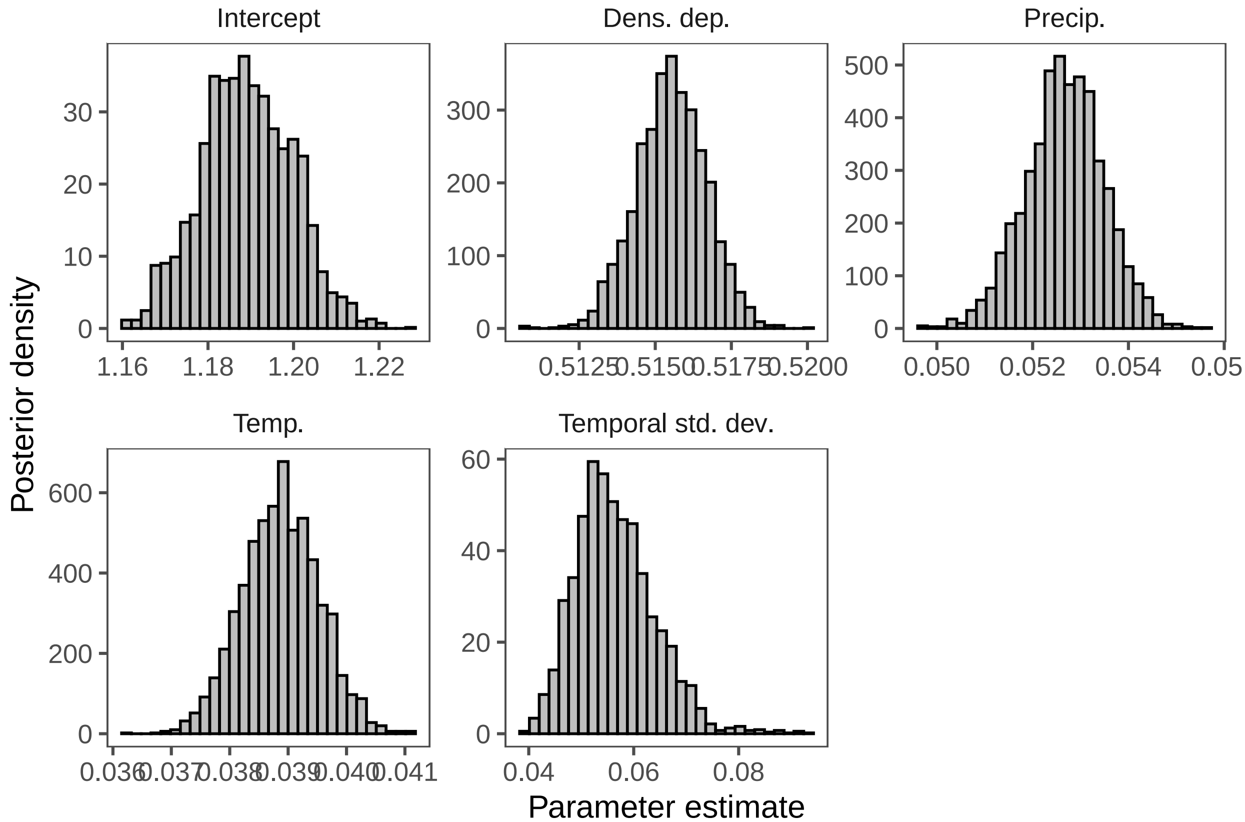

Figure S23: Posterior distributions of key parameters for the Natrona 2 core area.

Table S63: Statistical summaries of posterior distributions of key parameters for the Natrona 2 core area. SD = standard deviation; 2.5% and 97.5% quantiles bound the 95% Bayesian credible interval.

	Mean	Median	SD	2.5%	97.5%
Intercept, β_1	1.19	1.19	0.01	1.17	1.21
Density dependence, β_2	0.52	0.52	0.00	0.51	0.52
Precipitation effect, β_3	0.05	0.05	0.00	0.05	0.05
Temperature effect, β_4	0.04	0.04	0.00	0.04	0.04
Std. dev. of temporal random effect, σ_y	0.06	0.06	0.01	0.04	0.07

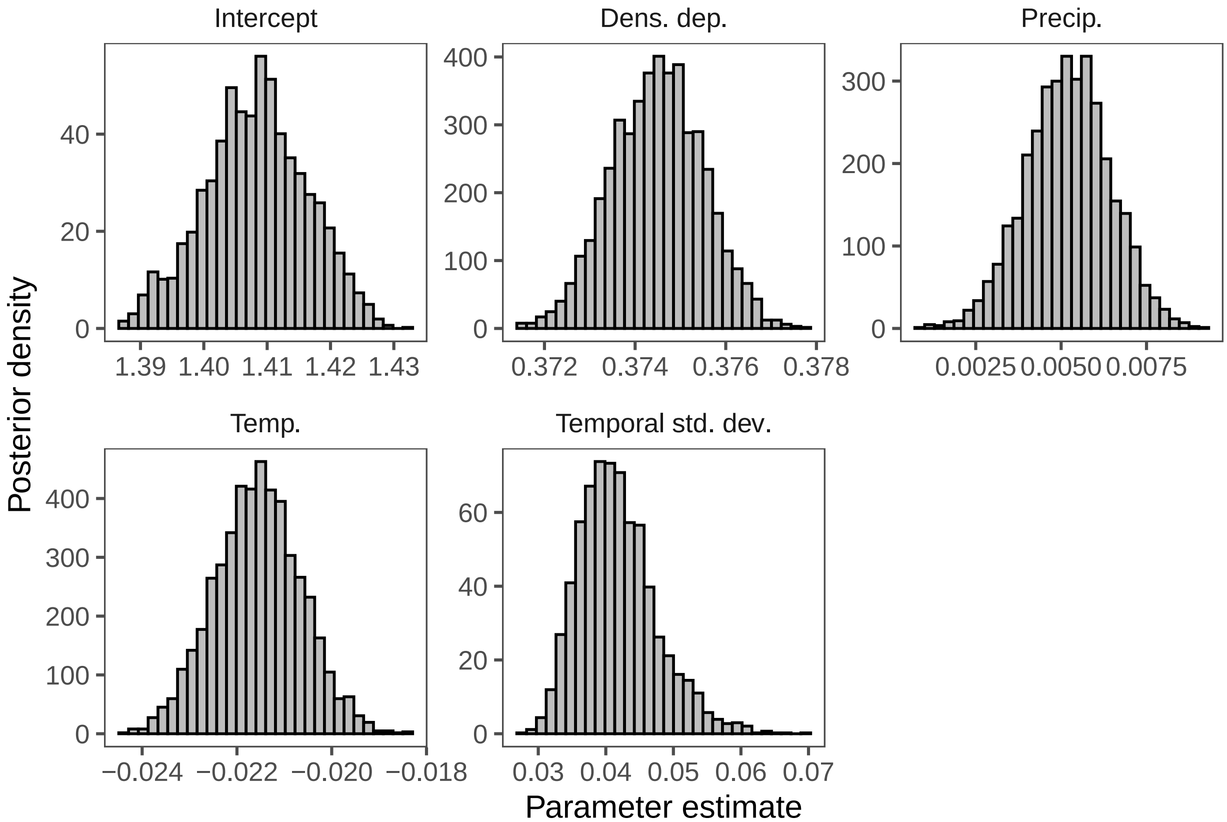

Figure S24: Posterior distributions of key parameters for the Natrona 3 core area.

Table S64: Statistical summaries of posterior distributions of key parameters for the Natrona 3 core area. SD = standard deviation; 2.5% and 97.5% quantiles bound the 95% Bayesian credible interval.

	Mean	Median	SD	2.5%	97.5%
Intercept, β_1	1.41	1.41	0.01	1.39	1.42
Density dependence, β_2	0.37	0.37	0.00	0.37	0.38
Precipitation effect, β_3	0.01	0.01	0.00	0.00	0.01
Temperature effect, β_4	-0.02	-0.02	0.00	-0.02	-0.02
Std. dev. of temporal random effect, σ_y	0.04	0.04	0.01	0.03	0.05

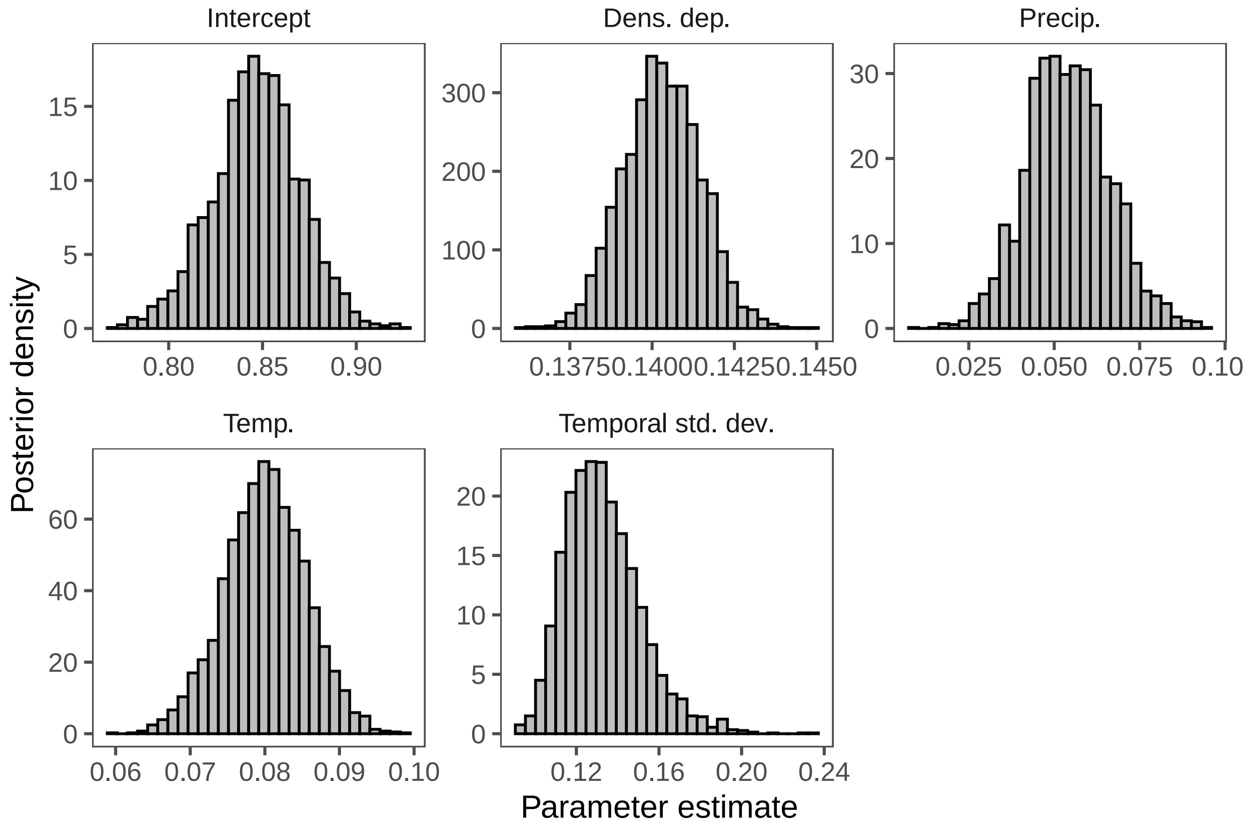

Figure S25: Posterior distributions of key parameters for the Newcastle core area.

Table S65: Statistical summaries of posterior distributions of key parameters for the Newcastle core area. SD = standard deviation; 2.5% and 97.5% quantiles bound the 95% Bayesian credible interval.

	Mean	Median	SD	2.5%	97.5%
Intercept, β_1	0.85	0.85	0.02	0.80	0.89
Density dependence, β_2	0.14	0.14	0.00	0.14	0.14
Precipitation effect, β_3	0.05	0.05	0.01	0.03	0.08
Temperature effect, β_4	0.08	0.08	0.01	0.07	0.09
Std. dev. of temporal random effect, σ_y	0.13	0.13	0.02	0.10	0.17

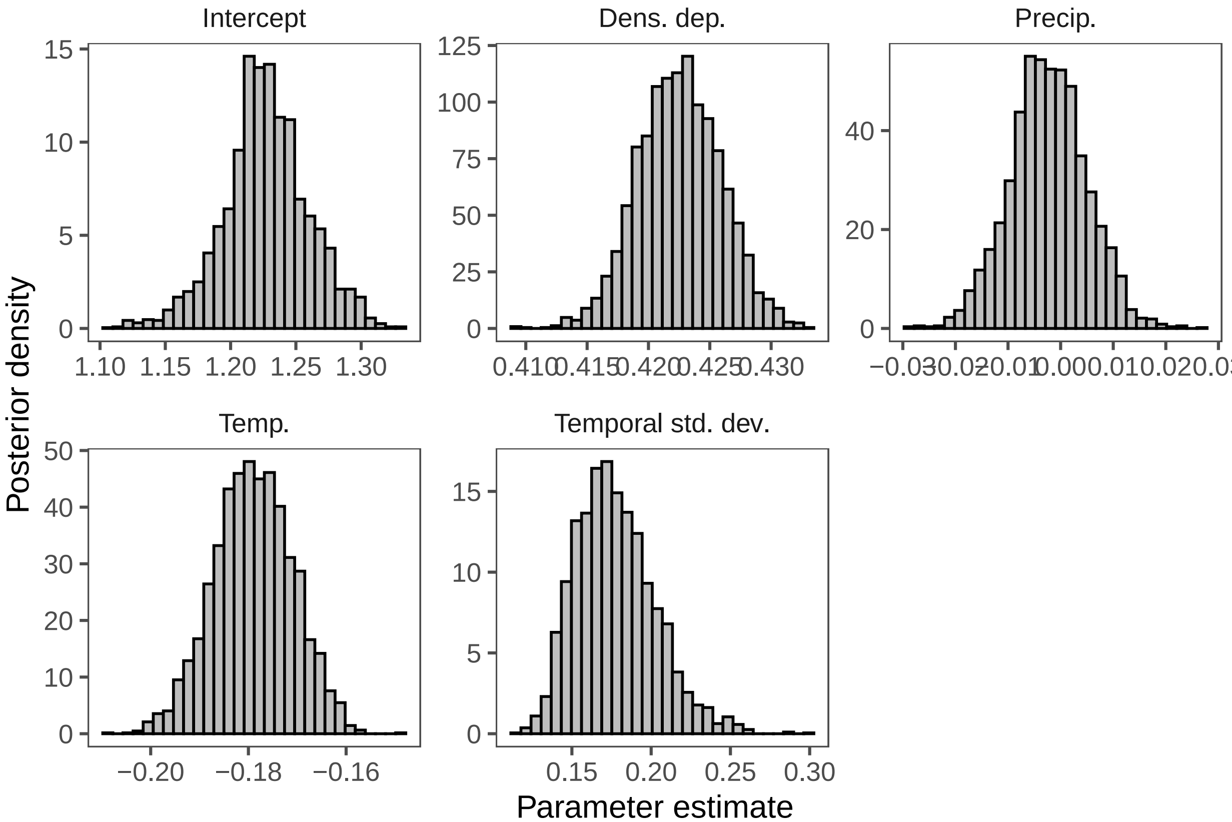

Figure S26: Posterior distributions of key parameters for the North Gillette core area.

Table S66: Statistical summaries of posterior distributions of key parameters for the North Gillette core area. SD = standard deviation; 2.5% and 97.5% quantiles bound the 95% Bayesian credible interval.

	Mean	Median	SD	2.5%	97.5%
Intercept, β_1	1.23	1.23	0.03	1.16	1.29
Density dependence, β_2	0.42	0.42	0.00	0.42	0.43
Precipitation effect, β_3	0.00	0.00	0.01	-0.02	0.01
Temperature effect, β_4	-0.18	-0.18	0.01	-0.20	-0.16
Std. dev. of temporal random effect, σ_y	0.18	0.17	0.02	0.14	0.23

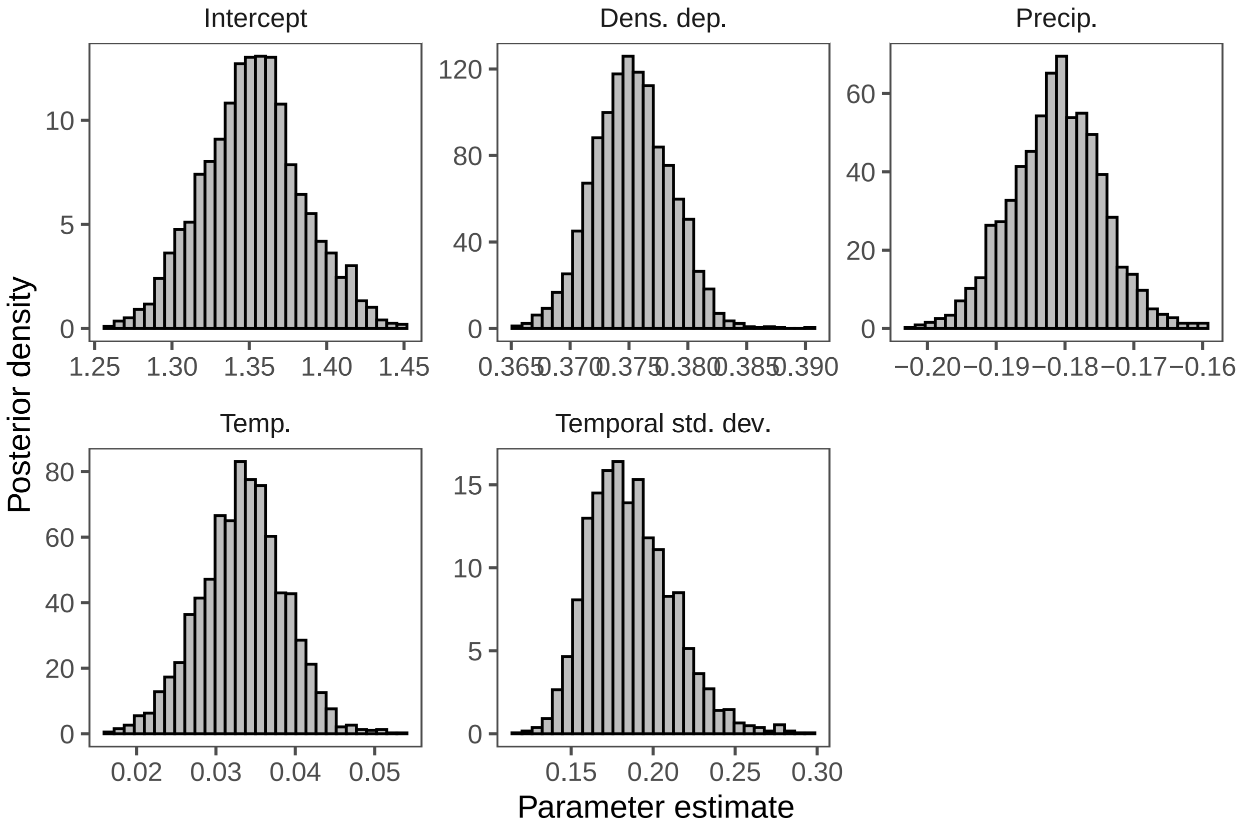

Figure S27: Posterior distributions of key parameters for the North Glenrock core area.

Table S67: Statistical summaries of posterior distributions of key parameters for the North Glenrock core area. SD = standard deviation; 2.5% and 97.5% quantiles bound the 95% Bayesian credible interval.

	Mean	Median	SD	2.5%	97.5%
Intercept, β_1	1.35	1.35	0.03	1.29	1.42
Density dependence, β_2	0.38	0.38	0.00	0.37	0.38
Precipitation effect, β_3	-0.18	-0.18	0.01	-0.19	-0.17
Temperature effect, β_4	0.03	0.03	0.01	0.02	0.04
Std. dev. of temporal random effect, σ_y	0.19	0.18	0.03	0.14	0.24

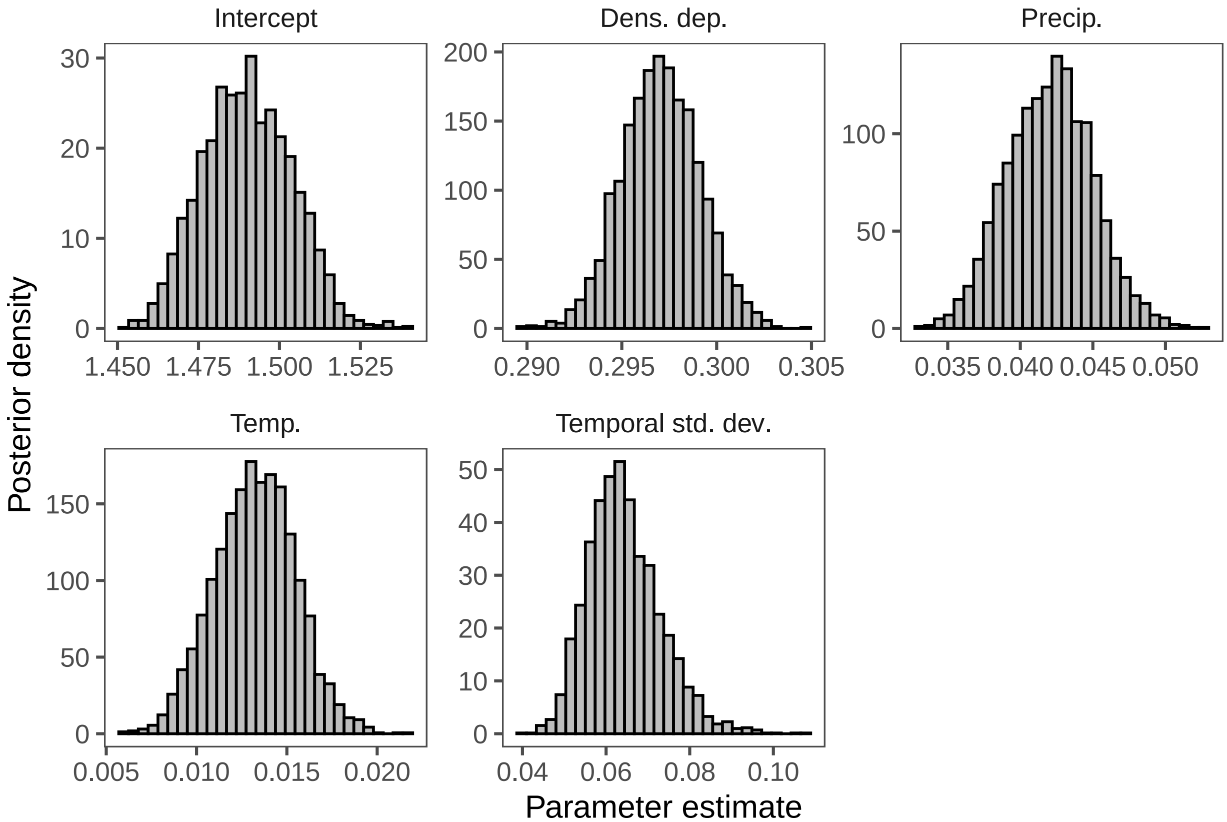

Figure S28: Posterior distributions of key parameters for the North Laramie core area.

Table S68: Statistical summaries of posterior distributions of key parameters for the North Laramie core area. SD = standard deviation; 2.5% and 97.5% quantiles bound the 95% Bayesian credible interval.

	Mean	Median	SD	2.5%	97.5%
Intercept, β_1	1.49	1.49	0.01	1.46	1.52
Density dependence, β_2	0.30	0.30	0.00	0.29	0.30
Precipitation effect, β_3	0.04	0.04	0.00	0.04	0.05
Temperature effect, β_4	0.01	0.01	0.00	0.01	0.02
Std. dev. of temporal random effect, σ_y	0.06	0.06	0.01	0.05	0.08

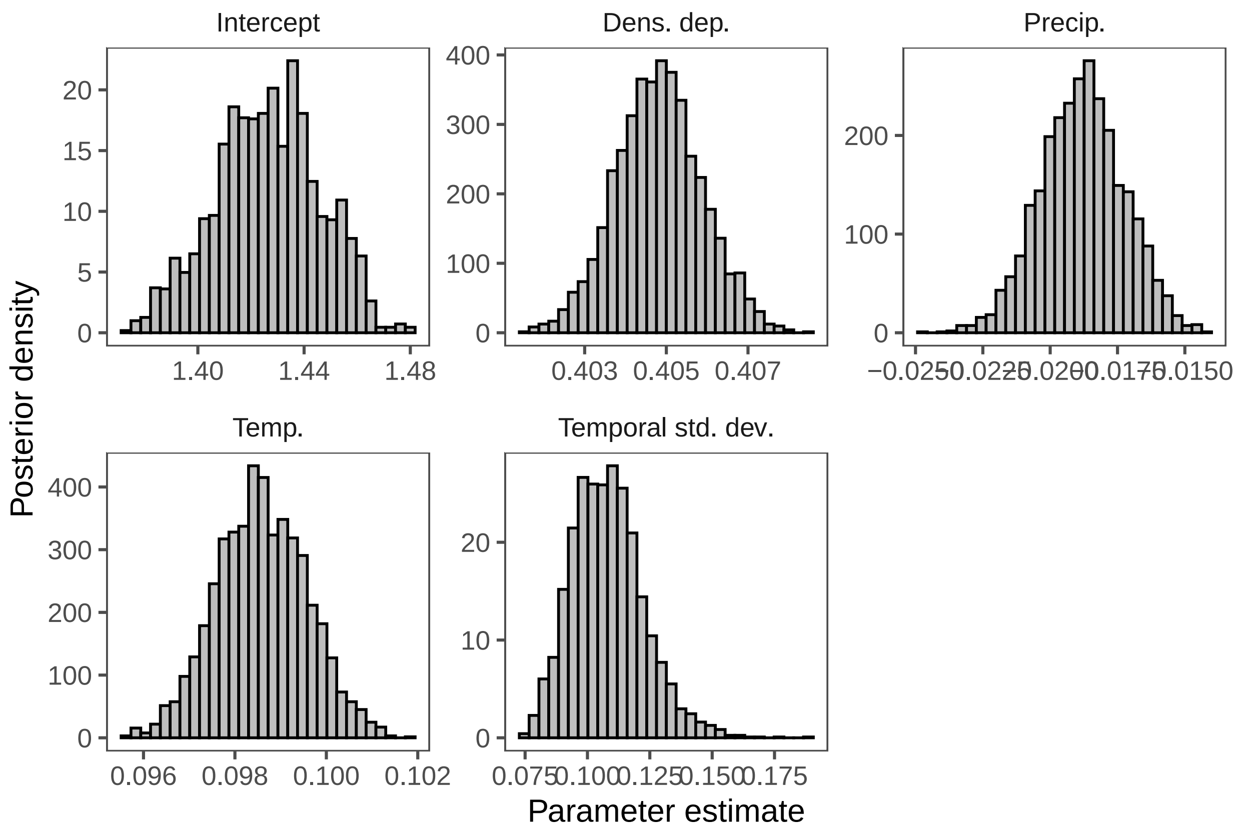

Figure S29: Posterior distributions of key parameters for the Oregon Basin core area.

Table S69: Statistical summaries of posterior distributions of key parameters for the Oregon Basin core area. SD = standard deviation; 2.5% and 97.5% quantiles bound the 95% Bayesian credible interval.

	Mean	Median	SD	2.5%	97.5%
Intercept, β_1	1.43	1.43	0.02	1.39	1.46
Density dependence, β_2	0.40	0.40	0.00	0.40	0.41
Precipitation effect, β_3	-0.02	-0.02	0.00	-0.02	-0.02
Temperature effect, β_4	0.10	0.10	0.00	0.10	0.10
Std. dev. of temporal random effect, σ_y	0.11	0.11	0.01	0.08	0.14

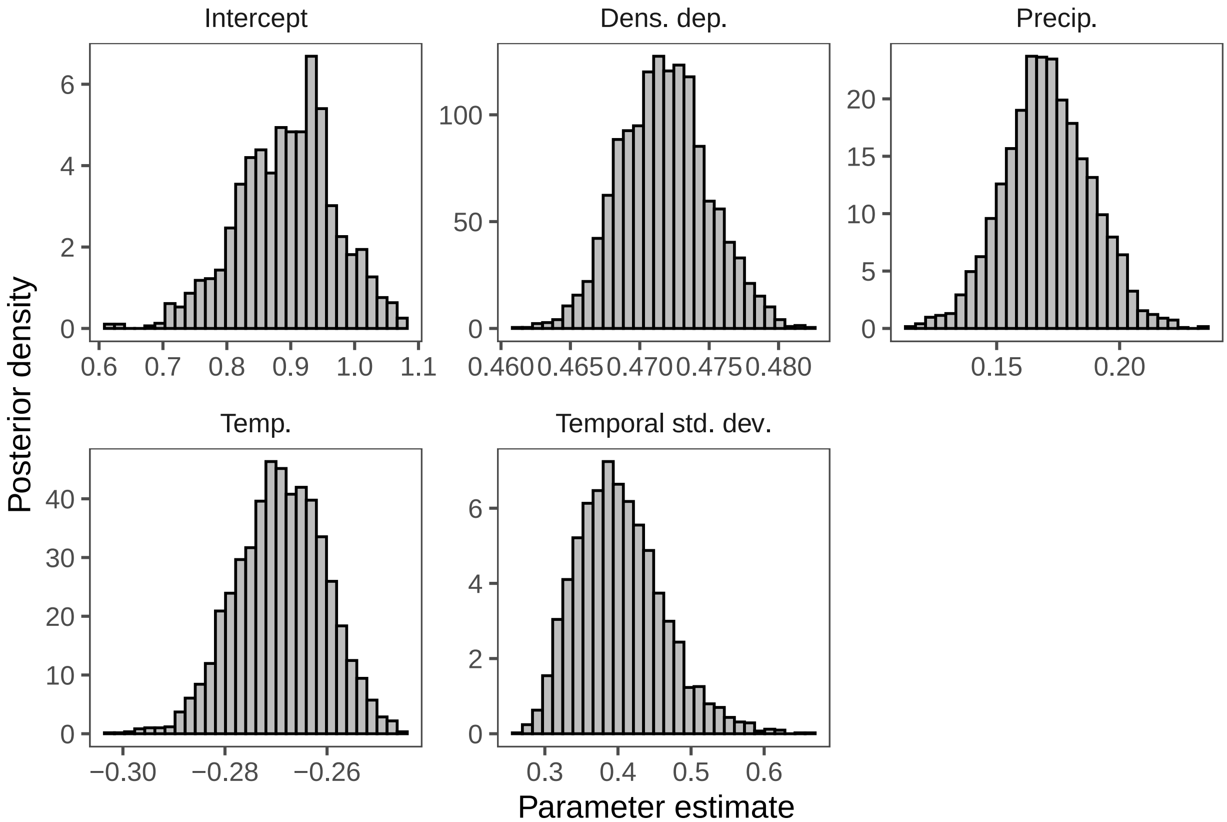

Figure S30: Posterior distributions of key parameters for the Powder core area.

Table S70: Statistical summaries of posterior distributions of key parameters for the Powder core area. SD = standard deviation; 2.5% and 97.5% quantiles bound the 95% Bayesian credible interval.

	Mean	Median	SD	2.5%	97.5%
Intercept, β_1	0.89	0.90	0.08	0.74	1.04
Density dependence, β_2	0.47	0.47	0.00	0.47	0.48
Precipitation effect, β_3	0.17	0.17	0.02	0.14	0.21
Temperature effect, β_4	-0.27	-0.27	0.01	-0.29	-0.25
Std. dev. of temporal random effect, σ_y	0.40	0.40	0.06	0.31	0.54

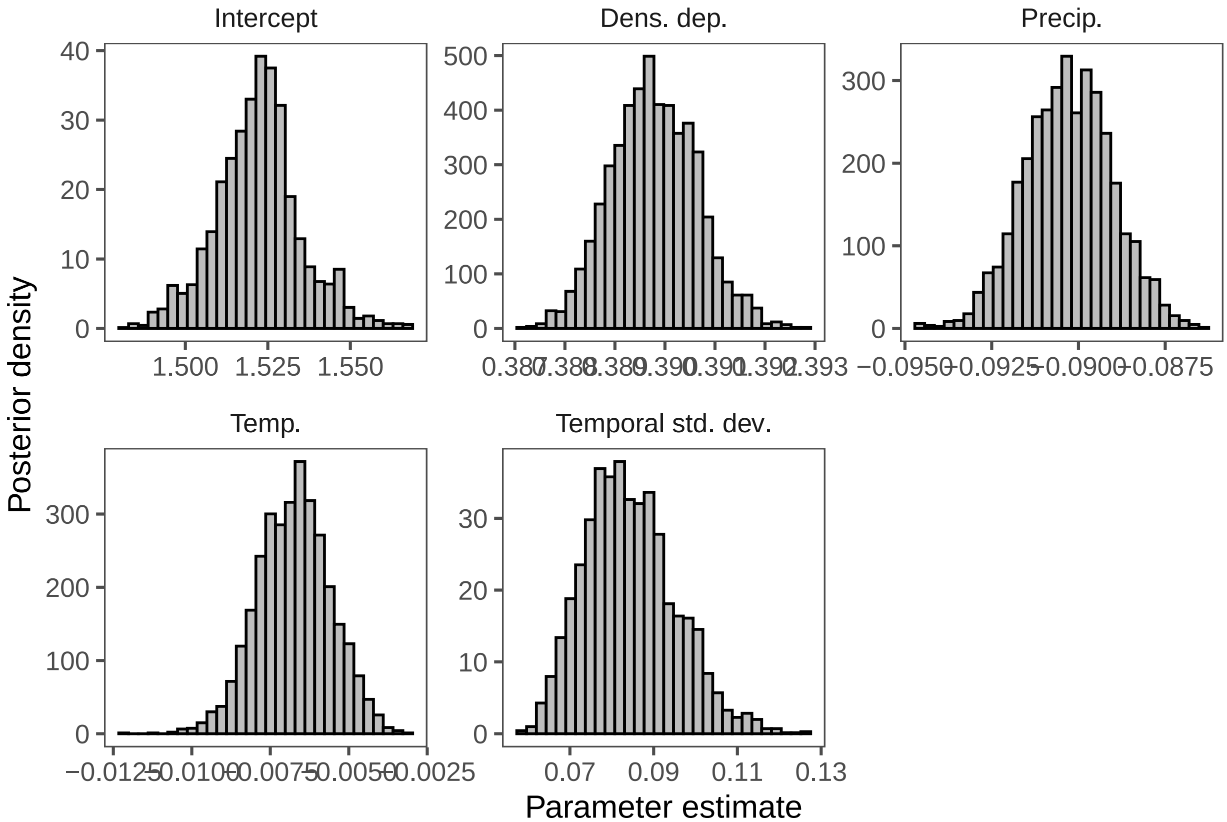

Figure S31: Posterior distributions of key parameters for the Sage core area.

Table S71: Statistical summaries of posterior distributions of key parameters for the Sage core area. SD = standard deviation; 2.5% and 97.5% quantiles bound the 95% Bayesian credible interval.

	Mean	Median	SD	2.5%	97.5%
Intercept, β_1	1.52	1.52	0.01	1.50	1.55
Density dependence, β_2	0.39	0.39	0.00	0.39	0.39
Precipitation effect, β_3	-0.09	-0.09	0.00	-0.09	-0.09
Temperature effect, β_4	-0.01	-0.01	0.00	-0.01	0.00
Std. dev. of temporal random effect, σ_y	0.08	0.08	0.01	0.07	0.11

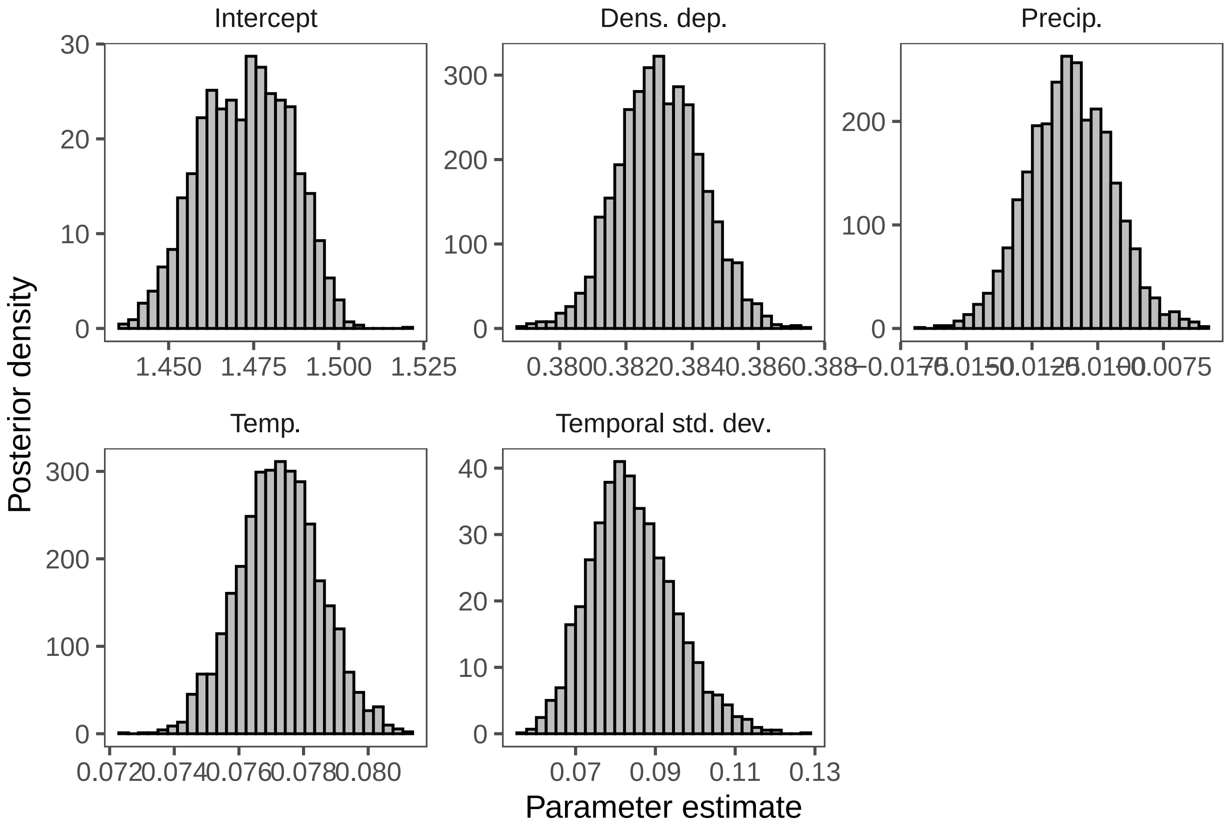

Figure S32: Posterior distributions of key parameters for the Salt Wells core area.

Table S72: Statistical summaries of posterior distributions of key parameters for the Salt Wells core area. SD = standard deviation; 2.5% and 97.5% quantiles bound the 95% Bayesian credible interval.

	Mean	Median	SD	2.5%	97.5%
Intercept, β_1	1.47	1.47	0.01	1.45	1.50
Density dependence, β_2	0.38	0.38	0.00	0.38	0.39
Precipitation effect, β_3	-0.01	-0.01	0.00	-0.01	-0.01
Temperature effect, β_4	0.08	0.08	0.00	0.07	0.08
Std. dev. of temporal random effect, σ_y	0.08	0.08	0.01	0.07	0.11

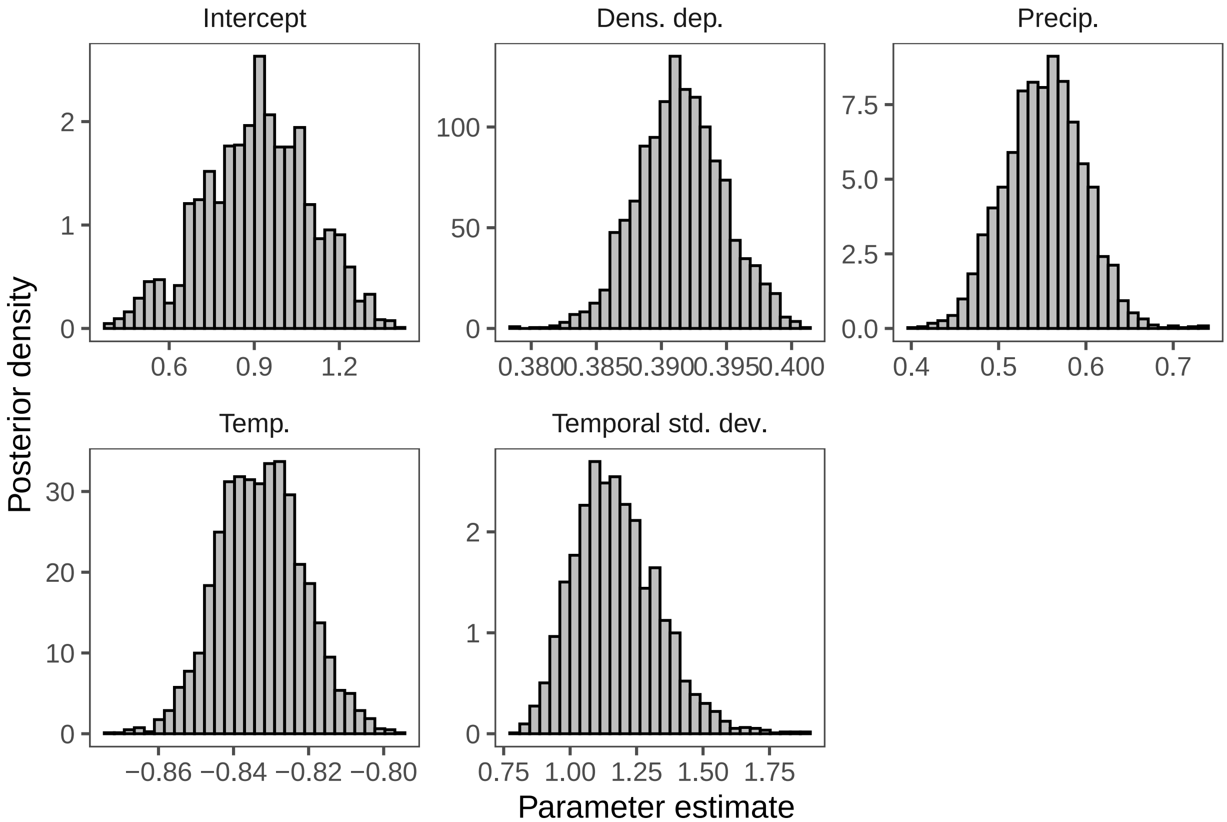

Figure S33: Posterior distributions of key parameters for the Seedskadee core area.

Table S73: Statistical summaries of posterior distributions of key parameters for the Seedskadee core area. SD = standard deviation; 2.5% and 97.5% quantiles bound the 95% Bayesian credible interval.

	Mean	Median	SD	2.5%	97.5%
Intercept, β_1	0.91	0.92	0.19	0.52	1.27
Density dependence, β_2	0.39	0.39	0.00	0.39	0.40
Precipitation effect, β_3	0.55	0.55	0.04	0.47	0.64
Temperature effect, β_4	-0.83	-0.83	0.01	-0.85	-0.81
Std. dev. of temporal random effect, σ_y	1.17	1.16	0.16	0.91	1.52

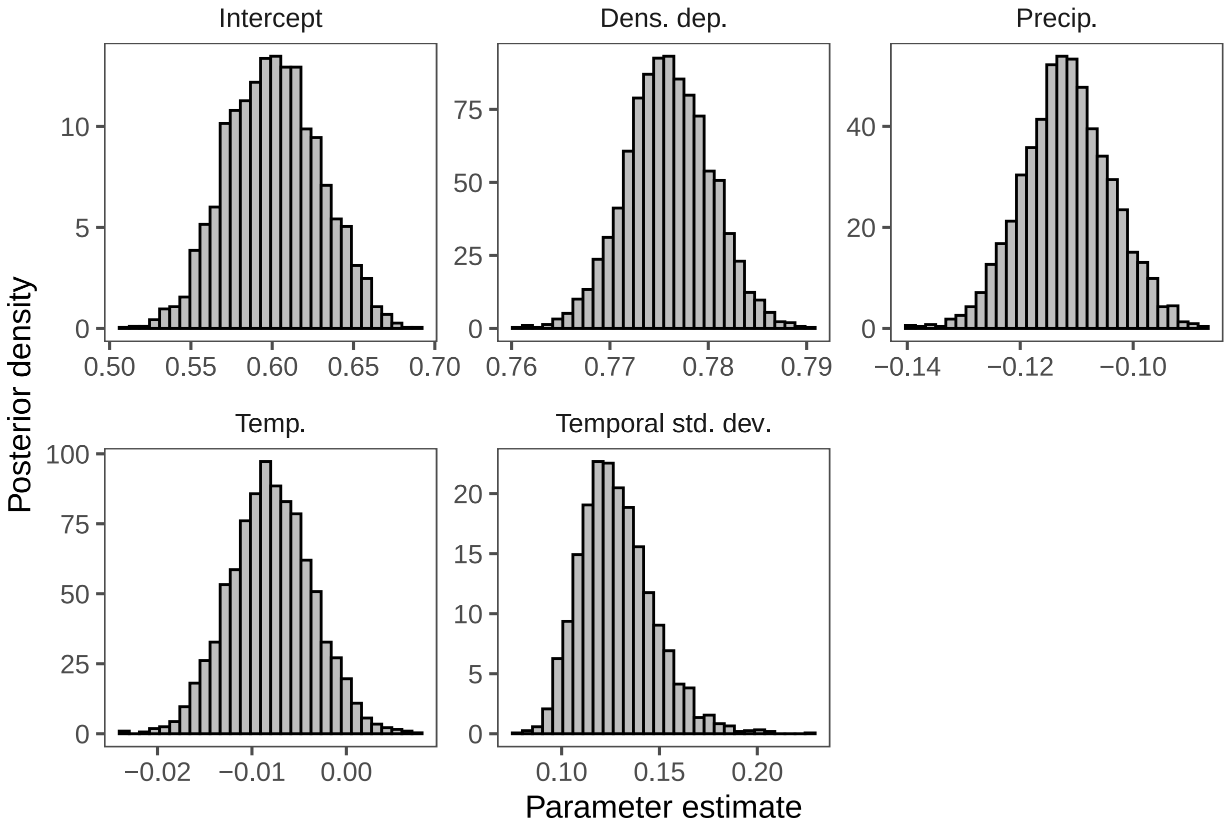

Figure S34: Posterior distributions of key parameters for the Shell core area.

Table S74: Statistical summaries of posterior distributions of key parameters for the Shell core area. SD = standard deviation; 2.5% and 97.5% quantiles bound the 95% Bayesian credible interval.

	Mean	Median	SD	2.5%	97.5%
Intercept, β_1	0.60	0.60	0.03	0.55	0.66
Density dependence, β_2	0.78	0.78	0.00	0.77	0.78
Precipitation effect, β_3	-0.11	-0.11	0.01	-0.13	-0.10
Temperature effect, β_4	-0.01	-0.01	0.00	-0.02	0.00
Std. dev. of temporal random effect, σ_y	0.13	0.13	0.02	0.10	0.17

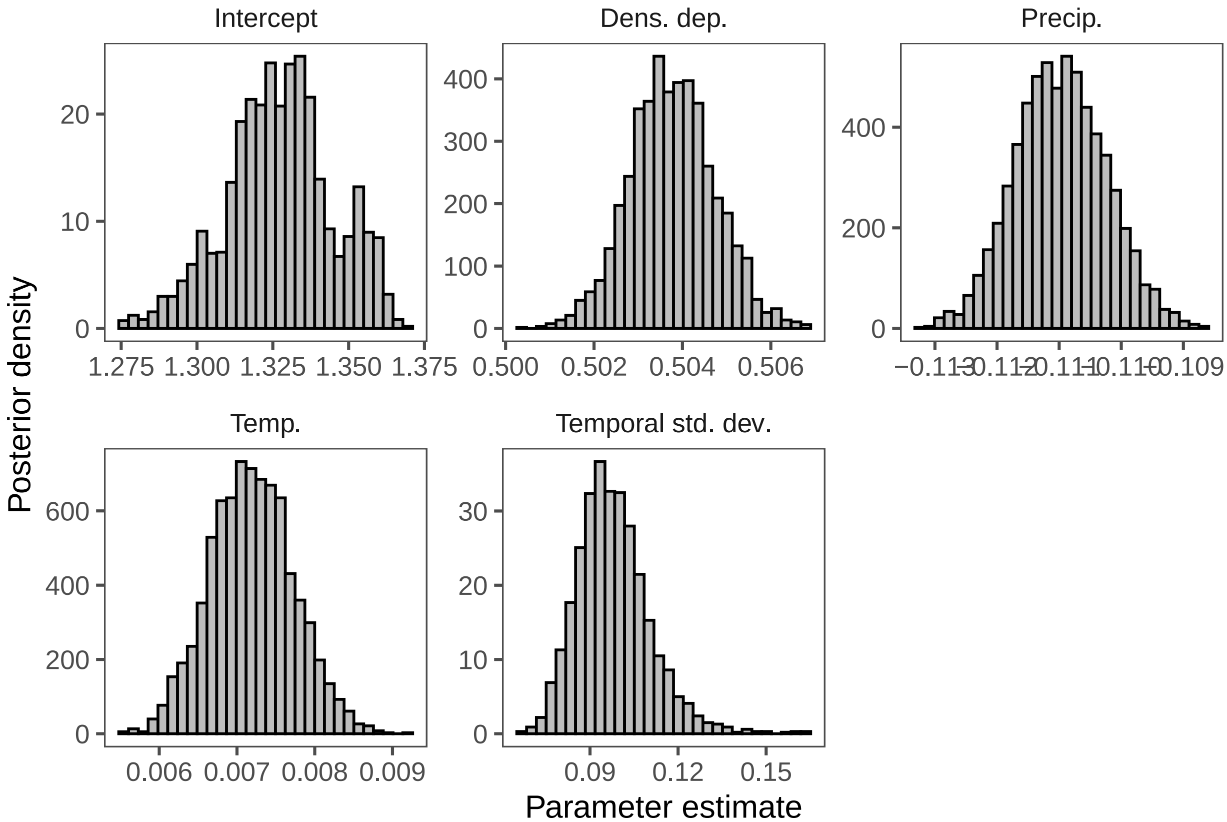

Figure S35: Posterior distributions of key parameters for the South Rawlins core area.

Table S75: Statistical summaries of posterior distributions of key parameters for the South Rawlins core area. SD = standard deviation; 2.5% and 97.5% quantiles bound the 95% Bayesian credible interval.

	Mean	Median	SD	2.5%	97.5%
Intercept, β_1	1.33	1.33	0.02	1.29	1.36
Density dependence, β_2	0.50	0.50	0.00	0.50	0.51
Precipitation effect, β_3	-0.11	-0.11	0.00	-0.11	-0.11
Temperature effect, β_4	0.01	0.01	0.00	0.01	0.01
Std. dev. of temporal random effect, σ_y	0.10	0.10	0.01	0.08	0.13

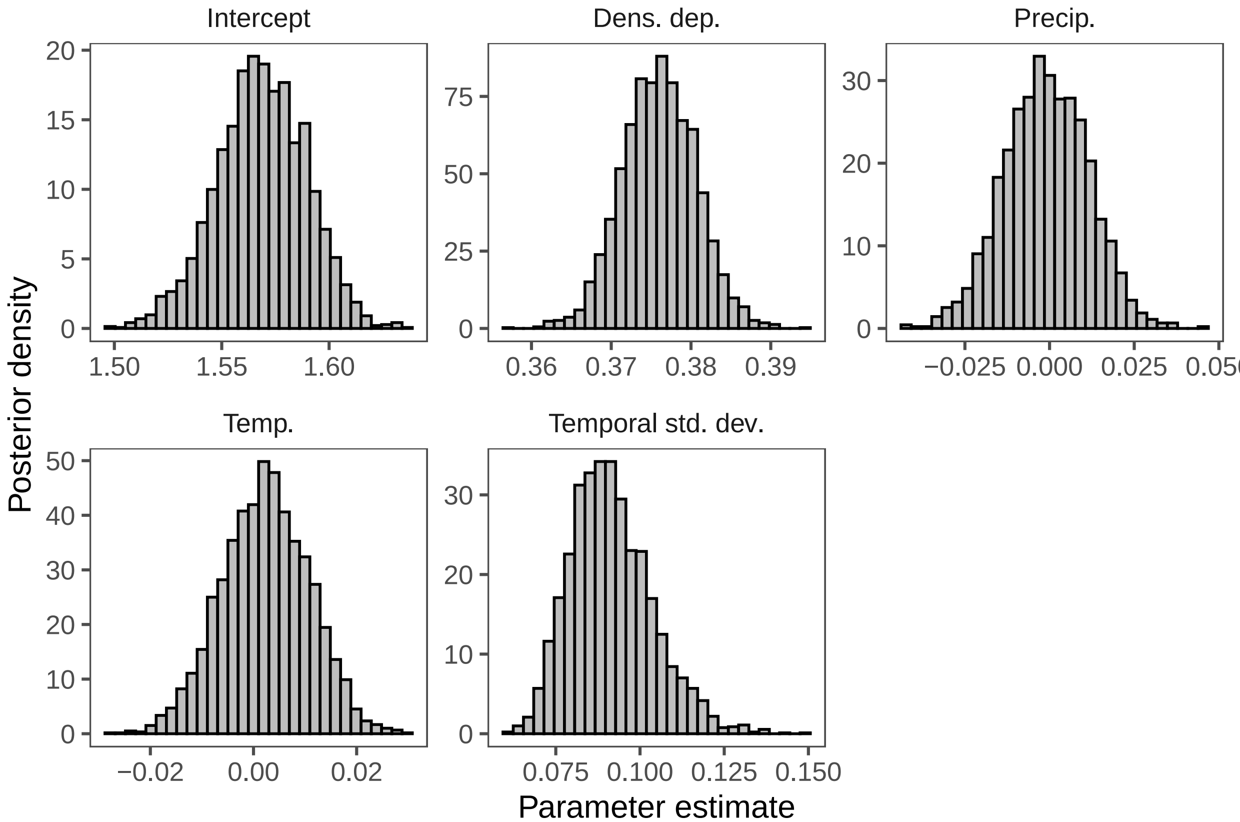

Figure S36: Posterior distributions of key parameters for the Thermopolis core area.

Table S76: Statistical summaries of posterior distributions of key parameters for the Thermopolis core area. SD = standard deviation; 2.5% and 97.5% quantiles bound the 95% Bayesian credible interval.

	Mean	Median	SD	2.5%	97.5%
Intercept, β_1	1.57	1.57	0.02	1.53	1.61
Density dependence, β_2	0.38	0.38	0.00	0.37	0.39
Precipitation effect, β_3	0.00	0.00	0.01	-0.03	0.02
Temperature effect, β_4	0.00	0.00	0.01	-0.01	0.02
Std. dev. of temporal random effect, σ_y	0.09	0.09	0.01	0.07	0.12

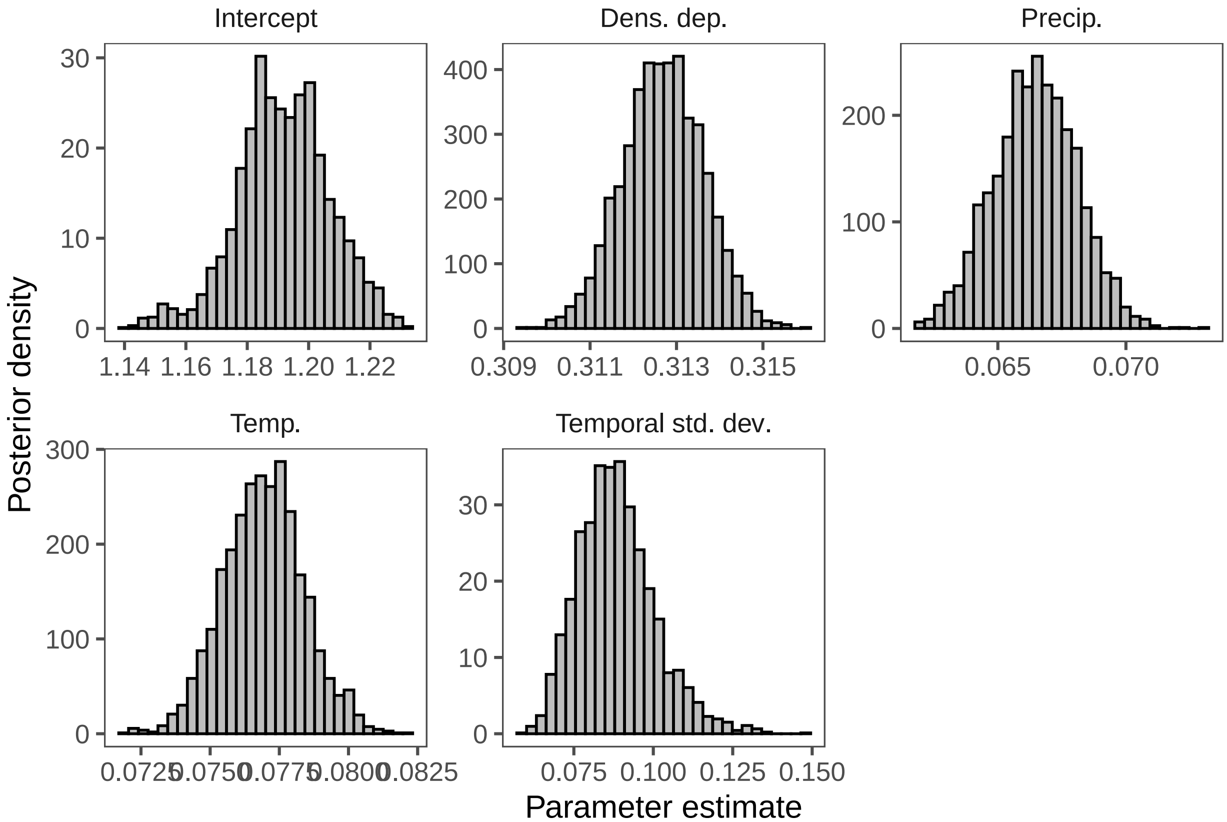

Figure S37: Posterior distributions of key parameters for the Thunder Basin core area.

Table S77: Statistical summaries of posterior distributions of key parameters for the Thunder Basin core area. SD = standard deviation; 2.5% and 97.5% quantiles bound the 95% Bayesian credible interval.

	Mean	Median	SD	2.5%	97.5%
Intercept, β_1	1.19	1.19	0.02	1.16	1.22
Density dependence, β_2	0.31	0.31	0.00	0.31	0.31
Precipitation effect, β_3	0.07	0.07	0.00	0.06	0.07
Temperature effect, β_4	0.08	0.08	0.00	0.07	0.08
Std. dev. of temporal random effect, σ_y	0.09	0.09	0.01	0.07	0.12

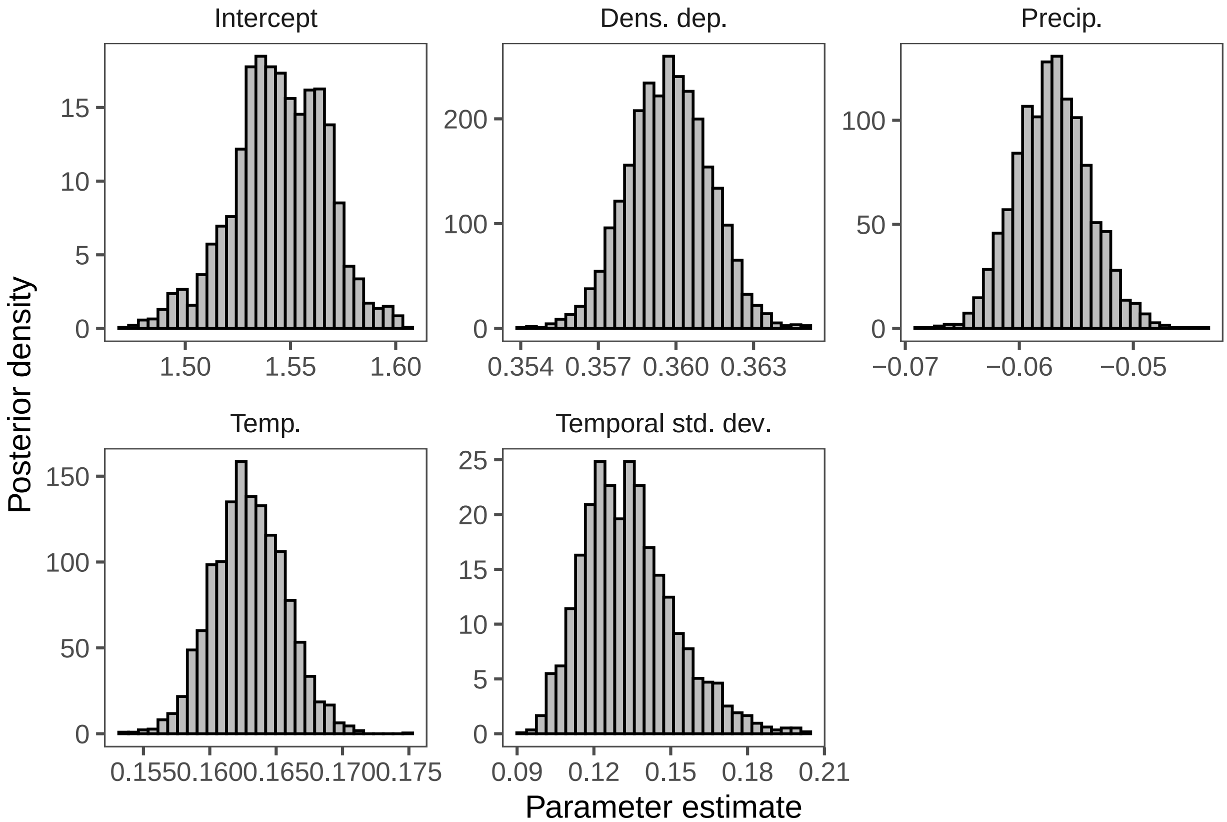

Figure S38: Posterior distributions of key parameters for the Uinta core area.

Table S78: Statistical summaries of posterior distributions of key parameters for the Uinta core area. SD = standard deviation; 2.5% and 97.5% quantiles bound the 95% Bayesian credible interval.

	Mean	Median	SD	2.5%	97.5%
Intercept, β_1	1.54	1.54	0.02	1.50	1.59
Density dependence, β_2	0.36	0.36	0.00	0.36	0.36
Precipitation effect, β_3	-0.06	-0.06	0.00	-0.06	-0.05
Temperature effect, β_4	0.16	0.16	0.00	0.16	0.17
Std. dev. of temporal random effect, σ_y	0.13	0.13	0.02	0.10	0.17

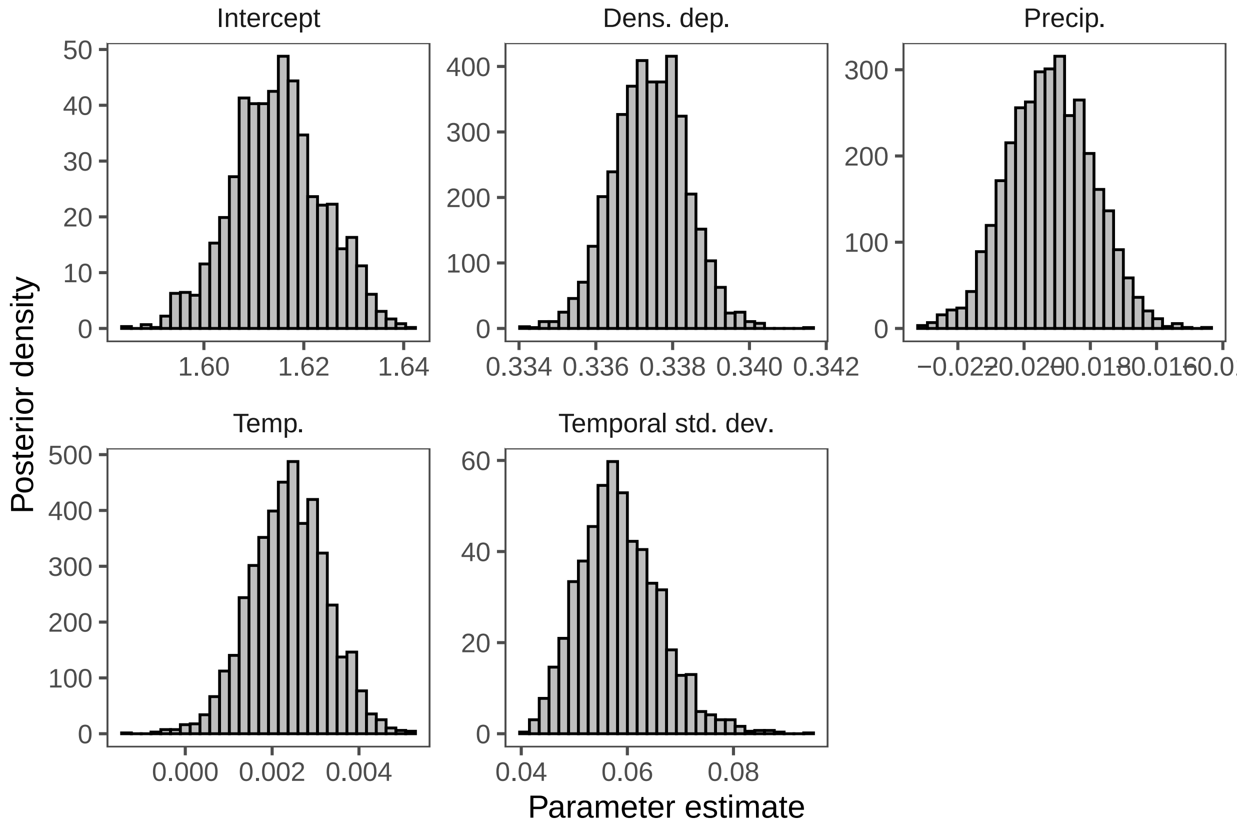

Figure S39: Posterior distributions of key parameters for the Washakie core area.

Table S79: Statistical summaries of posterior distributions of key parameters for the Washakie core area. SD = standard deviation; 2.5% and 97.5% quantiles bound the 95% Bayesian credible interval.

	Mean	Median	SD	2.5%	97.5%
Intercept, β_1	1.61	1.61	0.01	1.60	1.63
Density dependence, β_2	0.34	0.34	0.00	0.34	0.34
Precipitation effect, β_3	-0.02	-0.02	0.00	-0.02	-0.02
Temperature effect, β_4	0.00	0.00	0.00	0.00	0.00
Std. dev. of temporal random effect, σ_y	0.06	0.06	0.01	0.05	0.08

Estimated equilibrium cover

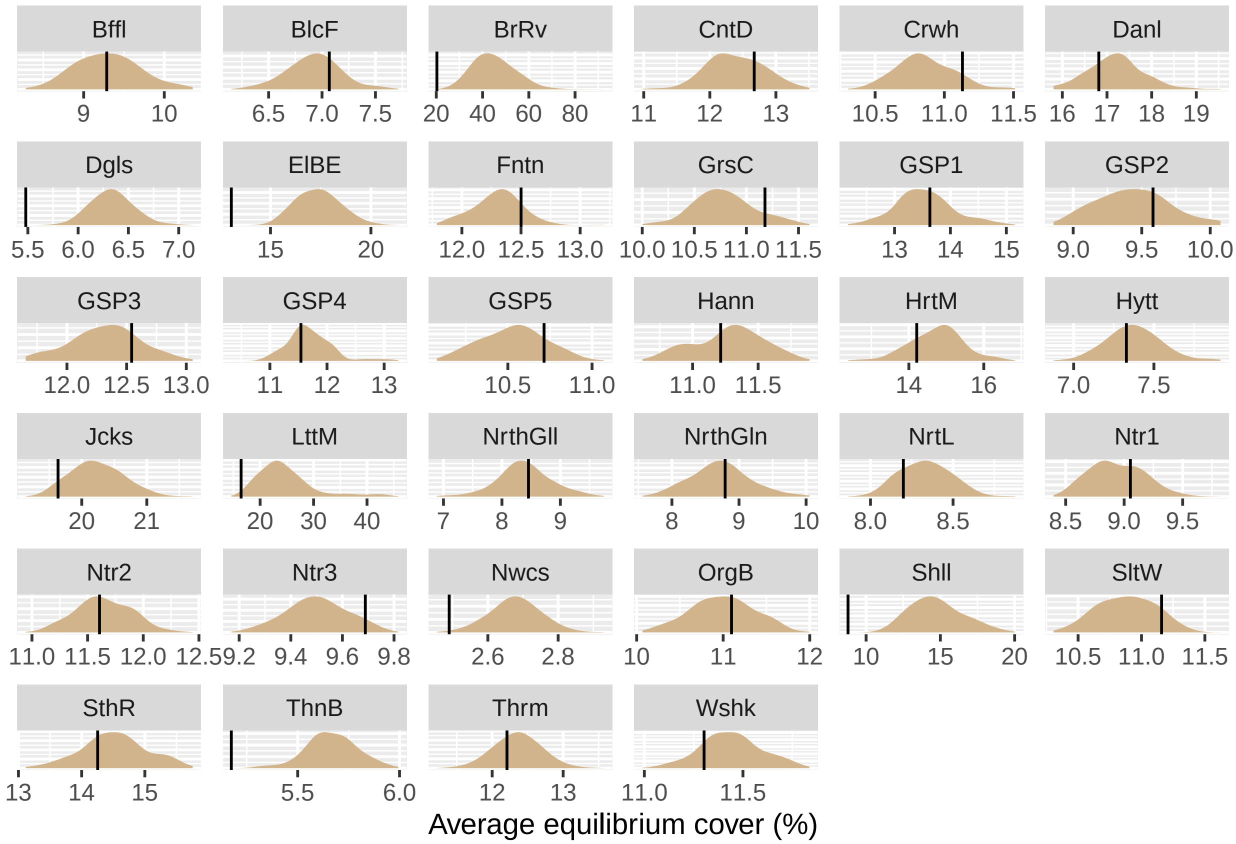

Figure S40: Posterior distributions of equilibrium cover calculated from fitted model parameters. The vertical black lines show the observed mean cover for each core area from 1985-2018.

Estimated colonization probabilities

Table S80: Results from colonization model for each core area. Pr(colonize | cover = 0) reads, "the probability of colonizition given that current cover is zero."

Core area	Pr(colonize | cover = 0)	Mean cover in colonized cells
Bear River	0.35	3
Blacks Fork	0.14	2
Buffalo	0.35	2
Continental Divide	0.22	2
Crowheart	0.21	2
Daniel	0.22	2
Douglas	0.37	2
Elk Basin East	0.42	2
Fontenelle	0.17	2
Grass Creek	0.15	2
Greater South Pass 1	0.17	2
Greater South Pass 2	0.14	2
Greater South Pass 3	0.18	2
Greater South Pass 4	0.23	2
Greater South Pass 5	0.13	2
Hanna	0.21	2
Heart Mountain	0.31	2
Hyattville	0.18	2
Jackson	0.42	4
Little Mountain	0.43	3
Natrona 1	0.21	2
Natrona 2	0.30	2
Natrona 3	0.19	2
Newcastle	0.19	2
North Gillette	0.17	2
North Glenrock	0.28	3
North Laramie	0.38	3
Oregon Basin	0.19	2
Salt Wells	0.20	2
Shell	0.19	2
South Rawlins	0.39	3
Thermopolis	0.26	3
Thunder Basin	0.24	2
Washakie	0.36	3

Nesting and summer cover thresholds

Table S81: Percent sagebrush cover thresholds for sage-grouse nesting habitat and summer habitat. See main text for details.

Name	Abbreviation	Region	NestingTarget	SummerTarget
Bear River	BrRv	Southwest Region	15.43	16.71
Blacks Fork	BlcF	Southwest Region	15.43	16.71
Buffalo	Bffl	Northeast Region	9.04	10.36
Continental Divide	CntD	Southwest Region	15.43	16.71
Crowheart	Crwh	Central Region	13.32	12.29
Daniel	Danl	Southwest Region	15.43	16.71
Douglas	Dgls	Northeast Region	9.04	10.36
Elk Basin East	ElBE	Central Region	13.32	12.29
Elk Basin West	ElBW	Central Region	13.32	12.29
Fontenelle	Fntn	Southwest Region	15.43	16.71
Grass Creek	GrsC	Central Region	13.32	12.29
Greater South Pass 1	GSP1	Southwest Region	15.43	16.71
Greater South Pass 2	GSP2	Southwest Region	15.43	16.71
Greater South Pass 3	GSP3	Central Region	13.32	12.29
Greater South Pass 4	GSP4	Central Region	13.32	12.29
Greater South Pass 5	GSP5	Southwest Region	15.43	16.71
Hanna	Hann	Central Region	13.32	12.29
Heart Mountain	HrtM	Central Region	13.32	12.29
Hyattville	Hytt	Central Region	13.32	12.29
Jackson	Jcks	Southwest Region	15.43	16.71
Little Mountain	LttM	Central Region	13.32	12.29
Natrona 1	Ntr1	Central Region	13.32	12.29
Natrona 2	Ntr2	Central Region	13.32	12.29
Natrona 3	Ntr3	Northeast Region	9.04	10.36
Newcastle	Nwcs	Northeast Region	9.04	10.36
North Gillette	NrthGll	Northeast Region	9.04	10.36
North Glenrock	NrthGln	Northeast Region	9.04	10.36
North Laramie	NrtL	Central Region	13.32	12.29
Oregon Basin	OrgB	Central Region	13.32	12.29
Powder	Pwdr	Southwest Region	15.43	16.71
Sage	Sage	Southwest Region	15.43	16.71
Salt Wells	SltW	Southwest Region	15.43	16.71
Seedskadee	Sdsk	Southwest Region	15.43	16.71
Shell	Shll	Central Region	13.32	12.29
South Rawlins	SthR	Central Region	13.32	12.29
Thermopolis	Thrm	Central Region	13.32	12.29
Thunder Basin	ThnB	Northeast Region	9.04	10.36
Uinta	Uint	Southwest Region	15.43	16.71
Washakie	Wshk	Central Region	13.32	12.29

Summer habitat cover targets compared to projections

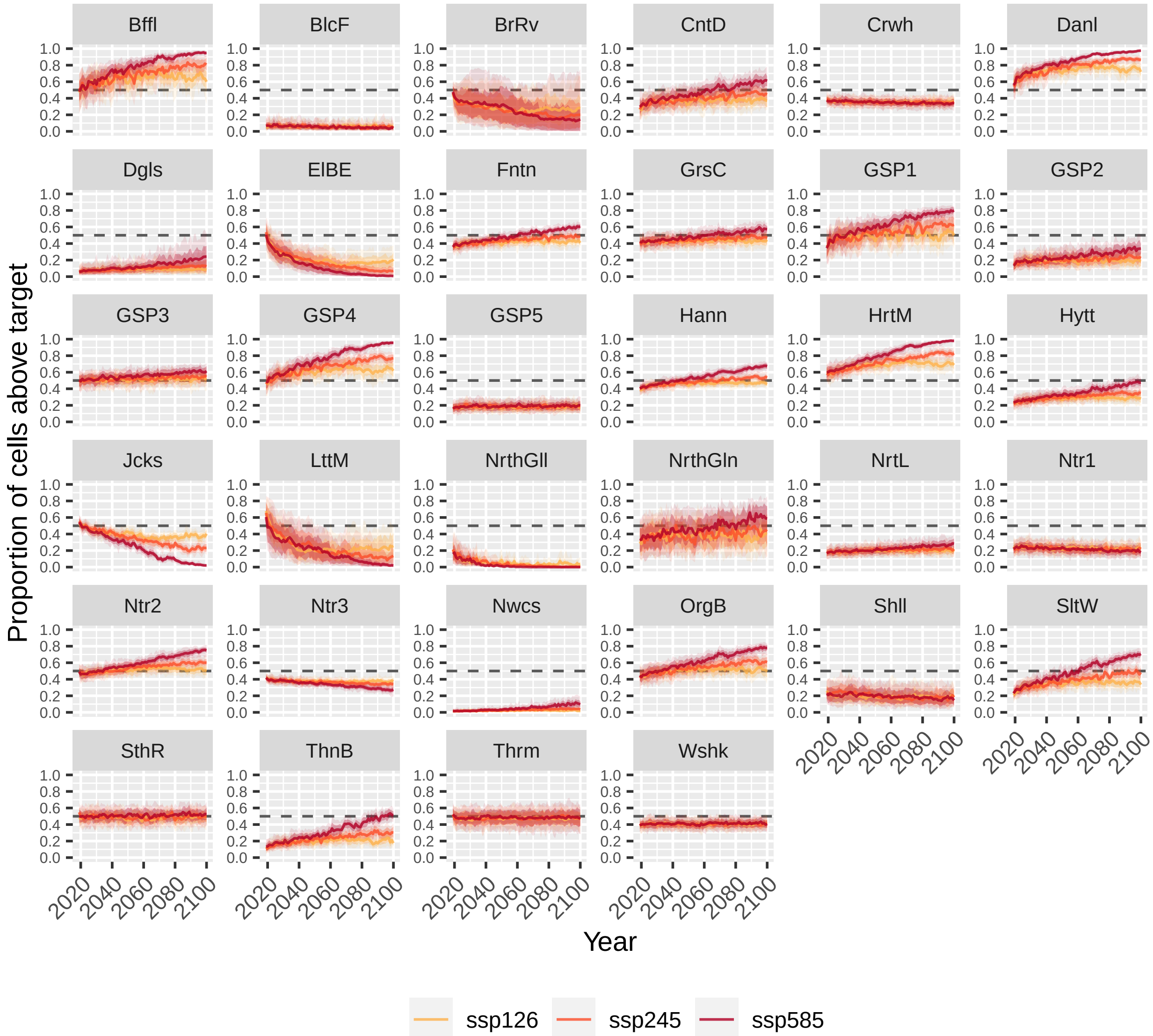

Figure S41: Projections of the proportion of 100-meter cells within a core area where sagebrush percent cover exceeds the sage-grouse summer cover threshold defined for each core area. The solid line is the median of the posterior predictive distribution; light shaded ribbon bounds the 68% BCI; very light shaded ribbon bounds the 95% BCI. The dashed horizontal line shows where the proportion of cells is equal to 50% of the area.