Appendix 2. Testing the Influence of Post-Management Treatments on Vegetation Structure Variables on Federal Lands Managed under an Adaptive-Management Framework by the U.S. Fish and Wildlife Service in North Dakota, South Dakota, Minnesota, and Montana, 2011–13

A. Mean Bare-Ground Cover (percent)

Table 2.1. Generalized linear mixed model, assuming a beta distribution with a logit link, *y* = (*y*+0.0), testing the influence of post-management treatments on mean bare-ground cover (percent) on two grass types on Federal lands managed under an adaptive-management framework by the U.S. Fish and Wildlife Service (Gannon and others, 2013) in North Dakota, South Dakota, Minnesota, and Montana, 2011–13.

[<, less than; *, evidence for moderate effect ($0.05<p\leq0.10$); **, evidence for strong effect ($p\leq0.05$)]

Effect	Sources of variation[1]	Numerator degrees of freedom	Denominator degrees of freedom[2]	*F*-statistic	*p*-value
Overall	Grass type × treatment	18	150.3	7.03	<0.0001**
Contrasts:	Mixed: burned linear	1	158.6	13.62	0.0003**
	Mixed: burned quadratic	1	107.2	0.15	0.7003
	Mixed: BG0 versus BG1-3	1	131.5	5.52	0.0203**
	Mixed: grazed linear	1	168.8	0.01	0.9384
	Mixed: grazed quadratic	1	159.1	0.01	0.9401
	Tall: burned linear	1	146.5	8.05	0.0052**
	Tall: grazed linear	1	161.1	0.31	0.5788
	Tall: grazed quadratic	1	131.8	0.37	0.5460
	B1: mixed versus tall	1	167.1	0.95	0.3299
	B2: mixed versus tall	1	167.6	0.53	0.4694
	G0: mixed versus tall	1	165.8	0.70	0.4035
	G: mixed versus tall	1	168.3	0.15	0.6957
	G1: mixed versus tall	1	168.6	0.65	0.4226
	G2: mixed versus tall	1	169.0	2.53	0.1133
	Mixed: burned versus rest	1	150.4	1.35	0.2470
	Mixed: grazed versus rest	1	149.9	0.71	0.3995
	Mixed: burned-grazed versus rest	1	150.6	3.34	0.0697*
	Mixed: burned versus grazed	1	163.1	1.47	0.2268
	Tall: burned versus rest	1	164.6	1.88	0.1724
	Tall: grazed versus rest	1	167.4	0.16	0.6867
	Tall: burned versus grazed	1	141.3	6.55	0.0115**

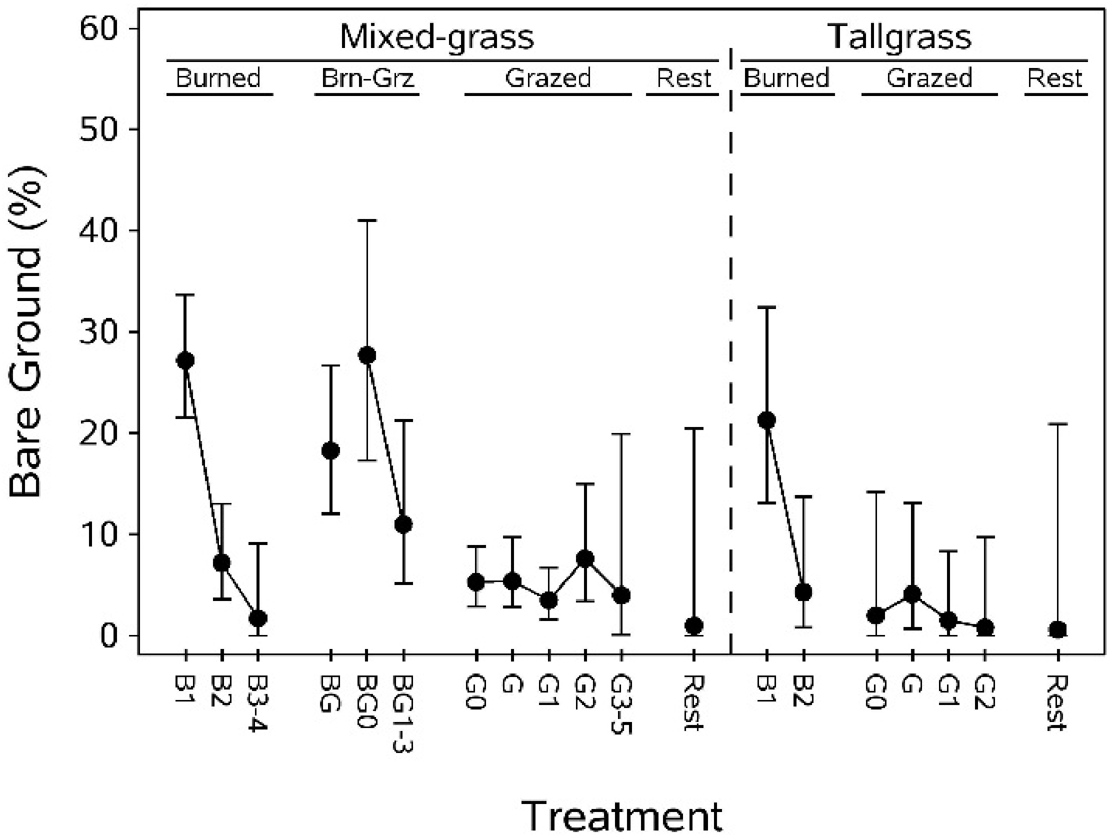
[1]Sources of variation for the model: Y=Unit(Grass type) + Grass type × Treatment + Residual, where Unit(Grass type) and Residual are random effects and Grass type × Treatment is a fixed effect in a mixed-model framework. Post-management treatments were generally defined by the number of growing seasons after the management treatment (for example, B1 = first growing season after burn; B3-4, three to four growing seasons after burning; G0 = grazed during growing season; BG3 = third growing season after burned-grazed; rest = no management treatment within previous 5 years).
[2]Degrees of freedom are based on Kenward-Roger correction for repeated-measures models (Littell and others, 2006).

Table 2.2. Least squares mean (standard error) bare-ground cover (percent) and back-transformed least squares mean (95-percent confidence intervals) bare-ground cover (percent), by grassland type (mixed-grass, tallgrass) and post-management treatment, on Federal lands managed under an adaptive-management framework by the U.S. Fish and Wildlife Service (Gannon and others, 2013) in North Dakota, South Dakota, Minnesota, and Montana, 2011–13.

[LSMean, least squares mean; SE, standard error; LCL, lower confidence limit; UCL, upper confidence limit]

				Back-transformed		
					95-percent confidence intervals	
Grass	Treatment[1]	LSMean	SE	LSMean	LCL	UCL
Mixed	B1	−0.933	0.155	27.2	21.5	33.7
	B2	−2.417	0.309	7.2	3.6	13.0
	B3-4	−3.578	0.713	1.7	0.0	9.1
	BG	−1.430	0.239	18.3	12.0	26.7
	BG0	−0.910	0.300	27.7	17.3	41.0
	BG1-3	−1.991	0.376	11.0	5.1	21.2
	G0	−2.707	0.250	5.3	2.9	8.8
	G	−2.682	0.285	5.4	2.8	9.7
	G1	−3.049	0.286	3.5	1.6	6.7
	G2	−2.368	0.361	7.6	3.4	15.0
	G3-5	−2.935	0.818	4.0	0.1	19.9
	Rest	−3.877	1.317	1.0	0.0	20.5
Tall	B1	−1.251	0.286	21.3	13.1	32.4
	B2	−2.892	0.577	4.3	0.8	13.7
	G0	−3.492	0.904	2.0	0.0	14.2
	G	−2.933	0.575	4.1	0.7	13.1
	G1	−3.661	0.705	1.5	0.0	8.3
	G2	−3.980	0.946	0.8	0.0	9.7
	Rest	−4.126	1.457	0.6	0.0	20.9

[1]Post-management treatments were generally defined by the number of growing seasons after the management treatment (for example, B1 = first growing season after burn; B3-4, three to four growing seasons after burning; G0 = grazed during growing season; BG3 = third growing season after burned-grazed; rest = no management treatment within previous 5 years).



[Brn-Grz, burned-grazed; %, percent]

Figure 2.1. Back-transformed least squares mean bare-ground cover (percent) in Native Prairie Adaptive Management (NPAM) units managed by the U.S. Fish and Wildlife Service in North Dakota, South Dakota, Minnesota, and Montana, 2011–13. Bars represent 95-percent confidence limits. Treatments are defined in tables 2.1 and 2.2.

B. Standard Deviation of Bare-Ground Cover (percent)

Table 2.3. Generalized linear mixed model, assuming a beta distribution with a logit link, *y* = (*y*+0.0), testing the influence of post-management treatments on the standard deviation of mean bare-ground cover (percent) on two grass types on Federal lands managed under an adaptive-management framework by the U.S. Fish and Wildlife Service (Gannon and others, 2013) in North Dakota, South Dakota, Minnesota, and Montana, 2011–13.

[<, less than; *, evidence for moderate effect (0.05<*p*≤0.10); **, evidence for strong effect (*p*≤0.05)]

Effect	Sources of variation[1]	Numerator degrees of freedom	Denominator degrees of freedom[2]	*F*-statistic	*p*-value
Overall	Grass type × Treatment	18	151.8	4.06	<0.0001**
Contrasts:	Mixed: burned linear	1	158.8	11.55	0.0009**
	Mixed: burned quadratic	1	104.5	0.77	0.3821
	Mixed: BG0 versus BG1-3	1	137.1	2.83	0.0950*
	Mixed: grazed linear	1	167.9	0.12	0.7258
	Mixed: grazed quadratic	1	159.9	0.03	0.8663
	Tall: burned linear	1	135.1	7.65	0.0065**
	Tall: grazed linear	1	161.9	0.39	0.5334
	Tall: grazed quadratic	1	134.0	1.05	0.3076
	B1: mixed versus tall	1	167.9	0.60	0.4387
	B2: mixed versus tall	1	168.3	0.55	0.4590
	G0: mixed versus tall	1	166.7	1.63	0.2034
	G: mixed versus tall	1	168.1	0.15	0.6950
	G1: mixed versus tall	1	168.9	2.04	0.1554
	G2: mixed versus tall	1	168.9	3.19	0.0760*
	Mixed: burned versus rest	1	155.1	1.51	0.2211
	Mixed: grazed versus rest	1	155.1	1.15	0.2853
	Mixed: burned-grazed versus rest	1	155.9	4.14	0.0435*
	Mixed: burned versus grazed	1	156.2	0.29	0.5880
	Tall: burned versus rest	1	165.2	3.57	0.0605*
	Tall: grazed versus rest	1	167.6	0.54	0.4640
	Tall: burned versus grazed	1	141.2	9.40	0.0026**

[1]Sources of variation for the model: Y=Unit(Grass type) + Grass type × Treatment + Residual, where Unit(Grass type) and Residual are random effects and Grass type × Treatment is a fixed effect in a mixed-model framework. Post-management treatments were generally defined by the number of growing seasons after the management treatment (for example, B1 = first growing season after burn; B3-4, three to four growing seasons after burning; G0 = grazed during growing season; BG3 = third growing season after burned-grazed; rest = no management treatment within previous 5 years).

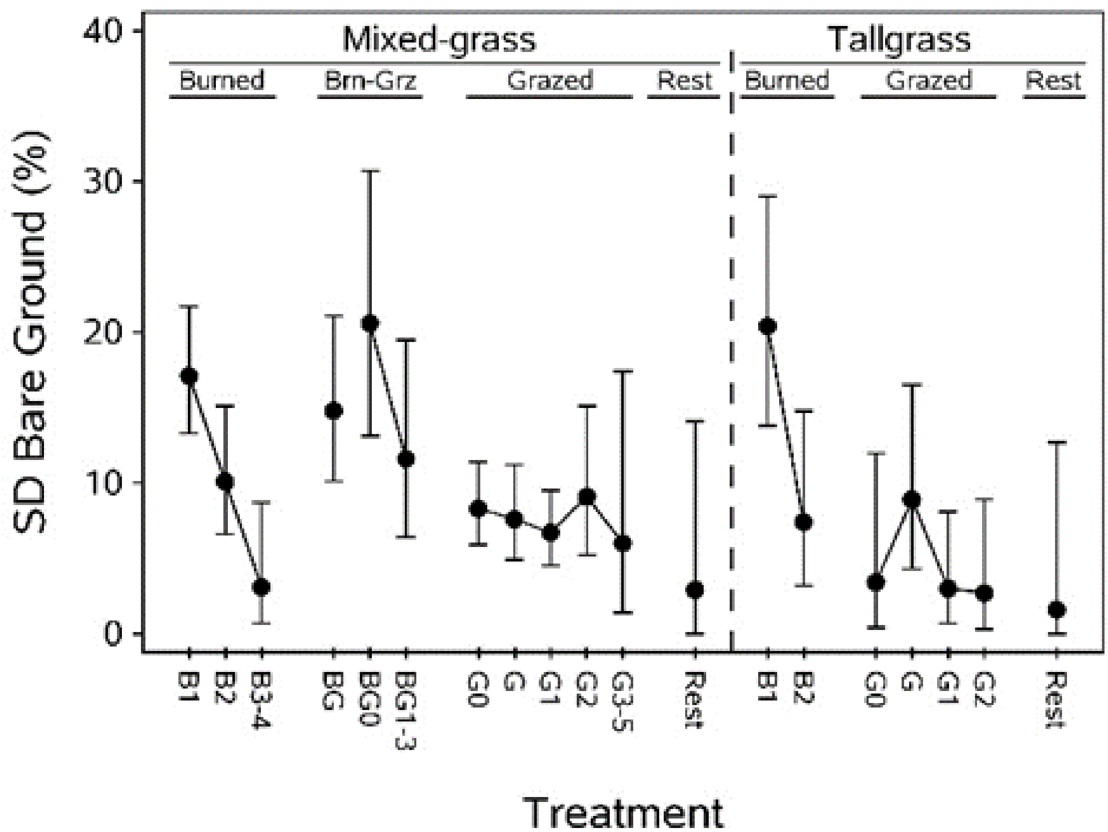
[2]Degrees of freedom are based on Kenward-Roger correction for repeated-measures models (Littell and others, 2006).

Table 2.4. Least squares mean (standard error) and back-transformed least squares mean (95-percent confidence intervals) of the standard deviation of bare-ground cover (percent), by grassland type (mixed-grass, tallgrass) and post-management treatment, on Federal lands managed under an adaptive-management framework by the U.S. Fish and Wildlife Service (Gannon and others, 2013) in North Dakota, South Dakota, Minnesota, and Montana, 2011–13.

[LSMean, least squares mean; SE, standard error; LCL, lower confidence limit; UCL, upper confidence limit]

				Back-transformed		
					95-percent confidence intervals	
Grass	Treatment[1]	LSMean	SE	LSMean	LCL	UCL
Mixed	B1	−1.510	0.144	17.1	13.3	21.7
	B2	−2.077	0.217	10.1	6.6	15.1
	B3-4	−3.160	0.472	3.1	0.7	8.7
	BG	−1.669	0.210	14.8	10.1	21.1
	BG0	−1.289	0.266	20.6	13.1	30.7
	BG1-3	−1.940	0.300	11.6	6.4	19.5
	G0	−2.278	0.167	8.3	5.9	11.4
	G	−2.367	0.201	7.6	4.9	11.2
	G1	−2.489	0.179	6.7	4.5	9.5
	G2	−2.184	0.270	9.1	5.2	15.1
	G3-5	−2.590	0.563	6.0	1.4	17.4
	Rest	−3.209	0.757	2.9	0.0	14.1
Tall	B1	−1.299	0.230	20.4	13.8	29.0
	B2	−2.395	0.370	7.4	3.2	14.8
	G0	−3.072	0.598	3.4	0.4	12.0
	G	−2.213	0.339	8.9	4.3	16.5
	G1	−3.178	0.449	3.0	0.7	8.1
	G2	−3.256	0.536	2.7	0.3	8.9
	Rest	−3.620	0.908	1.6	0.0	12.7

[1]Post-management treatments were generally defined by the number of growing seasons after the management treatment (for example, B1 = first growing season after burn; B3-4, three to four growing seasons after burning; G0 = grazed during growing season; BG3 = third growing season after burned-grazed; rest = no management treatment within previous 5 years).



[Brn-Grz, burned-grazed; %, percent; SD, standard deviation]

Figure 2.2. Back-transformed least squares mean standard deviation of bare-ground cover (percent) in Native Prairie Adaptive Management (NPAM) units managed by the U.S. Fish and Wildlife Service in North Dakota, South Dakota, Minnesota, and Montana, 2011–13. Bars represent 95-percent confidence limits. Treatments are defined in tables 2.3 and 2.4.

C. Mean Litter Depth (centimeters)

Table 2.5. Generalized linear mixed model, assuming a gamma distribution with a log link, y = (y+1), testing the influence of post-management treatments on mean litter depth (centimeters) on two grass types on Federal lands managed under an adaptive-management framework by the U.S. Fish and Wildlife Service (Gannon and others, 2013) in North Dakota, South Dakota, Minnesota, and Montana, 2011–13.

[<, less than; *, evidence for moderate effect (0.05<p≤0.10); **, evidence for strong effect (p≤0.05)]

Effect	Sources of variation[1]	Numerator degrees of freedom	Denominator degrees of freedom[2]	*F*-statistic	*p*-value
Overall	Grass type × Treatment	18	152.7	5.04	<0.0001**
Contrasts:	Mixed: burned linear	1	155.3	29.09	<0.0001**
	Mixed: burned quadratic	1	96.9	0.13	0.7215
	Mixed: BG0 versus BG1-3	1	141.0	1.96	0.1642
	Mixed: grazed linear	1	167.1	3.72	0.0553*
	Mixed: grazed quadratic	1	158.4	0.32	0.5718
	Tall: burned linear	1	125.6	10.78	0.0013**
	Tall: grazed linear	1	159.7	0.00	0.9784
	Tall: grazed quadratic	1	141.4	2.91	0.0901*
	B1: mixed versus tall	1	168.1	0.00	0.9832
	B2: mixed versus tall	1	168.7	0.70	0.4034
	G0: mixed versus tall	1	167.2	3.20	0.0753*
	G: mixed versus tall	1	168.2	0.07	0.7973
	G1: mixed versus tall	1	168.9	0.01	0.9053
	G2: mixed versus tall	1	168.3	0.44	0.5072
	Mixed: burned versus rest	1	155.7	4.18	0.0426**
	Mixed: grazed versus rest	1	156.8	1.72	0.1913
	Mixed: burned-grazed versus rest	1	158.2	9.79	0.0021**
	Mixed: burned versus grazed	1	146.8	3.46	0.0648*
	Tall: burned versus rest	1	161.5	3.81	0.0525*
	Tall: grazed versus rest	1	167.8	0.21	0.6448
	Tall: burned versus grazed	1	140.6	7.10	0.0086**

[1]Sources of variation for the model: Y=Unit(Grass type) + Grass type × Treatment + Residual, where Unit(Grass type) and Residual are random effects and Grass type × Treatment is a fixed effect in a mixed-model framework. Post-management treatments were generally defined by the number of growing seasons after the management treatment (for example, B1 = first growing season after burn; B3-4, three to four growing seasons after burning; G0 = grazed during growing season; BG3 = third growing season after burned-grazed; rest = no management treatment within previous 5 years).

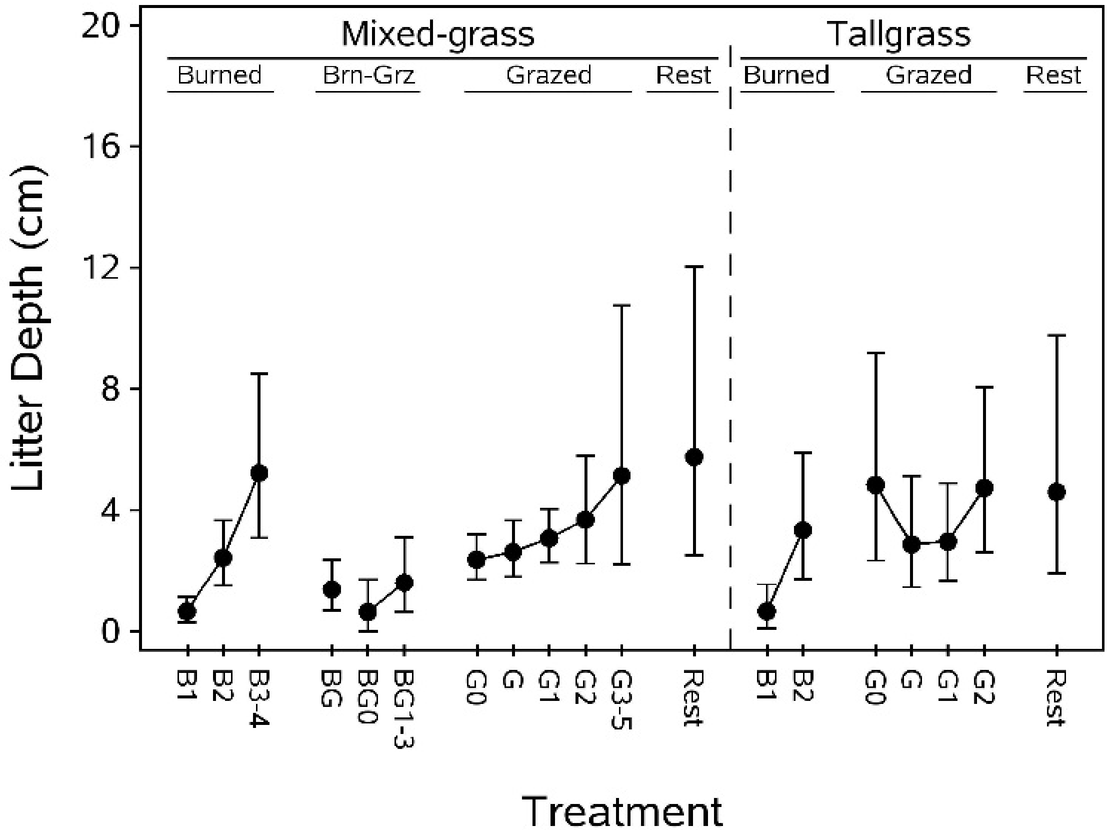
[2]Degrees of freedom are based on Kenward-Roger correction for repeated-measures models (Littell and others, 2006).

Table 2.6. Least squares mean (standard error) litter depth (centimeters) and back-transformed least squares mean (95-percent confidence intervals) litter depth (centimeters), by grassland type (mixed-grass, tallgrass) and post-management treatment, on Federal lands managed under an adaptive-management framework by the U.S. Fish and Wildlife Service (Gannon and others, 2013) in North Dakota, South Dakota, Minnesota, and Montana, 2011–13.

[LSMean, least squares mean; SE, standard error; LCL, lower confidence limit; UCL, upper confidence limit]

				Back-transformed		
					95-percent confidence intervals	
Grass	Treatment[1]	LSMean	SE	LSMean	LCL	UCL
Mixed	B1	0.50	0.13	0.66	0.29	1.13
	B2	1.23	0.16	2.43	1.51	3.67
	B3-4	1.83	0.22	5.23	3.08	8.50
	BG	0.87	0.18	1.38	0.68	2.37
	BG0	0.49	0.25	0.64	0.00	1.70
	BG1-3	0.96	0.23	1.61	0.66	3.10
	G0	1.22	0.11	2.37	1.71	3.20
	G	1.29	0.13	2.62	1.80	3.67
	G1	1.40	0.11	3.07	2.28	4.05
	G2	1.55	0.19	3.69	2.24	5.80
	G3-5	1.81	0.33	5.14	2.21	10.74
	Rest	1.91	0.34	5.76	2.50	12.05
Tall	B1	0.51	0.22	0.66	0.09	1.55
	B2	1.47	0.24	3.34	1.74	5.89
	G0	1.76	0.28	4.83	2.34	9.19
	G	1.35	0.23	2.87	1.45	5.12
	G1	1.38	0.20	2.96	1.66	4.89
	G2	1.75	0.23	4.73	2.62	8.06
	Rest	1.72	0.33	4.60	1.92	9.77

[1]Post-management treatments were generally defined by the number of growing seasons after the management treatment (for example, B1 = first growing season after burn; B3-4, three to four growing seasons after burning; G0 = grazed during growing season; BG3 = third growing season after burned-grazed; rest = no management treatment within previous 5 years).



[Brn-Grz, burned-grazed; cm, centimeters]

Figure 2.3. Back-transformed least squares mean litter depth (centimeters) in Native Prairie Adaptive Management (NPAM) units managed by the U.S. Fish and Wildlife Service in North Dakota, South Dakota, Minnesota, and Montana, 2011–13. Bars represent 95-percent confidence limits. Treatments are defined in tables 2.5 and 2.6.

D. Standard Deviation of Litter Depth (centimeters)

Table 2.7. Generalized linear mixed model, assuming a normal distribution with a log link, *y* = (*y*+1), testing the influence of post-management treatments on the standard deviation of the mean litter depth (centimeters) on two grass types on Federal lands managed under an adaptive-management framework by the U.S. Fish and Wildlife Service (Gannon and others, 2013) in North Dakota, South Dakota, Minnesota, and Montana, 2011–13.

Effect	Sources of variation[1]	Numerator degrees of freedom	Denominator degrees of freedom[2]	*F*-statistic	*p*-value
Overall	Grass type × Treatment	18	156.4	1.37	0.1521
Contrasts:	Mixed: burned linear	1	163.6	7.22	0.0079
	Mixed: burned quadratic	1	98.9	0.05	0.8308
	Mixed: BG0 versus BG1-3	1	157.6	0.91	0.3427
	Mixed: grazed linear	1	162.5	0.93	0.3355
	Mixed: grazed quadratic	1	157.4	0.12	0.7307
	Tall: burned linear	1	144.3	4.84	0.0294
	Tall: grazed linear	1	162.2	0.13	0.7152
	Tall: grazed quadratic	1	148.8	0.59	0.4447
	B1: mixed versus tall	1	168.8	0.03	0.8607
	B2: mixed versus tall	1	168.9	5.36	0.0219
	G0: mixed versus tall	1	168.5	0.65	0.4215
	G: mixed versus tall	1	168.6	0.04	0.8468
	G1: mixed versus tall	1	169.0	0.48	0.4877
	G2: mixed versus tall	1	168.7	0.01	0.9284
	Mixed: burned versus rest	1	159.1	1.89	0.1707
	Mixed: grazed versus rest	1	163.3	1.17	0.2803
	Mixed: burned-grazed versus rest	1	161.0	3.25	0.0733
	Mixed: burned versus grazed	1	128.3	0.41	0.5255
	Tall: burned versus rest	1	165.5	0.06	0.8114
	Tall: grazed versus rest	1	168.7	0.02	0.8776
	Tall: burned versus grazed	1	147.1	0.03	0.8643

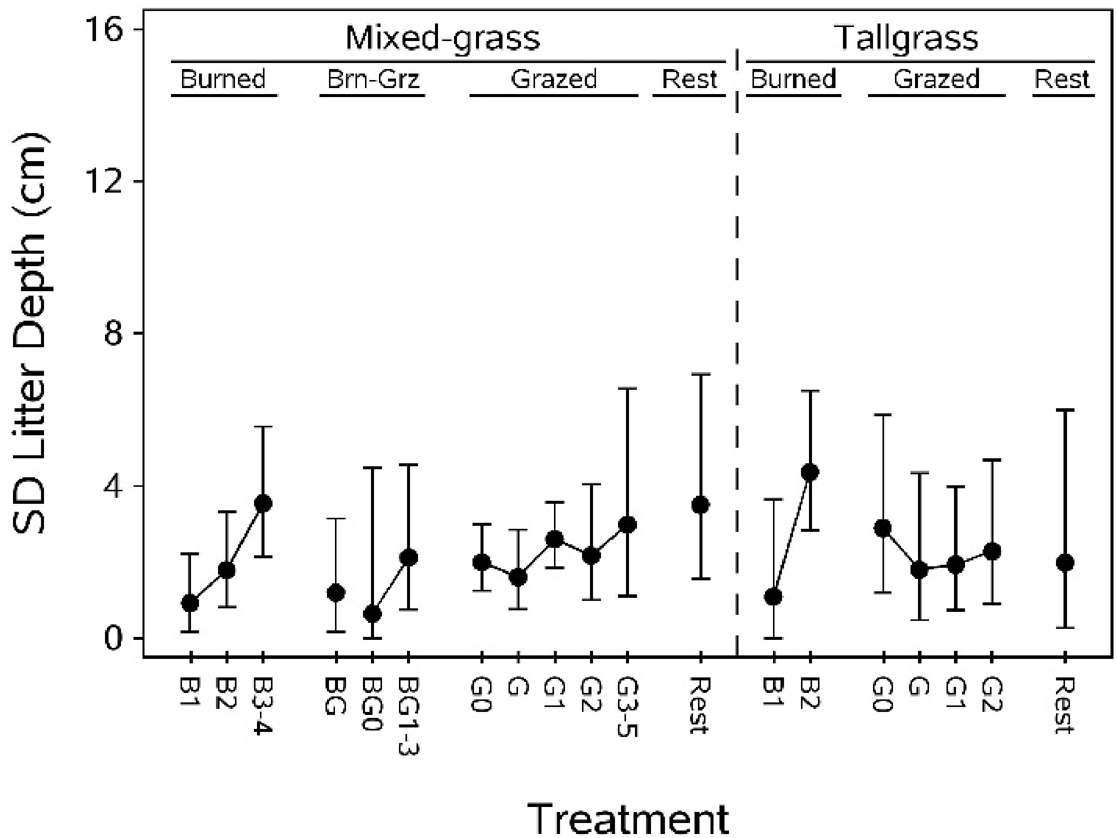
[1]Sources of variation for the model: Y=Unit(Grass type) + Grass type × Treatment + Residual, where Unit(Grass type) and Residual are random effects and Grass type × Treatment is a fixed effect in a mixed-model framework. Post-management treatments were generally defined by the number of growing seasons after the management treatment (for example, B1 = first growing season after burn; B3-4, three to four growing seasons after burning; G0 = grazed during growing season; BG3 = third growing season after burned-grazed; rest = no management treatment within previous 5 years).
[2]Degrees of freedom are based on Kenward-Roger correction for repeated-measures models (Littell and others, 2006).

Table 2.8. Least squares mean (standard error) and back-transformed least squares mean (95-percent confidence intervals) standard deviation of litter depth (centimeters), by grassland type (mixed-grass, tallgrass) and post-management treatment, on Federal lands managed under an adaptive-management framework by the U.S. Fish and Wildlife Service (Gannon and others, 2013) in North Dakota, South Dakota, Minnesota, and Montana, 2011–13.

[LSMean, least squares mean; SE, standard error; LCL, lower confidence limit; UCL, upper confidence limit]

				Back-transformed		
					95-percent confidence intervals	
Grass	Treatment[1]	LSMean	SE	LSMean	LCL	UCL
Mixed	B1	0.65	0.26	0.92	0.15	2.21
	B2	1.03	0.22	1.79	0.80	3.33
	B3-4	1.51	0.19	3.54	2.14	5.56
	BG	0.79	0.32	1.19	0.16	3.14
	BG0	0.49	0.61	0.64	0.00	4.47
	BG1-3	1.14	0.30	2.12	0.75	4.56
	G0	1.10	0.15	1.99	1.24	2.99
	G	0.96	0.20	1.60	0.76	2.84
	G1	1.28	0.12	2.60	1.85	3.56
	G2	1.15	0.24	2.17	1.00	4.04
	G3-5	1.38	0.33	2.98	1.09	6.55
	Rest	1.50	0.29	3.50	1.56	6.92
Tall	B1	0.74	0.41	1.09	0.00	3.64
	B2	1.68	0.17	4.36	2.83	6.50
	G0	1.36	0.29	2.89	1.20	5.86
	G	1.03	0.33	1.80	0.47	4.33
	G1	1.08	0.27	1.93	0.72	3.99
	G2	1.19	0.28	2.28	0.89	4.68
	Rest	1.09	0.44	1.98	0.27	6.00

[1]Post-management treatments were generally defined by the number of growing seasons after the management treatment (for example, B1 = first growing season after burn; B3-4, three to four growing seasons after burning; G0 = grazed during growing season; BG3 = third growing season after burned-grazed; rest = no management treatment within previous 5 years).



[Brn-Grz, burned-grazed; cm, centimeters; SD, standard deviation]

Figure 2.4. Back-transformed least squares mean standard deviation of litter depth (centimeters) in Native Prairie Adaptive Management (NPAM) units managed by the U.S. Fish and Wildlife Service in North Dakota, South Dakota, Minnesota, and Montana, 2011–13. Bars represent 95-percent confidence limits. Treatments are defined in tables 2.7 and 2.8.

E. Mean Maximum Vegetation Height (centimeters)

Table 2.9. Generalized linear mixed model, assuming a gamma distribution with a log link, y = (y+1), testing the influence of post-management treatments on maximum vegetation height (centimeters) on two grass types on Federal lands managed under an adaptive-management framework by the U.S. Fish and Wildlife Service (Gannon and others, 2013) in North Dakota, South Dakota, Minnesota, and Montana, 2011–13.

[<, less than; *, evidence for moderate effect (0.05<p≤0.10); **, evidence for strong effect (p≤0.05)]

Effect	Sources of variation[1]	Numerator degrees of freedom	Denominator degrees of freedom[2]	*F*-statistic	*p*-value
Overall	Grass type × Treatment	18	154.1	3.65	<0.0001**
Contrasts:	Mixed: burned linear	1	159.4	3.41	0.0667*
	Mixed: burned quadratic	1	96.5	2.05	0.1555
	Mixed: BG0 versus BG1-3	1	146.5	4.79	0.0302**
	Mixed: grazed linear	1	165.3	2.39	0.1237
	Mixed: grazed quadratic	1	159.1	0.00	0.9799
	Tall: burned linear	1	122.5	1.25	0.2649
	Tall: grazed linear	1	161.6	17.91	<0.0001**
	Tall: grazed quadratic	1	142.7	0.84	0.3619
	B1: mixed versus tall	1	168.5	1.50	0.2222
	B2: mixed versus tall	1	168.8	0.27	0.6056
	G0: mixed versus tall	1	167.9	4.74	0.0308**
	G: mixed versus tall	1	168.4	0.56	0.4533
	G1: mixed versus tall	1	169.0	6.93	0.0093**
	G2: mixed versus tall	1	168.5	0.08	0.7836
	Mixed: burned versus rest	1	159.8	0.86	0.3546
	Mixed: grazed versus rest	1	161.2	2.78	0.0972*
	Mixed: burned-grazed versus rest	1	161.3	4.41	0.0373**
	Mixed: burned versus grazed	1	137.8	3.24	0.0742*
	Tall: burned versus rest	1	162.6	0.45	0.5021
	Tall: grazed versus rest	1	168.2	0.10	0.7530
	Tall: burned versus grazed	1	137.2	2.98	0.0866*

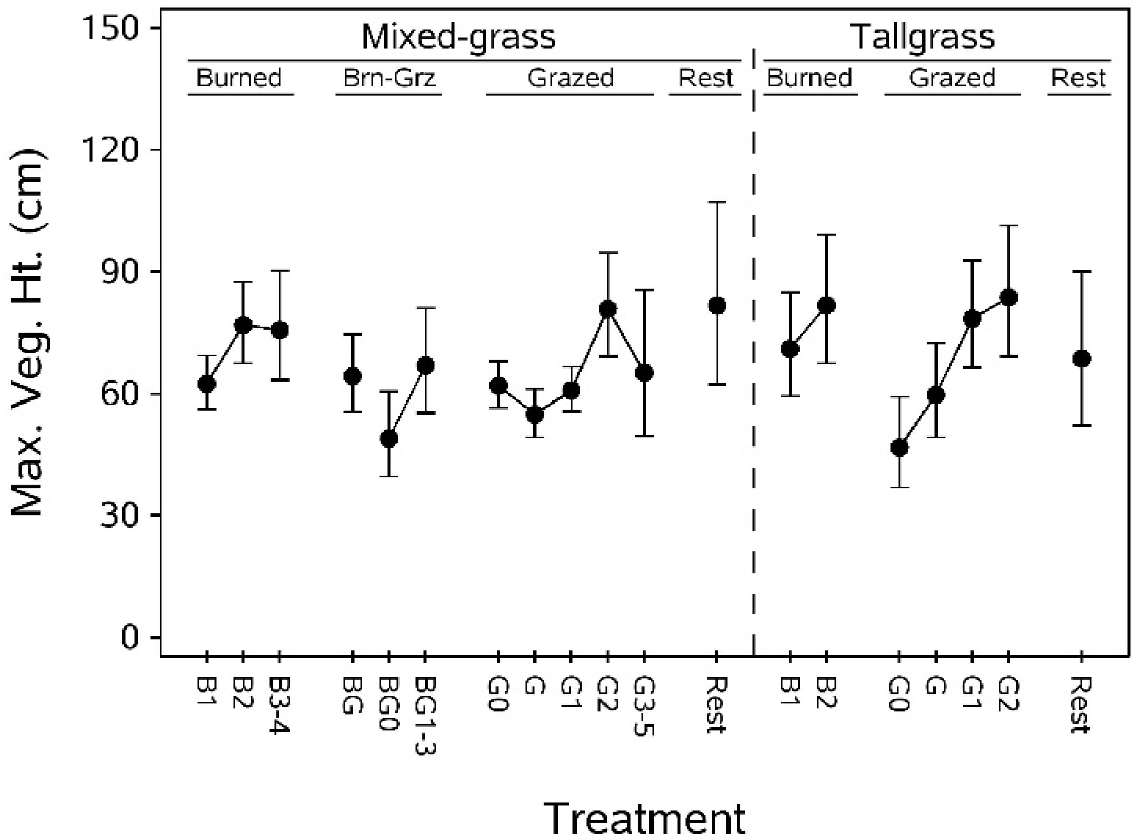
[1]Sources of variation for the model: Y=Unit(Grass type) + Grass type × Treatment + Residual, where Unit(Grass type) and Residual are random effects and Grass type × Treatment is a fixed effect in a mixed-model framework. Post-management treatments were generally defined by the number of growing seasons after the management treatment (for example, B1 = first growing season after burn; B3-4, three to four growing seasons after burning; G0 = grazed during growing season; BG3 = third growing season after burned-grazed; rest = no management treatment within previous 5 years).
[2]Degrees of freedom are based on Kenward-Roger correction for repeated-measures models (Littell and others, 2006).

Table 2.10. Least squares mean (standard error) and back-transformed least squares mean (95-percent confidence intervals) maximum vegetation height (centimeters), by grassland type (mixed-grass, tallgrass) and post-management treatment, on Federal lands managed under an adaptive-management framework by the U.S. Fish and Wildlife Service (Gannon and others, 2013) in North Dakota, South Dakota, Minnesota, and Montana, 2011–13.

[LSMean, least squares mean; SE, standard error; LCL, lower confidence limit; UCL, upper confidence limit]

				Back-transformed		
					95-percent confidence intervals	
Grass	Treatment[1]	LSMean	SE	LSMean	LCL	UCL
Mixed	B1	4.15	0.05	62.37	56.12	69.31
	B2	4.36	0.07	76.87	67.47	87.55
	B3-4	4.34	0.09	75.62	63.30	90.30
	BG	4.18	0.07	64.30	55.42	74.57
	BG0	3.91	0.11	48.97	39.62	60.48
	BG1-3	4.22	0.10	66.92	55.24	81.04
	G0	4.14	0.05	61.96	56.48	67.95
	G	4.02	0.05	54.85	49.23	61.11
	G1	4.12	0.05	60.82	55.54	66.59
	G2	4.41	0.08	80.87	69.16	94.53
	G3-5	4.19	0.14	65.13	49.57	85.49
	Rest	4.41	0.14	81.68	62.16	107.22
Tall	B1	4.28	0.09	71.01	59.39	84.85
	B2	4.42	0.10	81.73	67.41	99.04
	G0	3.87	0.12	46.74	36.86	59.20
	G	4.11	0.10	59.70	49.23	72.36
	G1	4.38	0.08	78.45	66.42	92.64
	G2	4.44	0.10	83.72	69.09	101.41
	Rest	4.24	0.14	68.59	52.19	90.05

[1]Post-management treatments were generally defined by the number of growing seasons after the management treatment (for example, B1 = first growing season after burn; B3-4, three to four growing seasons after burning; G0 = grazed during growing season; BG3 = third growing season after burned-grazed; rest = no management treatment within previous 5 years).



[Brn-Grz, burned-grazed; cm, centimeters; Max., maximum; Veg., vegetation; Ht., height]

Figure 2.5. Back-transformed least squares mean maximum vegetation height (centimeters) in Native Prairie Adaptive Management (NPAM) units managed by the U.S. Fish and Wildlife Service in North Dakota, South Dakota, Minnesota, and Montana, 2011–13. Bars represent 95-percent confidence limits. Treatments are defined in tables 2.9 and 2.10.

F. Standard Deviation of Maximum Vegetation Height (centimeters)

Table 2.11. Generalized linear mixed model, assuming a gamma distribution with a log link, $y = (y+1)$, testing the influence of post-management treatments on the standard deviation of maximum vegetation height on two grass types on Federal lands managed under an adaptive-management framework by the U.S. Fish and Wildlife Service (Gannon and others, 2013) in North Dakota, South Dakota, Minnesota, and Montana, 2011–13.

Effect	Sources of variation[1]	Numerator degrees of freedom	Denominator degrees of freedom[2]	*F*-statistic	*p*-value
Overall	Grass type × Treatment	18	159.0	1.10	0.3599
Contrasts:	Mixed: burned linear	1	164.9	0.56	0.4548
	Mixed: burned quadratic	1	113.5	0.07	0.7886
	Mixed: BG0 versus BG1-3	1	157.3	1.62	0.2045
	Mixed: grazed linear	1	165.2	0.97	0.3267
	Mixed: grazed quadratic	1	162.9	0.01	0.9119
	Tall: burned linear	1	132.6	1.77	0.1859
	Tall: grazed linear	1	165.2	0.36	0.5468
	Tall: grazed quadratic	1	151.7	0.71	0.4023
	B1: mixed versus tall	1	168.9	5.39	0.0214
	B2: mixed versus tall	1	169.0	0.01	0.9120
	G0: mixed versus tall	1	168.7	0.00	0.9540
	G: mixed versus tall	1	168.8	0.48	0.4886
	G1: mixed versus tall	1	169.0	0.14	0.7059
	G2: mixed versus tall	1	168.8	0.03	0.8554
	Mixed: burned versus rest	1	165.2	0.01	0.9332
	Mixed: grazed versus rest	1	166.1	0.19	0.6608
	Mixed: burned-grazed versus rest	1	165.6	0.00	0.9738
	Mixed: burned versus grazed	1	140.8	0.79	0.3755
	Tall: burned versus rest	1	165.5	1.23	0.2686
	Tall: grazed versus rest	1	168.7	0.00	0.9536
	Tall: burned versus grazed	1	144.2	3.59	0.0602

[1]Sources of variation for the model: Y=Unit(Grass type) + Grass type × Treatment + Residual, where Unit(Grass type) and Residual are random effects and Grass type × Treatment is a fixed effect in a mixed-model framework. Post-management treatments were generally defined by the number of growing seasons after the management treatment (for example, B1 = first growing season after burn; B3-4, three to four growing seasons after burning; G0 = grazed during growing season; BG3 = third growing season after burned-grazed; rest = no management treatment within previous 5 years).

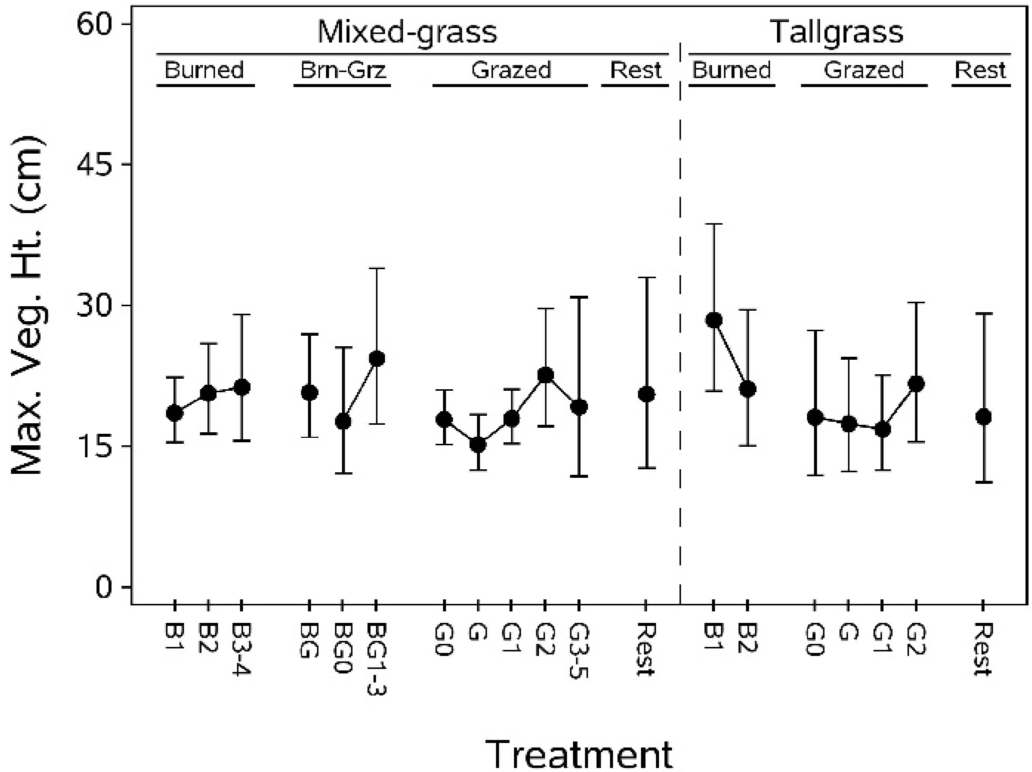
[2]Degrees of freedom are based on Kenward-Roger correction for repeated-measures models (Littell and others, 2006).

Table 2.12. Least squares mean (standard error) and back-transformed least squares mean (95-percent confidence intervals) standard deviation of maximum vegetation height (centimeters), by grassland type (mixed-grass, tallgrass) and post-management treatment, on Federal lands managed under an adaptive-management framework by the U.S. Fish and Wildlife Service (Gannon and others, 2013) in North Dakota, South Dakota, Minnesota, and Montana, 2011–13.

[LSMean, least squares mean; SE, standard error; LCL, lower confidence limit; UCL, upper confidence limit]

				Back-transformed		
					95-percent confidence intervals	
Grass	Treatment[1]	LSMean	SE	LSMean	LCL	UCL
Mixed	B1	2.97	0.09	18.55	15.39	22.32
	B2	3.08	0.11	20.65	16.40	25.94
	B3-4	3.10	0.15	21.30	15.55	29.03
	BG	3.08	0.13	20.75	15.95	26.90
	BG0	2.93	0.18	17.66	12.12	25.54
	BG1-3	3.23	0.16	24.35	17.38	33.97
	G0	2.94	0.08	17.87	15.17	21.02
	G	2.78	0.09	15.16	12.49	18.36
	G1	2.94	0.08	17.95	15.29	21.05
	G2	3.16	0.13	22.59	17.14	29.68
	G3-5	3.01	0.23	19.20	11.82	30.84
	Rest	3.07	0.23	20.57	12.69	32.99
Tall	B1	3.38	0.15	28.46	20.87	38.68
	B2	3.10	0.16	21.13	15.05	29.53
	G0	2.95	0.20	18.10	11.88	27.33
	G	2.91	0.16	17.41	12.35	24.40
	G1	2.88	0.14	16.83	12.49	22.55
	G2	3.12	0.16	21.69	15.45	30.30
	Rest	2.95	0.23	18.14	11.15	29.17

[1]Post-management treatments were generally defined by the number of growing seasons after the management treatment (for example, B1 = first growing season after burn; B3-4, three to four growing seasons after burning; G0 = grazed during growing season; BG3 = third growing season after burned-grazed; rest = no management treatment within previous 5 years).



[Brn-Grz, burned-grazed; cm, centimeter; Max., maximum; Veg., vegetation; Ht., height]

Figure 2.6. Back-transformed least squares mean standard deviation of maximum vegetation height (centimeters) in Native Prairie Adaptive Management (NPAM) units managed by the U.S. Fish and Wildlife Service in North Dakota, South Dakota, Minnesota, and Montana, 2011–13. Bars represent 95-percent confidence limits. Treatments are defined in tables 2.11 and 2.12.

G. Mean Vertical Obstruction Reading (VOR, decimeters)

Table 2.13. Generalized linear mixed model, assuming a gamma distribution with a log link, $y = (y+1.0)$, testing the influence of post-management treatments on mean vertical obstruction readings (decimeters) on two grass types on Federal lands managed under an adaptive-management framework by the U.S. Fish and Wildlife Service (Gannon and others, 2013) in North Dakota, South Dakota, Minnesota, and Montana, 2011–13.

[<, less than; *, evidence for moderate effect ($0.05<p\leq0.10$); **, evidence for strong effect ($p\leq0.05$)]

Effect	Sources of variation[1]	Numerator degrees of freedom	Denominator degrees of freedom[2]	*F*-statistic	*p*-value
Overall	Grass type × Treatment	18	146.2	6.00	<0.0001**
Contrasts:	Mixed: burned linear	1	142.9	6.78	0.0102**
	Mixed: burned quadratic	1	89.9	1.19	0.2775
	Mixed: BG0 versus BG1-3	1	126.1	14.54	0.0002**
	Mixed: grazed linear	1	168.9	7.34	0.0074**
	Mixed: grazed quadratic	1	153.9	0.49	0.4867
	Tall: burned linear	1	121.9	1.09	0.2991
	Tall: grazed linear	1	153.4	13.01	0.0004**
	Tall: grazed quadratic	1	133.4	3.76	0.0547*
	B1: mixed versus tall	1	166.5	2.62	0.1076
	B2: mixed versus tall	1	167.9	0.54	0.4617
	G0: mixed versus tall	1	165.3	0.02	0.8896
	G: mixed versus tall	1	168.2	7.73	0.0061**
	G1: mixed versus tall	1	168.5	11.75	0.0008**
	G2: mixed versus tall	1	168.0	0.65	0.4197
	Mixed: burned versus rest	1	143.6	2.91	0.0902*
	Mixed: grazed versus rest	1	143.8	8.92	0.0033**
	Mixed: burned-grazed versus rest	1	148.5	10.56	0.0014**
	Mixed: burned versus grazed	1	159.2	9.50	0.0024**
	Tall: burned versus rest	1	158.1	0.00	0.9907
	Tall: grazed versus rest	1	167.3	0.55	0.4609
	Tall: burned versus grazed	1	141.3	1.36	0.2450

[1]Sources of variation for the model: Y=Unit(Grass type) + Grass type × Treatment + Residual, where Unit(Grass type) and Residual are random effects and Grass type × Treatment is a fixed effect in a mixed-model framework. Post-management treatments were generally defined by the number of growing seasons after the management treatment (for example, B1 = first growing season after burn; B3-4, three to four growing seasons after burning; G0 = grazed during growing season; BG3 = third growing season after burned-grazed; rest = no management treatment within previous 5 years).

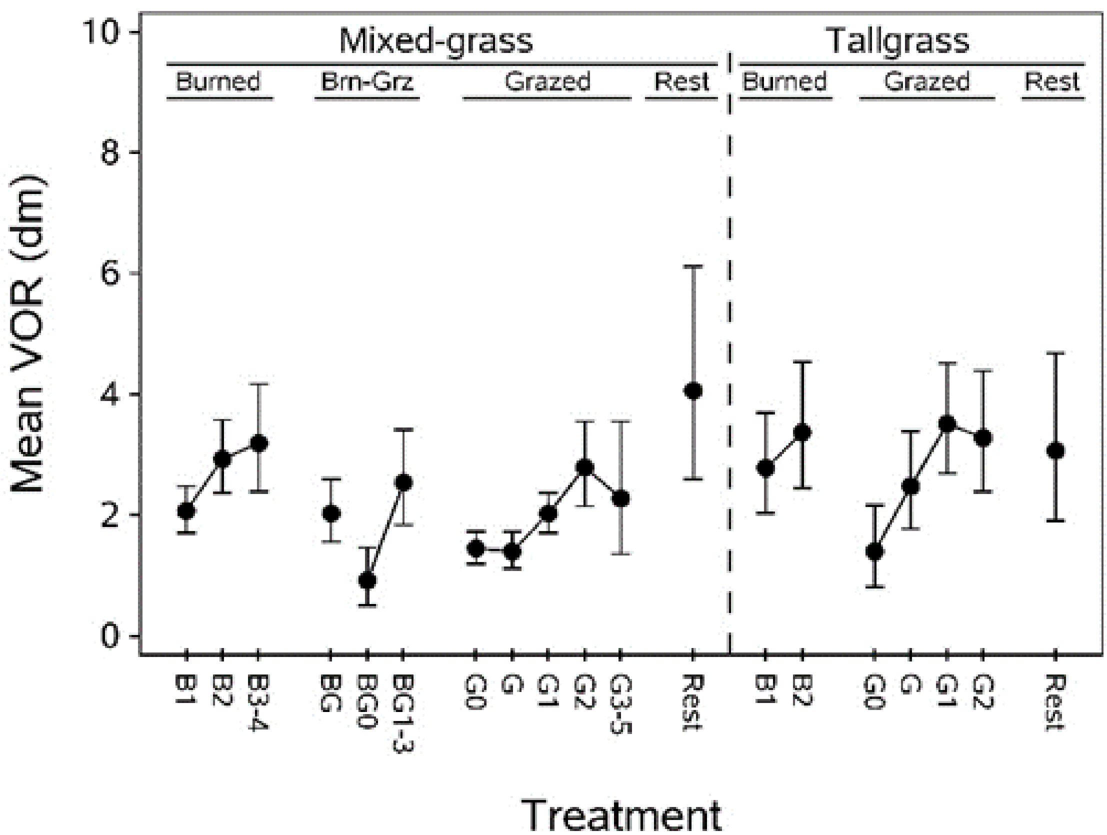
[2]Degrees of freedom are based on Kenward-Roger correction for repeated-measures models (Littell and others, 2006).

Table 2.14. Least squares mean (standard error) and back-transformed least squares mean (95-percent confidence intervals) vertical obstruction readings (decimeters), by grassland type (mixed-grass, tallgrass) and post-management treatment, on Federal lands managed under an adaptive-management framework by the U.S. Fish and Wildlife Service (Gannon and others, 2013) in North Dakota, South Dakota, Minnesota, and Montana, 2011–13.

[LSMean, least squares mean; SE, standard error; LCL, lower confidence limit; UCL, upper confidence limit]

				Back-transformed		
					95-percent confidence intervals	
Grass	Treatment[1]	LSMean	SE	LSMean	LCL	UCL
Mixed	B1	1.12	0.06	2.07	1.70	2.48
	B2	1.37	0.08	2.93	2.37	3.58
	B3-4	1.43	0.11	3.19	2.39	4.17
	BG	1.11	0.09	2.03	1.56	2.59
	BG0	0.65	0.13	0.92	0.50	1.46
	BG1-3	1.26	0.11	2.54	1.84	3.41
	G0	0.90	0.06	1.45	1.19	1.73
	G	0.88	0.06	1.40	1.11	1.72
	G1	1.11	0.06	2.03	1.71	2.37
	G2	1.33	0.09	2.79	2.15	3.55
	G3-5	1.19	0.17	2.28	1.36	3.55
	Rest	1.62	0.17	4.06	2.59	6.12
Tall	B1	1.33	0.11	2.78	2.04	3.69
	B2	1.47	0.12	3.37	2.45	4.53
	G0	0.87	0.14	1.40	0.81	2.16
	G	1.25	0.12	2.48	1.77	3.38
	G1	1.51	0.10	3.51	2.69	4.52
	G2	1.45	0.12	3.28	2.39	4.39
	Rest	1.40	0.17	3.07	1.91	4.68

[1]Post-management treatments were generally defined by the number of growing seasons after the management treatment (for example, B1 = first growing season after burn; B3-4, three to four growing seasons after burning; G0 = grazed during growing season; BG3 = third growing season after burned-grazed; rest = no management treatment within previous 5 years).



[Brn-Grz, burned-grazed; dm, decimeter; VOR, vertical obstruction reading]

Figure 2.7. Back-transformed least squares mean vertical obstruction readings (decimeters) in Native Prairie Adaptive Management (NPAM) units managed by the U.S. Fish and Wildlife Service in North Dakota, South Dakota, Minnesota, and Montana, 2011–13. Bars represent 95-percent confidence limits. Treatments are defined in tables 2.13 and 2.14.

H. Standard Deviation of Vertical Obstruction Reading (VOR, decimeters)

Table 2.15. Generalized linear mixed model, assuming a gamma distribution with a log link, y = (y+1), testing the influence of post-management treatments on the standard deviation of vertical obstruction readings (decimeters) on two grass types on Federal lands managed under an adaptive-management framework by the U.S. Fish and Wildlife Service (Gannon and others, 2013) in North Dakota, South Dakota, Minnesota, and Montana, 2011–13.

[<, less than; *, evidence for moderate effect (0.05<p≤0.10); **, evidence for strong effect (p≤0.05)]

Effect	Sources of variation[1]	Numerator degrees of freedom	Denominator degrees of freedom[2]	*F*-statistic	*p*-value
Overall	Grass type × Treatment	18	148.9	3.85	<0.0001**
Contrasts:	Mixed: burned linear	1	148.3	1.82	0.1791
	Mixed: burned quadratic	1	91.8	0.27	0.6025
	Mixed: BG0 versus BG1-3	1	132.0	11.32	0.0010**
	Mixed: grazed linear	1	168.3	3.89	0.0503*
	Mixed: grazed quadratic	1	155.8	0.01	0.9342
	Tall: burned linear	1	123.1	0.77	0.3829
	Tall: grazed linear	1	156.2	4.63	0.0330**
	Tall: grazed quadratic	1	136.4	1.64	0.2019
	B1: mixed versus tall	1	167.3	5.13	0.0247**
	B2: mixed versus tall	1	168.3	0.07	0.7961
	G0: mixed versus tall	1	166.1	0.85	0.3586
	G: mixed versus tall	1	168.1	2.38	0.1249
	G1: mixed versus tall	1	168.8	0.92	0.3395
	G2: mixed versus tall	1	168.1	0.07	0.7907
	Mixed: burned versus rest	1	148.8	0.45	0.5020
	Mixed: grazed versus rest	1	149.5	4.44	0.0368**
	Mixed: burned-grazed versus rest	1	152.8	2.94	0.0882*
	Mixed: burned versus grazed	1	153.5	12.13	0.0006**
	Tall: burned versus rest	1	159.3	2.80	0.0960*
	Tall: grazed versus rest	1	167.4	0.09	0.7610
	Tall: burned versus grazed	1	140.4	11.60	0.0009**

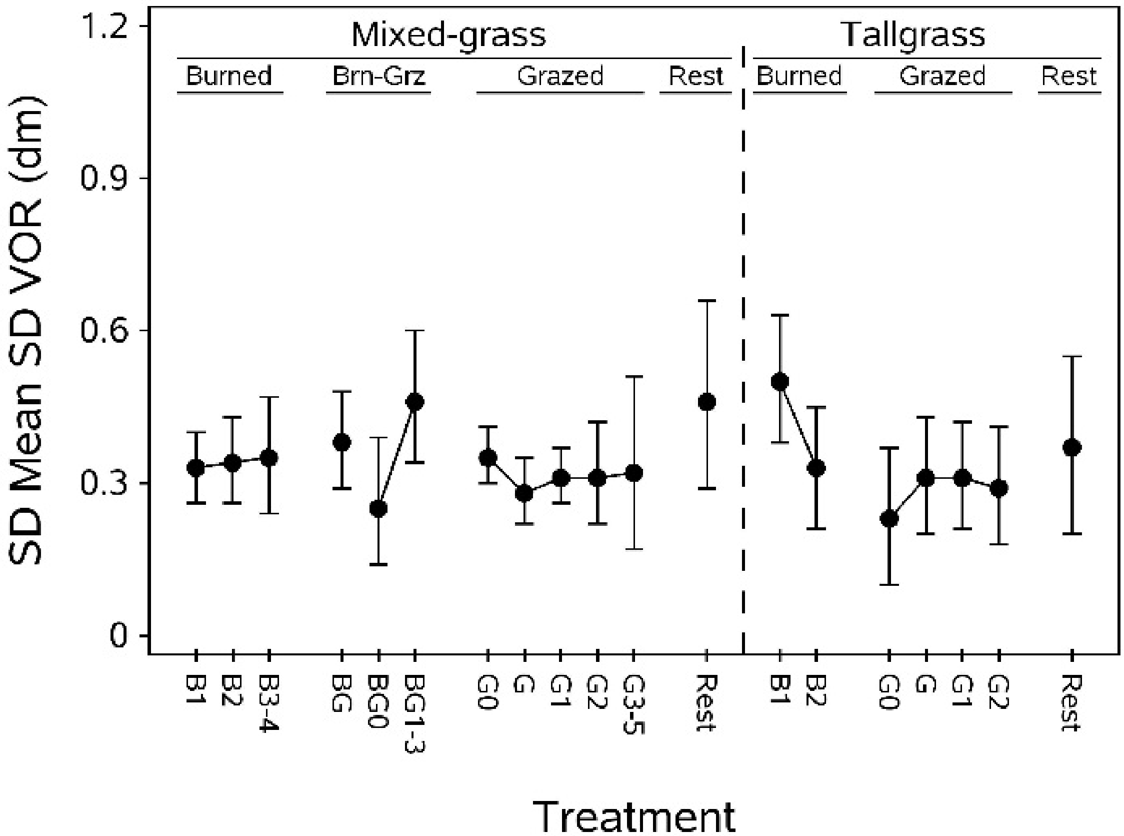
[1]Sources of variation for the model: Y=Unit(Grass type) + Grass type × Treatment + Residual, where Unit(Grass type) and Residual are random effects and Grass type × Treatment is a fixed effect in a mixed-model framework. Post-management treatments were generally defined by the number of growing seasons after the management treatment (for example, B1 = first growing season after burn; B3-4, three to four growing seasons after burning; G0 = grazed during growing season; BG3 = third growing season after burned-grazed; rest = no management treatment within previous 5 years).
[2]Degrees of freedom are based on Kenward-Roger correction for repeated-measures models (Littell and others, 2006).

Table 2.16. Least squares mean (standard error) and back-transformed least squares mean (95-percent confidence intervals) standard deviation of vertical obstruction readings (decimeters), by grassland type (mixed-grass, tallgrass) and post-management treatment, on Federal lands managed under an adaptive-management framework by the U.S. Fish and Wildlife Service (Gannon and others, 2013) in North Dakota, South Dakota, Minnesota, and Montana, 2011–13.

[LSMean, least squares mean; SE, standard error; LCL, lower confidence limit; UCL, upper confidence limit]

				Back-transformed		
					95-percent confidence intervals	
Grass	Treatment[1]	LSMean	SE	LSMean	LCL	UCL
Mixed	B1	0.77	0.05	1.17	0.97	1.39
	B2	0.87	0.06	1.39	1.13	1.69
	B3-4	0.90	0.08	1.46	1.09	1.89
	BG	0.72	0.07	1.06	0.80	1.35
	BG0	0.48	0.10	0.61	0.33	0.95
	BG1-3	0.90	0.09	1.45	1.07	1.91
	G0	0.57	0.04	0.76	0.62	0.92
	G	0.54	0.05	0.71	0.55	0.89
	G1	0.65	0.04	0.92	0.77	1.08
	G2	0.78	0.07	1.19	0.90	1.52
	G3-5	0.73	0.13	1.08	0.62	1.67
	Rest	0.94	0.13	1.57	0.98	2.32
Tall	B1	1.00	0.08	1.71	1.30	2.20
	B2	0.90	0.09	1.46	1.06	1.94
	G0	0.46	0.11	0.58	0.28	0.96
	G	0.70	0.09	1.01	0.68	1.39
	G1	0.74	0.08	1.09	0.79	1.43
	G2	0.75	0.09	1.12	0.78	1.53
	Rest	0.70	0.13	1.02	0.57	1.60

[1]Post-management treatments were generally defined by the number of growing seasons after the management treatment (for example, B1 = first growing season after burn; B3-4, three to four growing seasons after burning; G0 = grazed during growing season; BG3 = third growing season after burned-grazed; rest = no management treatment within previous 5 years).



[Brn-Grz, burned-grazed; dm, decimeter; Min., minimum; SD, standard deviation; VOR, vertical obstruction reading]

Figure 2.8. Back-transformed least squares mean standard deviation vertical obstruction readings (decimeters) in Native Prairie Adaptive Management (NPAM) units managed by the U.S. Fish and Wildlife Service in North Dakota, South Dakota, Minnesota, and Montana, 2011–13. Bars represent 95-percent confidence limits. Treatments are defined in tables 2.15 and 2.16.

I. Mean Minimum Vertical Obstruction Reading (VOR, decimeters)

Table 2.17. Generalized linear mixed model, assuming a gamma distribution with a log link, y = (y+1), testing the influence of post-management treatments on the mean minimum vertical obstruction readings (decimeters) on two grass types on Federal lands managed under an adaptive-management framework by the U.S. Fish and Wildlife Service (Gannon and others, 2013) in North Dakota, South Dakota, Minnesota, and Montana, 2011–13.

[<, less than; *, evidence for moderate effect (0.05<p≤0.10); **, evidence for strong effect (p≤0.05)]

Effect	Sources of variation[1]	Numerator degrees of freedom	Denominator degrees of freedom[2]	F-statistic	*p*-value
Overall	Grass type × Treatment	18	144.5	6.46	<0.0001**
Contrasts:	Mixed: burned linear	1	140.0	7.35	0.0076**
	Mixed: burned quadratic	1	88.3	1.13	0.2901
	Mixed: BG0 versus BG1-3	1	123.0	15.04	0.0002**
	Mixed: grazed linear	1	169.0	7.77	0.0059**
	Mixed: grazed quadratic	1	152.7	0.82	0.3665
	Tall: burned linear	1	120.6	1.46	0.2290**
	Tall: grazed linear	1	151.9	14.08	0.0002**
	Tall: grazed quadratic	1	131.4	3.61	0.0597*
	B1: mixed versus tall	1	166.1	2.44	0.1205
	B2: mixed versus tall	1	167.6	0.69	0.4086
	G0: mixed versus tall	1	164.9	0.00	0.9692
	G: mixed versus tall	1	168.3	8.34	0.0044**
	G1: mixed versus tall	1	168.3	12.47	0.0005**
	G2: mixed versus tall	1	168.0	0.85	0.3581
	Mixed: burned versus rest	1	140.8	3.10	0.0805*
	Mixed: grazed versus rest	1	140.7	9.60	0.0023**
	Mixed: burned-grazed versus rest	1	146.0	11.30	0.0010**
	Mixed: burned versus grazed	1	161.4	10.45	0.0015**
	Tall: burned versus rest	1	157.5	0.01	0.9351
	Tall: grazed versus rest	1	167.3	0.36	0.5518
	Tall: burned versus grazed	1	141.3	1.19	0.2764

[1]Sources of variation for the model: Y=Unit(Grass type) + Grass type × Treatment + Residual, where Unit(Grass type) and Residual are random effects and Grass type × Treatment is a fixed effect in a mixed-model framework. Post-management treatments were generally defined by the number of growing seasons after the management treatment (for example, B1 = first growing season after burn; B3-4, three to four growing seasons after burning; G0 = grazed during growing season; BG3 = third growing season after burned-grazed; rest = no management treatment within previous 5 years).

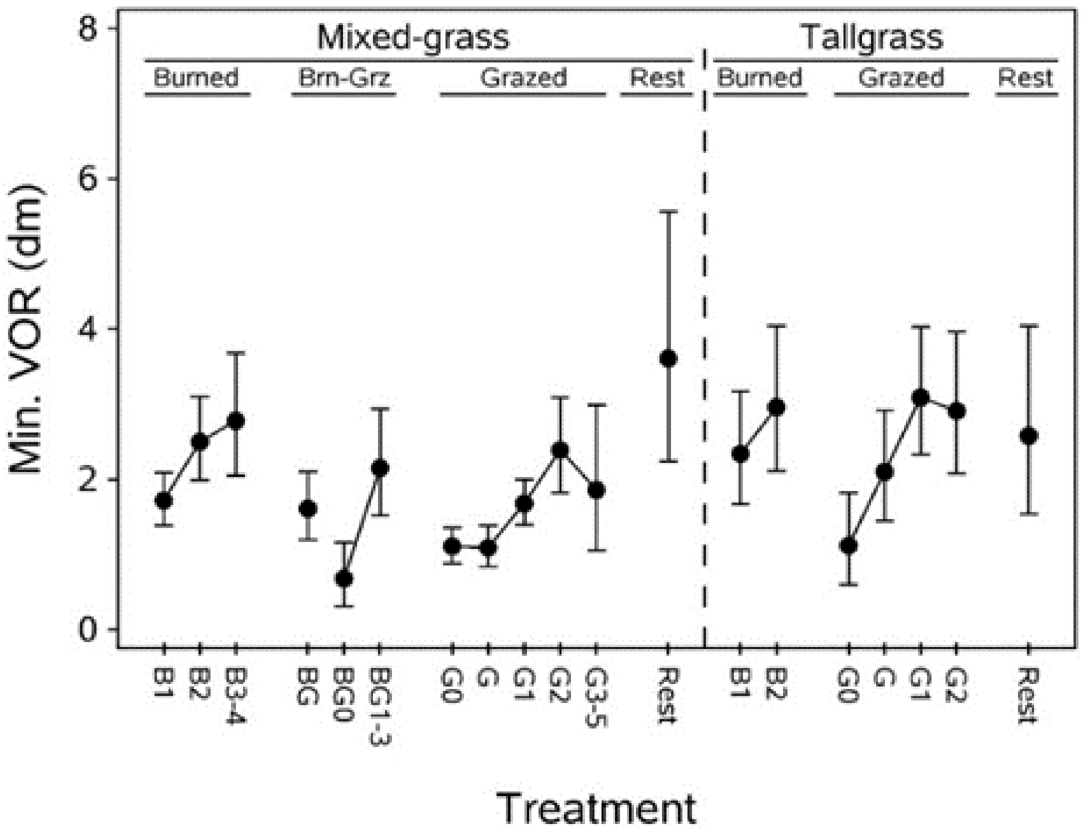
[2]Degrees of freedom are based on Kenward-Roger correction for repeated-measures models (Littell and others, 2006).

Table 2.18. Least squares mean (standard error) and back-transformed least squares mean (95-percent confidence intervals) minimum vertical obstruction readings (decimeters), by grassland type (mixed-grass, tallgrass) and post-management treatment, on Federal lands managed under an adaptive-management framework by the U.S. Fish and Wildlife Service (Gannon and others, 2013) in North Dakota, South Dakota, Minnesota, and Montana, 2011–13.

[LSMean, least squares mean; SE, standard error; LCL, lower confidence limit; UCL, upper confidence limit]

				Back-transformed		
					95-percent confidence intervals	
Grass	Treatment[1]	LSMean	SE	LSMean	LCL	UCL
Mixed	B1	1.00	0.07	1.72	1.38	2.09
	B2	1.25	0.08	2.50	1.99	3.10
	B3-4	1.33	0.11	2.78	2.05	3.68
	BG	0.96	0.09	1.61	1.19	2.10
	BG0	0.52	0.13	0.68	0.31	1.16
	BG1-3	1.15	0.11	2.15	1.52	2.94
	G0	0.75	0.06	1.11	0.88	1.36
	G	0.74	0.07	1.09	0.84	1.38
	G1	0.99	0.06	1.68	1.40	2.00
	G2	1.22	0.10	2.39	1.82	3.09
	G3-5	1.05	0.17	1.86	1.05	2.99
	Rest	1.53	0.18	3.61	2.24	5.56
Tall	B1	1.20	0.11	2.34	1.67	3.17
	B2	1.38	0.12	2.96	2.11	4.04
	G0	0.75	0.14	1.12	0.60	1.82
	G	1.13	0.12	2.10	1.45	2.92
	G1	1.41	0.11	3.09	2.33	4.03
	G2	1.36	0.12	2.91	2.08	3.96
	Rest	1.27	0.17	2.58	1.54	4.04

[1]Post-management treatments were generally defined by the number of growing seasons after the management treatment (for example, B1 = first growing season after burn; B3-4, three to four growing seasons after burning; G0 = grazed during growing season; BG3 = third growing season after burned-grazed; rest = no management treatment within previous 5 years).



[Brn-Grz, burned-grazed; dm, decimeter; Min., minimum; SD, VOR, vertical obstruction reading]

Figure 2.9. Back-transformed least squares mean minimum vertical obstruction readings (decimeters) in Native Prairie Adaptive Management (NPAM) units managed by the U.S. Fish and Wildlife Service in North Dakota, South Dakota, Minnesota, and Montana, 2011–13. Bars represent 95-percent confidence limits. Treatments are defined in tables 2.17 and 2.18.

J. Standard Deviation of Minimum Vertical Obstruction Reading (VOR, decimeters)

Table 2.19. Generalized linear mixed model, assuming a gamma distribution with a log link, *y* = (*y*+1), testing the influence of post-management treatments on the standard deviation of mean minimum vertical obstruction readings (decimeters) on two grass types on Federal lands managed under an adaptive-management framework by the U.S. Fish and Wildlife Service (Gannon and others, 2013) in North Dakota, South Dakota, Minnesota, and Montana, 2011–13.

[<, less than; *, evidence for moderate effect (0.05<p≤0.10); **, evidence for strong effect (p≤0.05)]

Effect	Sources of variation[1]	Numerator degrees of freedom	Denominator degrees of freedom[2]	*F*-statistic	*p*-value
Overall	Grass type × Treatment	18	148.1	4.11	<0.0001**
Contrasts:	Mixed: burned linear	1	146.4	3.20	0.0755*
	Mixed: burned quadratic	1	91.6	0.13	0.7165
	Mixed: BG0 versus BG1-3	1	130.0	10.79	0.0013**
	Mixed: grazed linear	1	168.6	4.50	0.0353**
	Mixed: grazed quadratic	1	155.2	0.06	0.8004
	Tall: burned linear	1	123.2	0.10	0.7501
	Tall: grazed linear	1	155.3	5.47	0.0206**
	Tall: grazed quadratic	1	135.5	1.93	0.1674
	B1: mixed versus tall	1	167.0	4.04	0.0461**
	B2: mixed versus tall	1	168.2	0.26	0.6124
	G0: mixed versus tall	1	165.8	0.40	0.5271
	G: mixed versus tall	1	168.1	2.52	0.1143
	G1: mixed versus tall	1	168.7	1.89	0.1715
	G2: mixed versus tall	1	168.1	0.00	0.9964
	Mixed: burned versus rest	1	147.0	0.42	0.5176
	Mixed: grazed versus rest	1	147.5	4.86	0.0290**
	Mixed: burned-grazed versus rest	1	151.3	3.73	0.0554*
	Mixed: burned versus grazed	1	156.0	14.34	0.0002**
	Tall: burned versus rest	1	159.0	2.33	0.1293
	Tall: grazed versus rest	1	167.4	0.11	0.7397
	Tall: burned versus grazed	1	141.1	10.12	0.0018**

[1]Sources of variation for the model: Y=Unit(Grass type) + Grass type × Treatment + Residual, where Unit(Grass type) and Residual are random effects and Grass type × Treatment is a fixed effect in a mixed-model framework. Post-management treatments were generally defined by the number of growing seasons after the management treatment (for example, B1 = first growing season after burn; B3-4, three to four growing seasons after burning; G0 = grazed during growing season; BG3 = third growing season after burned-grazed; rest = no management treatment within previous 5 years).

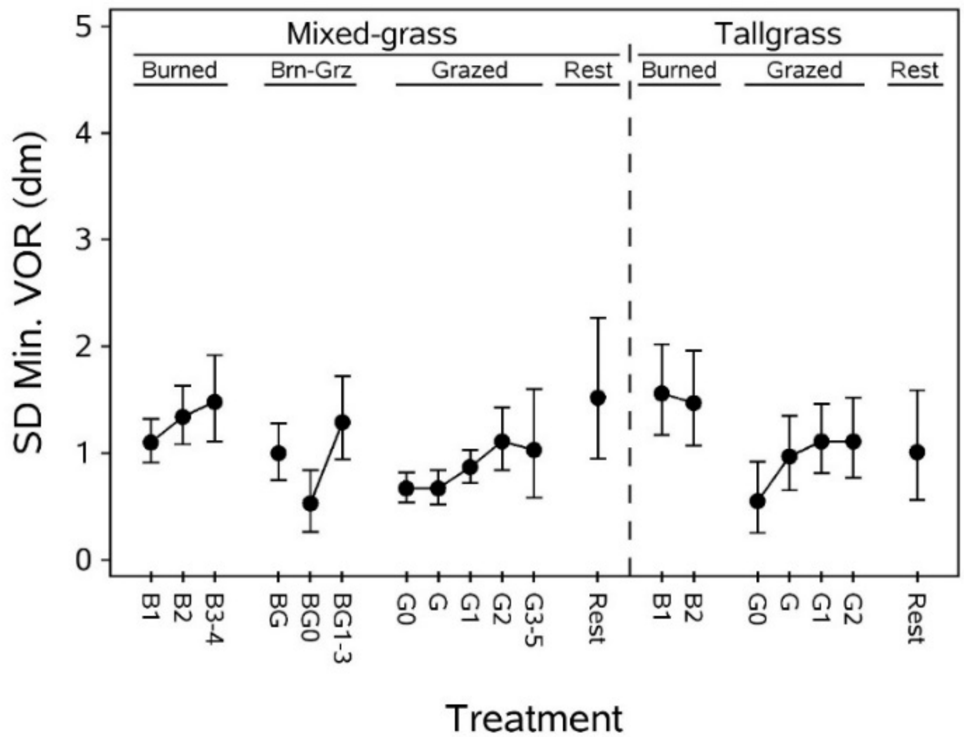
[2]Degrees of freedom are based on Kenward-Roger correction for repeated-measures models (Littell and others, 2006).

Table 2.20. Least squares mean (standard error) and back-transformed least squares mean (95-percent confidence intervals) standard deviation of mean minimum vertical obstruction reading (decimeters), by grassland type (mixed grass, tallgrass) and post-management treatment, on Federal lands managed under an adaptive-management framework by the U.S. Fish and Wildlife Service (Gannon and others, 2013) in North Dakota, South Dakota, Minnesota, and Montana, 2011–13.

[LSMean, least squares mean; SE, standard error; LCL, lower confidence limit; UCL, upper confidence limit]

				Back-transformed		
					95-percent confidence intervals	
Grass	Treatment[1]	LSMean	SE	LSMean	LCL	UCL
Mixed	B1	0.74	0.05	1.10	0.91	1.32
	B2	0.85	0.06	1.34	1.08	1.63
	B3-4	0.91	0.08	1.48	1.11	1.92
	BG	0.69	0.07	1.00	0.75	1.28
	BG0	0.42	0.10	0.53	0.26	0.84
	BG1-3	0.83	0.09	1.29	0.94	1.72
	G0	0.51	0.04	0.67	0.54	0.82
	G	0.51	0.05	0.67	0.52	0.84
	G1	0.63	0.04	0.87	0.72	1.03
	G2	0.75	0.07	1.11	0.84	1.43
	G3-5	0.71	0.13	1.03	0.58	1.60
	Rest	0.92	0.13	1.52	0.95	2.27
Tall	B1	0.94	0.08	1.56	1.17	2.02
	B2	0.91	0.09	1.47	1.07	1.96
	G0	0.44	0.11	0.55	0.25	0.92
	G	0.68	0.09	0.97	0.65	1.35
	G1	0.75	0.08	1.11	0.81	1.46
	G2	0.75	0.09	1.11	0.77	1.52
	Rest	0.70	0.13	1.01	0.56	1.59

[1]Post-management treatments were generally defined by the number of growing seasons after the management treatment (for example, B1 = first growing season after burn; B3-4, three to four growing seasons after burning; G0 = grazed during growing season; BG3 = third growing season after burned-grazed; rest = no management treatment within previous 5 years).



[Brn-Grz, burned-grazed; dm, decimeter; Min., minimum; SD, standard deviation; VOR, vertical obstruction reading]

Figure 2.10. Back-transformed least squares mean standard deviation of the mean minimum vertical obstruction readings (decimeters) in Native Prairie Adaptive Management (NPAM) units managed by the U.S. Fish and Wildlife Service in North Dakota, South Dakota, Minnesota, and Montana, 2011–13. Bars represent 95-percent confidence limits. Treatments are defined in tables 2.19 and 2.20.

K. Mean Maximum Vertical Obstruction Reading (VOR, decimeters)

Table 2.21. Generalized linear mixed model, assuming a gamma distribution with a log link, $y = (y+1)$, testing the influence of post-management treatments on the mean maximum vertical obstruction readings (decimeters) on two grass types on Federal lands managed under an adaptive-management framework by the U.S. Fish and Wildlife Service (Gannon and others, 2013) in North Dakota, South Dakota, Minnesota, and Montana, 2011–13.

[<, less than; *, evidence for moderate effect ($0.05<p\leq0.10$); **, evidence for strong effect ($p\leq0.05$)]

Effect	Sources of variation[1]	Numerator degrees of freedom	Denominator degrees of freedom[2]	*F*-statistic	*p*-value
Overall	Grass type × Treatment	18	149.1	5.19	<0.0001**
Contrasts:	Mixed: burned linear	1	148.3	6.04	0.0151**
	Mixed: burned quadratic	1	92.5	1.14	0.2877
	Mixed: BG0 versus BG1-3	1	132.1	13.47	0.0003**
	Mixed: grazed linear	1	168.4	6.22	0.0136**
	Mixed: grazed quadratic	1	155.9	0.18	0.6715
	Tall: burned linear	1	123.8	0.69	0.4093
	Tall: grazed linear	1	156.2	10.33	0.0016**
	Tall: grazed quadratic	1	136.7	3.64	0.0584*
	B1: mixed versus tall	1	167.3	3.14	0.0783*
	B2: mixed versus tall	1	168.3	0.51	0.4745
	G0: mixed versus tall	1	166.1	0.08	0.7773
	G: mixed versus tall	1	168.1	7.22	0.0079**
	G1: mixed versus tall	1	168.7	10.05	0.0018**
	G2: mixed versus tall	1	168.1	0.45	0.5026
	Mixed: burned versus rest	1	148.8	2.70	0.1022
	Mixed: grazed versus rest	1	149.4	7.95	0.0055**
	Mixed: burned-grazed versus rest	1	152.8	9.69	0.0022**
	Mixed: burned versus grazed	1	154.3	7.94	0.0055**
	Tall: burned versus rest	1	159.4	0.00	0.9803
	Tall: grazed versus rest	1	167.4	0.67	0.4147
	Tall: burned versus grazed	1	141.0	1.66	0.2000

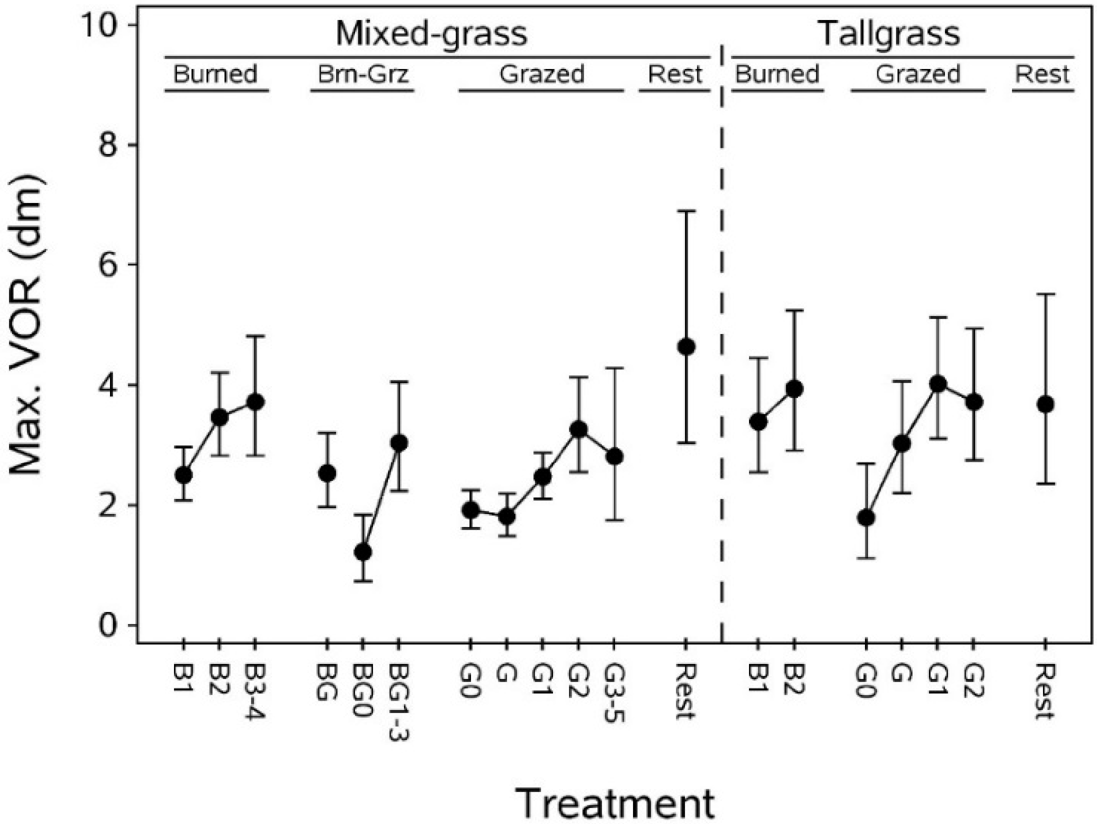
[1]Sources of variation for the model: Y=Unit(Grass type) + Grass type × Treatment + Residual, where Unit(Grass type) and Residual are random effects and Grass type × Treatment is a fixed effect in a mixed-model framework. Post-management treatments were generally defined by the number of growing seasons after the management treatment (for example, B1 = first growing season after burn; B3-4, three to four growing seasons after burning; G0 = grazed during growing season; BG3 = third growing season after burned-grazed; rest = no management treatment within previous 5 years).
[2]Degrees of freedom are based on Kenward-Roger correction for repeated-measures models (Littell and others, 2006).

Table 2.22. Least squares mean (standard error) and back-transformed least squares mean (95-percent confidence intervals) maximum vertical obstruction readings (decimeters), by grassland type (mixed-grass, tallgrass) and post-management treatment, on Federal lands managed under an adaptive-management framework by the U.S. Fish and Wildlife Service (Gannon and others, 2013) in North Dakota, South Dakota, Minnesota, and Montana, 2011–13.

[LSMean, least squares mean; SE, standard error; LCL, lower confidence limit; UCL, upper confidence limit]

				Back-transformed		
					95-percent confidence intervals	
Grass	Treatment[1]	LSMean	SE	LSMean	LCL	UCL
Mixed	B1	1.25	0.06	2.50	2.08	2.97
	B2	1.49	0.08	3.46	2.82	4.20
	B3-4	1.55	0.11	3.72	2.82	4.82
	BG	1.26	0.09	2.53	1.97	3.20
	BG0	0.80	0.13	1.22	0.73	1.84
	BG1-3	1.40	0.11	3.04	2.23	4.05
	G0	1.07	0.06	1.92	1.61	2.25
	G	1.03	0.06	1.81	1.48	2.19
	G1	1.24	0.06	2.47	2.11	2.87
	G2	1.45	0.09	3.26	2.55	4.13
	G3-5	1.34	0.17	2.81	1.75	4.28
	Rest	1.73	0.17	4.64	3.03	6.90
Tall	B1	1.48	0.11	3.39	2.54	4.45
	B2	1.60	0.12	3.94	2.91	5.24
	G0	1.03	0.14	1.79	1.11	2.69
	G	1.39	0.12	3.03	2.20	4.06
	G1	1.61	0.10	4.02	3.11	5.13
	G2	1.55	0.12	3.72	2.75	4.94
	Rest	1.54	0.17	3.68	2.36	5.51

[1]Post-management treatments were generally defined by the number of growing seasons after the management treatment (for example, B1 = first growing season after burn; B3-4, three to four growing seasons after burning; G0 = grazed during growing season; BG3 = third growing season after burned-grazed; rest = no management treatment within previous 5 years).



[Brn-Grz, burned-grazed; dm, decimeter; Max., maximum; VOR, vertical obstruction reading]

Figure 2.11. Back-transformed least squares mean maximum vertical obstruction reading (decimeters) in Native Prairie Adaptive Management (NPAM) units managed by the U.S. Fish and Wildlife Service in North Dakota, South Dakota, Minnesota, and Montana, 2011–13. Bars represent 95-percent confidence limits. Treatments are defined in tables 2.21 and 2.22.

L. Standard Deviation of Maximum Vertical Obstruction Reading (VOR, decimeters)

Table 2.23. Generalized linear mixed model, assuming a gamma distribution with a log link, $y = (y+1)$, testing the influence of post-management treatments on the standard deviation of mean maximum vertical obstruction readings (decimeters) on two grass types on Federal lands managed under an adaptive-management framework by the U.S. Fish and Wildlife Service (Gannon and others, 2013) in North Dakota, South Dakota, Minnesota, and Montana, 2011–13.

[<, less than; *, evidence for moderate effect (0.05<*p*≤0.10); **, evidence for strong effect (*p*≤0.05)]

Effect	Sources of variation[1]	Numerator degrees of freedom	Denominator degrees of freedom[2]	*F*-statistic	*p*-value
Overall	Grass type × Treatment	18	154.5	3.05	<0.0001**
Contrasts:	Mixed: burned linear	1	159.4	0.56	0.4545
	Mixed: burned quadratic	1	98.9	0.18	0.6752
	Mixed: BG0 versus BG1-3	1	146.8	11.79	0.0008**
	Mixed: grazed linear	1	165.8	2.13	0.1468
	Mixed: grazed quadratic	1	159.5	0.01	0.9182
	Tall: burned linear	1	124.9	2.05	0.1544
	Tall: grazed linear	1	161.7	2.61	0.1079
	Tall: grazed quadratic	1	143.7	1.26	0.2634
	B1: mixed versus tall	1	168.5	5.83	0.0168**
	B2: mixed versus tall	1	168.8	0.00	0.9730
	G0: mixed versus tall	1	167.9	1.80	0.1812
	G: mixed versus tall	1	168.4	1.97	0.1626
	G1: mixed versus tall	1	169.0	0.01	0.9424
	G2: mixed versus tall	1	168.5	0.21	0.6448
	Mixed: burned versus rest	1	159.7	0.60	0.4380
	Mixed: grazed versus rest	1	161.0	3.58	0.0601*
	Mixed: burned-grazed versus rest	1	161.3	2.09	0.1504
	Mixed: burned versus grazed	1	140.5	7.45	0.0071**
	Tall: burned versus rest	1	162.8	2.84	0.0937*
	Tall: grazed versus rest	1	168.2	0.11	0.7420
	Tall: burned versus grazed	1	139.2	12.56	0.0005**

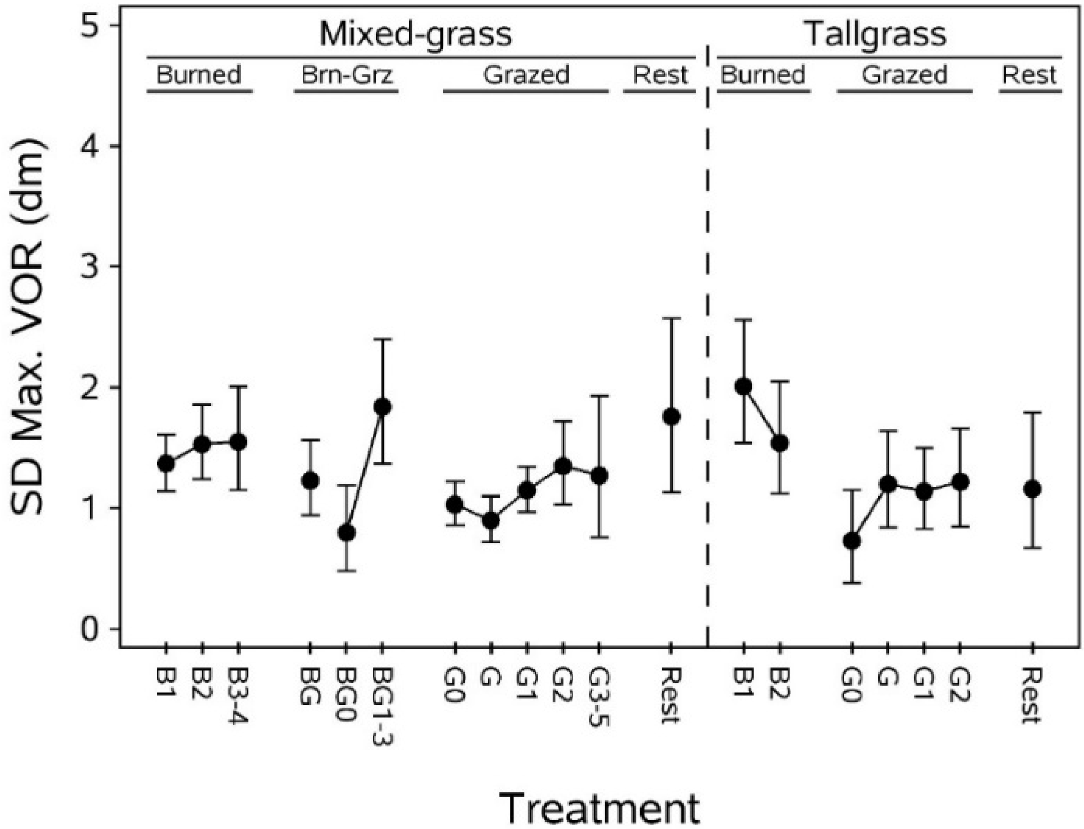
[1]Sources of variation for the model: Y=Unit(Grass type) + Grass type × Treatment + Residual, where Unit(Grass type) and Residual are random effects and Grass type × Treatment is a fixed effect in a mixed-model framework. Post-management treatments were generally defined by the number of growing seasons after the management treatment (for example, B1 = first growing season after burn; B3-4, three to four growing seasons after burning; G0 = grazed during growing season; BG3 = third growing season after burned-grazed; rest = no management treatment within previous 5 years).
[2]Degrees of freedom are based on Kenward-Roger correction for repeated-measures models (Littell and others, 2006).

Table 2.24. Least squares mean (standard error) and back-transformed least squares mean (95-percent confidence intervals) standard deviation of mean maximum vertical obstruction readings (decimeters), by grassland type (mixed grass, tallgrass) and post-management treatment, on Federal lands managed under an adaptive-management framework by the U.S. Fish and Wildlife Service (Gannon and others, 2013) in North Dakota, South Dakota, Minnesota, and Montana, 2011–13.

[LSMean, least squares mean; SE, standard error; LCL, lower confidence limit; UCL, upper confidence limit]

				Back-transformed		
					95-percent confidence intervals	
Grass	Treatment[1]	LSMean	SE	LSMean	LCL	UCL
Mixed	B1	0.86	0.05	1.37	1.14	1.61
	B2	0.93	0.06	1.53	1.24	1.86
	B3-4	0.93	0.09	1.55	1.15	2.01
	BG	0.80	0.07	1.23	0.94	1.56
	BG0	0.59	0.10	0.80	0.48	1.19
	BG1-3	1.04	0.09	1.84	1.37	2.40
	G0	0.71	0.04	1.03	0.86	1.22
	G	0.64	0.05	0.90	0.72	1.10
	G1	0.77	0.04	1.15	0.97	1.34
	G2	0.85	0.07	1.35	1.03	1.72
	G3-5	0.82	0.13	1.27	0.76	1.93
	Rest	1.02	0.13	1.76	1.13	2.57
Tall	B1	1.10	0.09	2.01	1.54	2.56
	B2	0.93	0.09	1.54	1.12	2.05
	G0	0.55	0.11	0.73	0.38	1.15
	G	0.79	0.09	1.20	0.84	1.64
	G1	0.76	0.08	1.14	0.83	1.50
	G2	0.80	0.09	1.22	0.85	1.66
	Rest	0.77	0.13	1.16	0.67	1.79

[1]Post-management treatments were generally defined by the number of growing seasons after the management treatment (for example, B1 = first growing season after burn; B3-4, three to four growing seasons after burning; G0 = grazed during growing season; BG3 = third growing season after burned-grazed; rest = no management treatment within previous 5 years).



[Brn-Grz, burned-grazed; dm, decimeters; Max., maximum; SD, standard deviation; VOR, vertical obstruction reading]

Figure 2.12. Back-transformed least squares mean standard deviation of the mean maximum vertical obstruction readings (decimeters) in Native Prairie Adaptive Management (NPAM) units managed by the U.S. Fish and Wildlife Service in North Dakota, South Dakota, Minnesota, and Montana, 2011–13. Bars represent 95-percent confidence limits. Treatments are defined in tables 2.23 and 2.24.

M. Mean Standing Dead Cover (percent)

Table 2.25. Generalized linear mixed model, assuming a beta distribution with a logit link, y = (y+0.0), testing the influence of post-management treatments on mean standing dead cover (percent) on two grass types on Federal lands managed under an adaptive-management framework by the U.S. Fish and Wildlife Service (Gannon and others, 2013) in North Dakota, South Dakota, Minnesota, and Montana, 2011–13.

Effect	Sources of variation[1]	Numerator degrees of freedom	Denominator degrees of freedom[2]	*F*-statistic	*p*-value
Overall	Grass type × Treatment	18	162.3	1.25	0.2295
Contrasts:	Mixed: burned linear	1	168.9	5.05	0.0260
	Mixed: burned quadratic	1	128.5	2.05	0.1546
	Mixed: BG0 versus BG1-3	1	168.6	3.30	0.0711
	Mixed: grazed linear	1	163.7	0.39	0.5341
	Mixed: grazed quadratic	1	166.6	0.01	0.9118
	Tall: burned linear	1	138.3	1.34	0.2490
	Tall: grazed linear	1	168.5	1.50	0.2228
	Tall: grazed quadratic	1	158.0	0.50	0.4826
	B1: mixed versus tall	1	169.0	0.16	0.6921
	B2: mixed versus tall	1	169.0	0.02	0.9027
	G0: mixed versus tall	1	168.9	0.15	0.7010
	G: mixed versus tall	1	168.9	1.05	0.3072
	G1: mixed versus tall	1	169.0	2.04	0.1554
	G2: mixed versus tall	1	168.9	0.01	0.9246
	Mixed: burned versus rest	1	169.0	0.01	0.9318
	Mixed: grazed versus rest	1	168.8	0.06	0.8021
	Mixed: burned-grazed versus rest	1	168.9	0.00	0.9794
	Mixed: burned versus grazed	1	139.0	0.20	0.6556
	Tall: burned versus rest	1	166.9	0.76	0.3858
	Tall: grazed versus rest	1	169.0	0.22	0.6434
	Tall: burned versus grazed	1	144.8	0.50	0.4818

[1]Sources of variation for the model: Y=Unit(Grass type) + Grass type × Treatment + Residual, where Unit(Grass type) and Residual are random effects and Grass type × Treatment is a fixed effect in a mixed-model framework. Post-management treatments were generally defined by the number of growing seasons after the management treatment (for example, B1 = first growing season after burn; B3-4, three to four growing seasons after burning; G0 = grazed during growing season; BG3 = third growing season after burned-grazed; rest = no management treatment within previous 5 years).

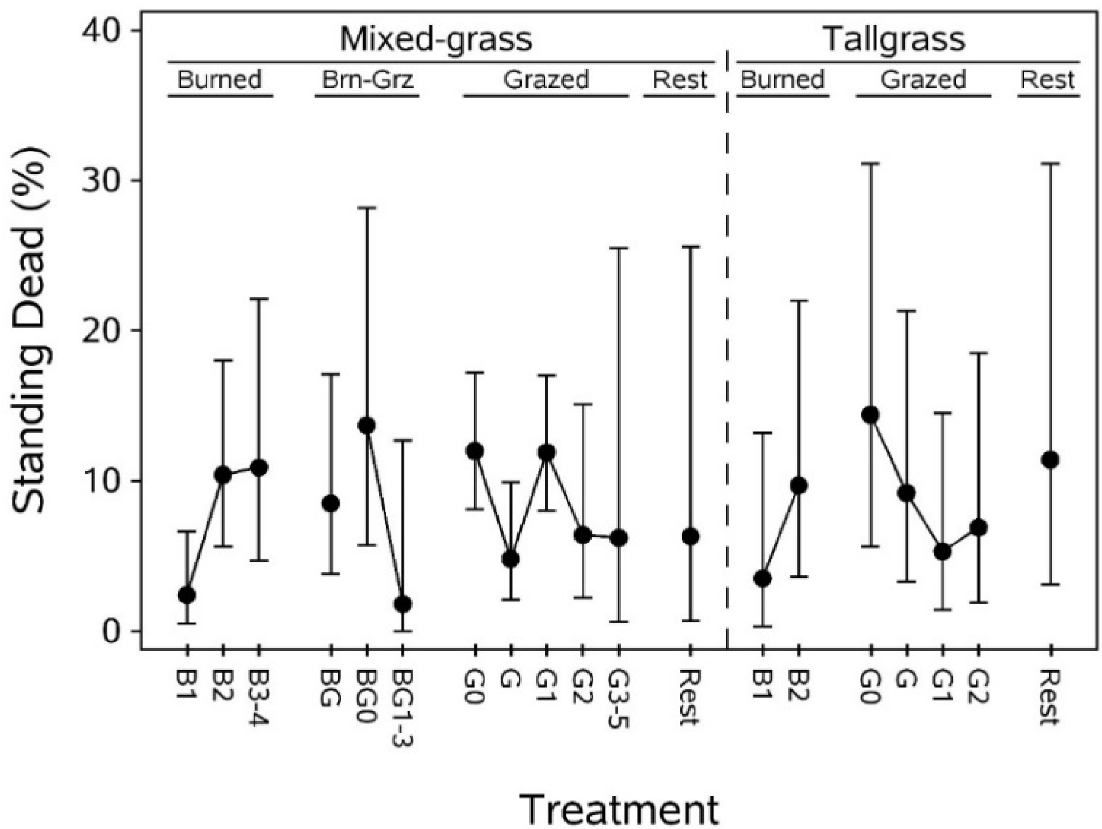
[2]Degrees of freedom are based on Kenward-Roger correction for repeated-measures models (Littell and others, 2006).

Table 2.26. Least squares mean (standard error) standing dead cover (percent) and back-transformed least squares mean (95-percent confidence intervals) standing dead cover (percent) by grassland type (mixed-grass, tallgrass) and post-management treatment, on Federal lands managed under an adaptive-management framework by the U.S. Fish and Wildlife Service (Gannon and others, 2013) in North Dakota, South Dakota, Minnesota, and Montana, 2011–13.

[LSMean, least squares mean; SE, standard error; LCL, lower confidence limit; UCL, upper confidence limit]

				Back-transformed		
					95-percent confidence intervals	
Grass	Treatment[1]	LSMean	SE	LSMean	LCL	UCL
Mixed	B1	−3.353	0.435	2.4	0.5	6.6
	B2	−2.049	0.307	10.4	5.6	18.0
	B3-4	−2.005	0.411	10.9	4.7	22.1
	BG	−2.252	0.380	8.5	3.8	17.1
	BG0	−1.758	0.444	13.7	5.7	28.2
	BG1-3	−3.539	0.868	1.8	0.0	12.7
	G0	−1.904	0.205	12.0	8.1	17.2
	G	−2.780	0.344	4.8	2.1	9.9
	G1	−1.913	0.202	11.9	8.0	17.0
	G2	−2.525	0.448	6.4	2.2	15.1
	G3-5	−2.563	0.787	6.2	0.6	25.5
	Rest	−2.538	0.776	6.3	0.7	25.6
Tall	B1	−3.047	0.637	3.5	0.3	13.2
	B2	−2.117	0.462	9.7	3.6	22.0
	G0	−1.701	0.486	14.4	5.6	31.1
	G	−2.180	0.475	9.2	3.3	21.3
	G1	−2.696	0.510	5.3	1.4	14.5
	G2	−2.459	0.532	6.9	1.9	18.5
	Rest	−1.952	0.614	11.4	3.1	31.1

[1]Post-management treatments were generally defined by the number of growing seasons after the management treatment (for example, B1 = first growing season after burn; B3-4, three to four growing seasons after burning; G0 = grazed during growing season; BG3 = third growing season after burned-grazed; rest = no management treatment within previous 5 years).



[Brn-Grz, burned-grazed; %, percent]

Figure 2.13. Back-transformed least squares mean standing dead cover (percent) in Native Prairie Adaptive Management (NPAM) units managed by the U.S. Fish and Wildlife Service in North Dakota, South Dakota, Minnesota, and Montana, 2011–13. Bars represent 95-percent confidence limits. Treatments are defined in tables 2.25 and 2.26.

N. Standard Deviation of Standing Dead Cover (percent)

Table 2.27. Generalized linear mixed model, assuming a beta distribution with a logit link, *y* = (*y*+0.0), testing the influence of post-management treatments on the standard deviation of mean standing dead cover (percent) on two grass types on Federal lands managed under an adaptive-management framework by the U.S. Fish and Wildlife Service (Gannon and others, 2013) in North Dakota, South Dakota, Minnesota, and Montana, 2011–13.

[*, evidence for moderate effect (0.05<*p*≤0.10); **, evidence for strong effect (*p*≤0.05)]

Effect	Sources of variation[1]	Numerator degrees of freedom	Denominator degrees of freedom[2]	*F*-statistic	*p*-value
Overall	Grass type × Treatment	18	160.5	1.59	0.0683*
Contrasts:	Mixed: burned linear	1	168.7	3.95	0.0484**
	Mixed: burned quadratic	1	128.3	0.94	0.3337
	Mixed: BG0 versus BG1-3	1	169.0	2.28	0.1333
	Mixed: grazed linear	1	160.2	0.04	0.8486
	Mixed: grazed quadratic	1	166.5	0.01	0.9281
	Tall: burned linear	1	127.8	2.22	0.1383
	Tall: grazed linear	1	168.9	1.75	0.1879
	Tall: grazed quadratic	1	157.3	0.04	0.8329
	B1: mixed versus tall	1	168.8	0.18	0.6751
	B2: mixed versus tall	1	169.0	0.44	0.5099
	G0: mixed versus tall	1	168.4	0.43	0.5114
	G: mixed versus tall	1	168.2	2.06	0.1532
	G1: mixed versus tall	1	169.0	2.31	0.1301
	G2: mixed versus tall	1	168.6	0.01	0.9034
	Mixed: burned versus rest	1	168.3	0.14	0.7063
	Mixed: grazed versus rest	1	167.6	0.06	0.8056
	Mixed: burned-grazed versus rest	1	169.0	1.05	0.3072
	Mixed: burned versus grazed	1	125.5	0.12	0.7322
	Tall: burned versus rest	1	167.4	1.95	0.1639
	Tall: grazed versus rest	1	169.0	1.80	0.1820
	Tall: burned versus grazed	1	137.9	0.05	0.8273

[1]Sources of variation for the model: Y=Unit(Grass type) + Grass type × Treatment + Residual, where Unit(Grass type) and Residual are random effects and Grass type × Treatment is a fixed effect in a mixed-model framework. Post-management treatments were generally defined by the number of growing seasons after the management treatment (for example, B1 = first growing season after burn; B3-4, three to four growing seasons after burning; G0 = grazed during growing season; BG3 = third growing season after burned-grazed; rest = no management treatment within previous 5 years).

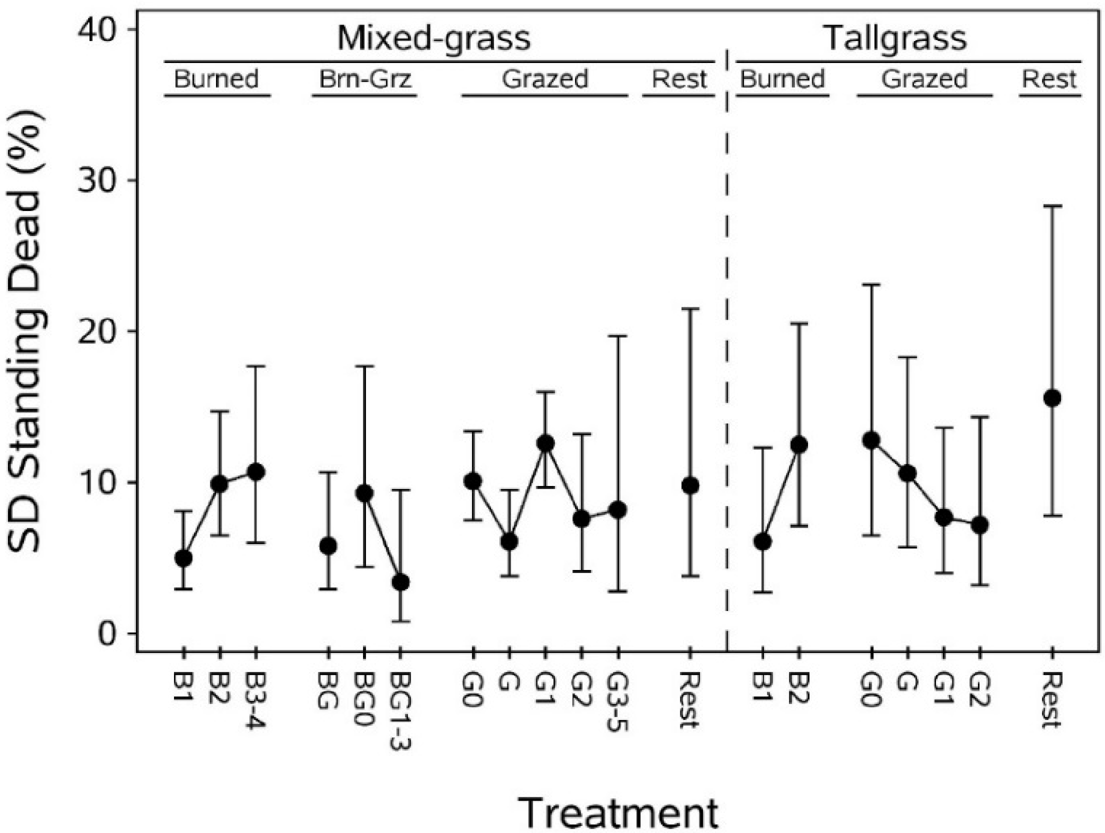
[2]Degrees of freedom are based on Kenward-Roger correction for repeated-measures models (Littell and others, 2006).

Table 2.28. Least squares mean (standard error) and back-transformed least squares mean (95-percent confidence intervals) of the standard deviation of standing dead cover (percent) by grassland type (mixed-grass, tallgrass) and post-management treatment, on Federal lands managed under an adaptive-management framework by the U.S. Fish and Wildlife Service (Gannon and others, 2013) in North Dakota, South Dakota, Minnesota, and Montana, 2011–13.

[LSMean, least squares mean; SE, standard error; LCL, lower confidence limit; UCL, upper confidence limit]

				Back-transformed		
					95-percent confidence intervals	
Grass	Treatment[1]	LSMean	SE	LSMean	LCL	UCL
Mixed	B1	−2.748	0.226	5.0	2.9	8.1
	B2	−2.099	0.214	9.9	6.5	14.7
	B3-4	−2.023	0.283	10.7	6.0	17.7
	BG	−2.619	0.303	5.8	2.9	10.7
	BG0	−2.169	0.355	9.3	4.4	17.7
	BG1-3	−3.080	0.480	3.4	0.8	9.5
	G0	−2.079	0.150	10.1	7.5	13.4
	G	−2.567	0.215	6.1	3.8	9.5
	G1	−1.851	0.135	12.6	9.7	16.0
	G2	−2.357	0.286	7.6	4.1	13.2
	G3-5	−2.285	0.480	8.2	2.8	19.7
	Rest	−2.113	0.448	9.8	3.8	21.5
Tall	B1	−2.571	0.354	6.1	2.7	12.3
	B2	−1.862	0.288	12.5	7.1	20.5
	G0	−1.829	0.349	12.8	6.5	23.1
	G	−2.029	0.307	10.6	5.7	18.3
	G1	−2.356	0.303	7.7	4.0	13.6
	G2	−2.413	0.358	7.2	3.2	14.3
	Rest	−1.612	0.373	15.6	7.8	28.3

[1]Post-management treatments were generally defined by the number of growing seasons after the management treatment (for example, B1 = first growing season after burn; B3-4, three to four growing seasons after burning; G0 = grazed during growing season; BG3 = third growing season after burned-grazed; rest = no management treatment within previous 5 years).



[Brn-Grz, burned-grazed; %, percent; SD, standard deviation]

Figure 2.14. Back-transformed least squares mean standard deviation of standing dead cover (percent) in Native Prairie Adaptive Management (NPAM) units managed by the U.S. Fish and Wildlife Service in North Dakota, South Dakota, Minnesota, and Montana, 2011–13. Bars represent 95-percent confidence limits. Treatments are defined in tables 2.27 and 2.28.

References

Gannon, J.J., Shaffer, T.L., and Moore, C.T., 2013, Native Prairie Adaptive Management—A multi-region adaptive approach to invasive plant management on Fish and Wildlife Service owned native prairies: U.S. Geological Survey Open-File Report 2013–1279, 184 p. [Also available at *https://dx.doi.org/10.3133/ofr20131279*.]

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