Appendix 5. Testing the Influence of Management Regime and Year on Breeding Densities (Pairs per 100 Hectares) of 35 Common Bird Species and Grassland Bird Species of Conservation Concern on Two Grass Types 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. Red-winged Blackbird (*Agelaius phoeniceus*)

Table 5.1. Generalized linear mixed model (assuming a gamma distribution with a log link) testing the influence of management regime and year on breeding densities (pairs per 100 hectares) of red-winged blackbirds (*Agelaius phoeniceus*) on two grass types (mixed-grass, tallgrass) 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 strong effect ($p \leq 0.05$)]

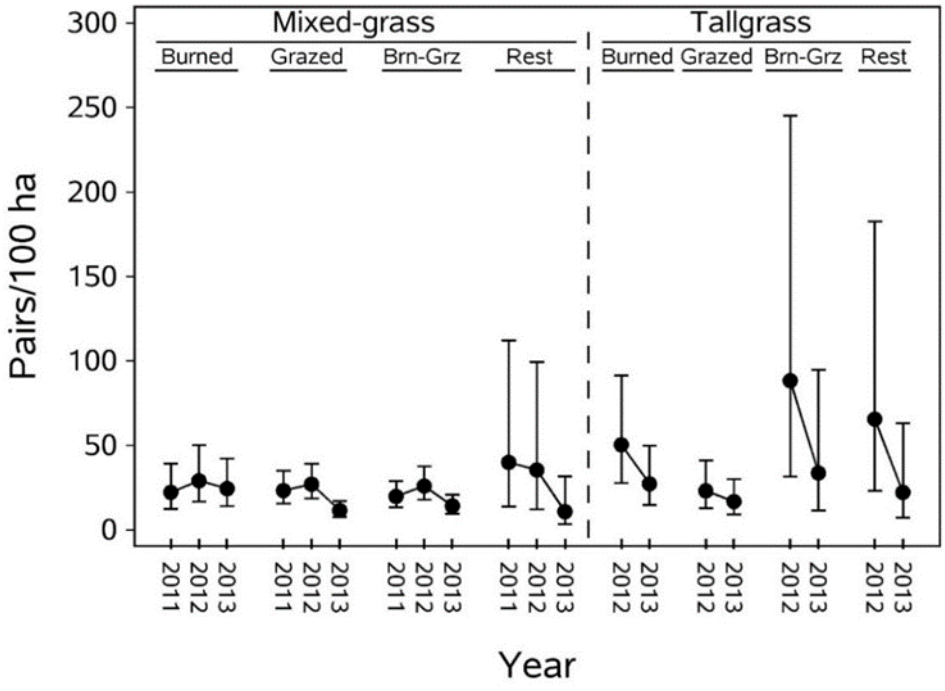
Effect	Sources of variation[1]	Numerator degrees of freedom	Denominator degrees of freedom[2]	*F*-statistic	*p*-value
Overall	Grass type × regime × year	19	185.6	3.26	<0.0001**
Contrasts:	Mixed: regime effect	3	86.3	0.43	0.7350
	Mixed: year effect	2	139.1	8.93	0.0002**
	Mixed: interaction	6	142.4	1.09	0.3713
	Tall: regime effect	3	109.3	1.75	0.1604
	Tall: year effect	1	132.9	12.26	0.0006**
	Tall: interaction	3	132.9	0.78	0.5078
	Mixed versus tall: burned only	1	98.9	1.27	0.2633
	Mixed versus tall: grazed only	1	104.1	0.00	0.9644
	Mixed versus tall: burned-grazed	1	107.0	4.48	0.0366**
	Mixed versus tall: rest	1	97.0	0.46	0.5012

[1]Sources of variation for the model: Y=Unit(Grass type × Regime) + Grass type × Regime × Year + Year × Unit(Grass type × Regime), where Grass type × Regime × Year is a fixed effect, Unit(Grass type × Regime) and Year × Unit(Grass type × Regime) are random effects in a mixed-model framework, and Year is a repeated-measures factor.
[2]Degrees of freedom are based on Kenward-Roger correction for repeated-measures models (Littell and others, 2006).

Table 5.2. Least squares mean (standard error) densities (pairs per 100 hectares) and back-transformed least squares mean (95-percent confidence intervals) densities (pairs per 100 hectares) of red-winged blackbirds (*Agelaius phoeniceus*), by grassland type (mixed-grass, tallgrass), overall treatment regime (burned only, grazed only, burned-grazed, or rest), and year (2011, 2012, 2013), 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	Regime	Year	LSMean	SE	LSMean	LCL	UCL
Mixed	Burned only	2011	3.15	0.28	22.34	12.49	39.38
		2012	3.41	0.27	29.18	16.78	50.22
		2013	3.24	0.27	24.53	14.04	42.32
	Grazed only	2011	3.20	0.20	23.41	15.53	35.06
		2012	3.34	0.18	27.15	18.71	39.20
		2013	2.53	0.18	11.61	7.82	17.03
	Burned-grazed	2011	3.04	0.18	19.93	13.57	29.06
		2012	3.30	0.18	26.06	17.95	37.64
		2013	2.73	0.18	14.33	9.72	20.92
	Rest	2011	3.72	0.52	40.08	13.92	112.12
		2012	3.60	0.52	35.52	12.26	99.54
		2013	2.48	0.52	10.94	3.34	31.87
Tall	Burned only	2012	3.94	0.30	50.52	27.71	91.45
		2013	3.35	0.30	27.39	14.82	49.94
	Grazed only	2012	3.19	0.28	23.23	12.92	41.20
		2013	2.88	0.28	16.86	9.25	30.10
	Burned-grazed	2012	4.49	0.52	88.40	31.47	245.15
		2013	3.55	0.52	33.77	11.63	94.74
	Rest	2012	4.20	0.52	65.65	23.21	182.50
		2013	3.15	0.52	22.28	7.46	63.10



[Brn-Grz, burned-grazed]

Figure 5.1. Back-transformed least squares mean densities (pairs per 100 hectares) of red-winged blackbirds (*Agelaius phoeniceus*) 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.

B. Clay-colored Sparrow (*Spizella pallida*)

Table 5.3. Generalized linear mixed model (assuming a gamma distribution with a log link) testing the influence of management regime and year on breeding densities (pairs per 100 hectares) of clay-colored sparrows (*Spizella pallida*) on two grass types (mixed-grass, tallgrass) 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.

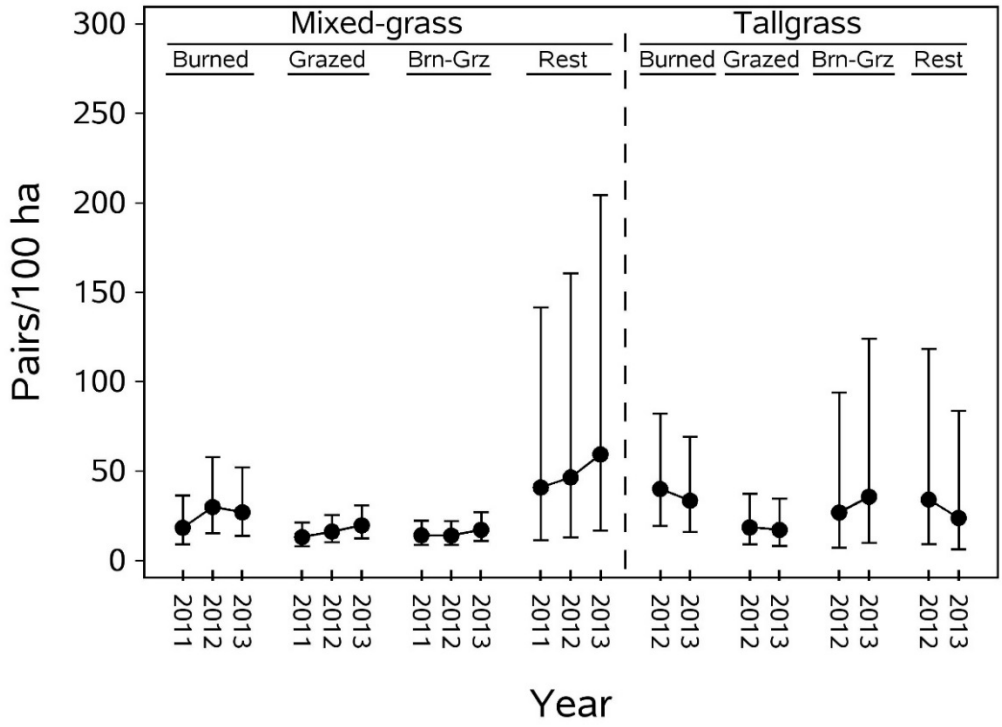
Effect	Sources of Variation[1]	Numerator degrees of freedom	Denominator degrees of freedom[2]	*F*-statistic	*p*-value
Overall	Grass type × regime × year	19	182.6	1.07	0.3882
Contrasts:	Mixed: regime effect	3	80.0	1.63	0.1887
	Mixed: year effect	2	130.1	1.76	0.1753
	Mixed: interaction	6	131.5	0.70	0.6504
	Tall: regime effect	3	91.3	0.76	0.5167
	Tall: year effect	1	128.2	0.22	0.6431
	Tall: interaction	3	128.2	0.41	0.7445
	Mixed versus tall: burned only	1	86.3	0.73	0.3941
	Mixed versus tall: grazed only	1	89.1	0.06	0.8035
	Mixed versus tall: burned-grazed	1	90.6	1.24	0.2693
	Mixed versus tall: rest	1	85.3	0.40	0.5306

[1]Sources of variation for the model: Y=Unit(Grass type × Regime) + Grass type × Regime × Year + Year × Unit(Grass type × Regime), where Grass type × Regime × Year is a fixed effect, Unit(Grass type × Regime) and Year × Unit(Grass type × Regime) are random effects in a mixed-model framework, and Year is a repeated-measures factor.
[2]Degrees of freedom are based on Kenward-Roger correction for repeated-measures models (Littell and others, 2006).

Table 5.4. Least squares mean (standard error) densities (pairs per 100 hectares) and back-transformed least squares mean (95-percent confidence intervals) densities (pairs per 100 hectares) of clay-colored sparrows (*Spizella pallida*), by grassland type (mixed-grass, tallgrass), overall treatment regime (burned only, grazed only, burned-grazed, or rest), and year (2011, 2012, 2013), 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	Regime	Year	LSMean	SE	LSMean	LCL	UCL
Mixed	Burned only	2011	2.97	0.33	18.44	9.14	36.30
		2012	3.43	0.33	30.02	15.38	57.76
		2013	3.33	0.33	27.06	13.81	52.15
	Grazed only	2011	2.66	0.23	13.23	8.08	21.33
		2012	2.85	0.22	16.30	10.28	25.52
		2013	3.03	0.22	19.78	12.52	30.92
	Burned-grazed	2011	2.72	0.22	14.19	8.87	22.37
		2012	2.71	0.22	14.06	8.82	22.08
		2013	2.91	0.22	17.29	10.91	27.11
	Rest	2011	3.74	0.62	40.92	11.34	141.43
		2012	3.86	0.62	46.59	13.01	160.70
		2013	4.10	0.62	59.43	16.78	204.32
Tall	Burned only	2012	3.72	0.36	40.12	19.29	82.32
		2013	3.54	0.36	33.60	16.08	69.10
	Grazed only	2012	2.98	0.34	18.65	9.06	37.40
		2013	2.90	0.34	17.24	8.33	34.64
	Burned-grazed	2012	3.33	0.62	26.96	7.23	94.02
		2013	3.61	0.62	35.80	9.83	124.04
	Rest	2012	3.56	0.62	34.15	9.35	118.44
		2013	3.22	0.62	23.94	6.34	83.73



[Brn-Grz, burned-grazed]

Figure 5.2. Back-transformed least squares mean densities (pairs per 100 hectares) of clay-colored sparrows (*Spizella pallida*) 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.

C. Bobolink (*Dolichonyx oryzivorus*)

Table 5.5. Generalized linear mixed model (assuming a gamma distribution with a log link) testing the influence of management regime and year on breeding densities (pairs per 100 hectares) of bobolinks (*Dolichonyx oryzivorus*) on two grass types (mixed-grass, tallgrass) 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 ($0.05<p\leq0.10$); **, evidence for strong effect ($p\leq0.05$)]

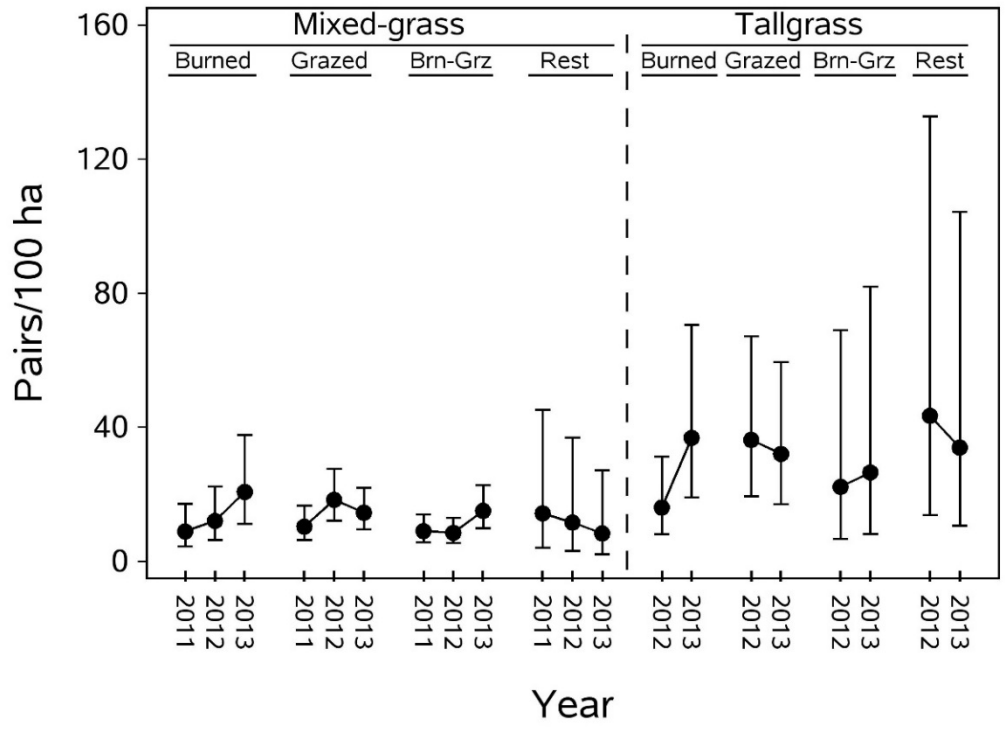
Effect	Sources of variation[1]	Numerator degrees of freedom	Denominator degrees of freedom[2]	*F*-statistic	*p*-value
Overall	Grass type × regime × year	19	184.7	2.28	0.0027**
Contrasts:	Mixed: regime effect	3	87.8	0.77	0.5133
	Mixed: year effect	2	139.8	0.59	0.5584
	Mixed: interaction	6	146.3	1.18	0.3215
	Tall: regime effect	3	116.9	0.49	0.6932
	Tall: year effect	1	124.1	0.26	0.6094
	Tall: interaction	3	124.1	1.00	0.3970
	Mixed versus tall: burned only	1	104.8	3.56	0.0621*
	Mixed versus tall: grazed only	1	111.2	9.93	0.0021**
	Mixed versus tall: burned-grazed	1	114.2	3.09	0.0813*
	Mixed versus tall: rest	1	102.0	4.43	0.0377**

[1]Sources of variation for the model: Y=Unit(Grass type × Regime) + Grass type × Regime × Year + Year × Unit(Grass type × Regime), where Grass type × Regime × Year is a fixed effect, Unit(Grass type × Regime) and Year × Unit(Grass type × Regime) are random effects in a mixed-model framework, and Year is a repeated-measures factor.
[2]Degrees of freedom are based on Kenward-Roger correction for repeated-measures models (Littell and others, 2006).

Table 5.6. Least squares mean (standard error) densities (pairs per 100 hectares) and back-transformed least squares mean (95-percent confidence intervals) densities (pairs per 100 hectares) of bobolinks (*Dolichonyx oryzivorus*), by grassland type (mixed-grass, tallgrass), overall treatment regime (burned only, grazed only, burned-grazed, or rest), and year (2011, 2012, 2013), 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	Regime	Year	LSMean	SE	LSMean	LCL	UCL
Mixed	Burned only	2011	2.30	0.31	8.95	4.45	17.19
		2012	2.57	0.29	12.10	6.37	22.29
		2013	3.08	0.29	20.74	11.23	37.65
	Grazed only	2011	2.43	0.22	10.40	6.36	16.65
		2012	2.96	0.20	18.39	12.14	27.62
		2013	2.74	0.20	14.55	9.53	21.95
	Burned-grazed	2011	2.31	0.20	9.07	5.77	13.99
		2012	2.26	0.20	8.54	5.46	13.08
		2013	2.78	0.20	15.09	9.90	22.76
	Rest	2011	2.73	0.56	14.37	4.11	45.25
		2012	2.53	0.56	11.61	3.19	36.93
		2013	2.24	0.56	8.36	2.11	27.15
Tall	Burned only	2012	2.84	0.32	16.08	8.04	31.26
		2013	3.63	0.32	36.89	19.06	70.57
	Grazed only	2012	3.62	0.31	36.28	19.39	67.15
		2013	3.50	0.31	32.07	17.09	59.46
	Burned-grazed	2012	3.15	0.56	22.25	6.73	68.96
		2013	3.32	0.56	26.56	8.16	81.94
	Rest	2012	3.79	0.56	43.45	13.77	132.75
		2013	3.55	0.56	33.97	10.62	104.23



[Brn-Grz, burned-grazed]

Figure 5.3. Back-transformed least squares mean densities (pairs per 100 hectares) of bobolinks (*Dolichonyx oryzivorus*) 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.

D. Grasshopper Sparrow (*Ammodramus savannarum*)

Table 5.7. Generalized linear mixed model (assuming a gamma distribution with a log link) testing the influence of management regime and year on breeding densities (pairs per 100 hectares) of grasshopper sparrows (*Ammodramus savannarum*) on two grass types (mixed-grass, tallgrass) 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 strong effect ($p \leq 0.05$)]

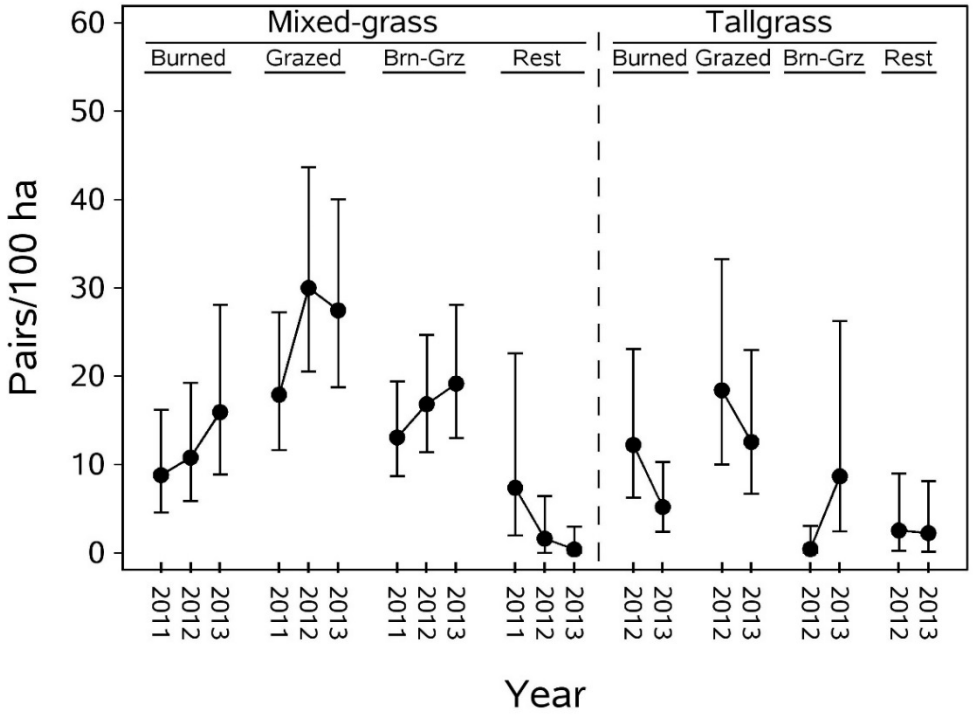
Effect	Sources of variation[1]	Numerator degrees of freedom	Denominator degrees of freedom[2]	*F*-statistic	*p*-value
Overall	Grass type × regime × year	19	183.7	4.73	<0.0001**
Contrasts:	Mixed: regime effect	3	80.8	9.17	<0.0001**
	Mixed: year effect	2	134.4	0.16	0.8546
	Mixed: interaction	6	138.2	2.21	0.0459**
	Tall: regime effect	3	105.3	4.71	0.0040**
	Tall: year effect	1	126.8	0.60	0.4391
	Tall: interaction	3	126.8	5.98	0.0008**
	Mixed versus tall: burned only	1	94.3	0.92	0.3386
	Mixed versus tall: grazed only	1	99.8	2.51	0.1163
	Mixed versus tall: burned-grazed	1	102.9	10.37	0.0017**
	Mixed versus tall: rest	1	92.2	0.02	0.8999

[1]Sources of variation for the model: Y=Unit(Grass type × Regime) + Grass type × Regime × Year + Year × Unit(Grass type × Regime), where Grass type × Regime × Year is a fixed effect, Unit(Grass type × Regime) and Year × Unit(Grass type × Regime) are random effects in a mixed-model framework, and Year is a repeated-measures factor.
[2]Degrees of freedom are based on Kenward-Roger correction for repeated-measures models (Littell and others, 2006).

Table 5.8. Least squares mean (standard error) densities (pairs per 100 hectares) and back-transformed least squares mean (95-percent confidence intervals) densities (pairs per 100 hectares) of grasshopper sparrows (*Ammodramus savannarum*), by grassland type (mixed-grass, tallgrass), overall treatment regime (burned only, grazed only, burned-grazed, or rest), and year (2011, 2012, 2013), 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	Regime	Year	LSMean	SE	LSMean	LCL	UCL
Mixed	Burned only	2011	2.28	0.29	8.82	4.60	16.21
		2012	2.47	0.28	10.81	5.88	19.28
		2013	2.83	0.28	15.95	8.87	28.11
	Grazed only	2011	2.94	0.20	17.92	11.66	27.26
		2012	3.43	0.19	30.00	20.53	43.63
		2013	3.35	0.19	27.47	18.75	40.04
	Burned-grazed	2011	2.65	0.19	13.09	8.73	19.42
		2012	2.88	0.19	16.84	11.39	24.68
		2013	3.00	0.19	19.17	12.99	28.08
	Rest	2011	2.13	0.53	7.38	1.98	22.60
		2012	0.97	0.53	1.63	0.00	6.42
		2013	0.35	0.53	0.41	0.00	2.98
Tall	Burned only	2012	2.58	0.30	12.24	6.28	23.07
		2013	1.83	0.30	5.21	2.42	10.29
	Grazed only	2012	2.97	0.29	18.43	10.02	33.26
		2013	2.61	0.29	12.58	6.71	22.95
	Burned-grazed	2012	0.37	0.53	0.45	0.00	3.09
		2013	2.27	0.53	8.68	2.44	26.26
	Rest	2012	1.27	0.53	2.56	0.26	9.01
		2013	1.18	0.53	2.25	0.15	8.14



[Brn-Grz, burned-grazed]

Figure 5.4. Back-transformed least squares mean densities (pairs per 100 hectares) of grasshopper sparrows (*Ammodramus savannarum*) 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.

E. Savannah Sparrow (*Passerculus sandwichensis*)

Table 5.9. Generalized linear mixed model (assuming a gamma distribution with a log link) testing the influence of management regime and year on breeding densities (pairs per 100 hectares) of Savannah sparrows (*Passerculus sandwichensis*) on two grass types (mixed-grass, tallgrass) 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 ($p\leq0.05$]

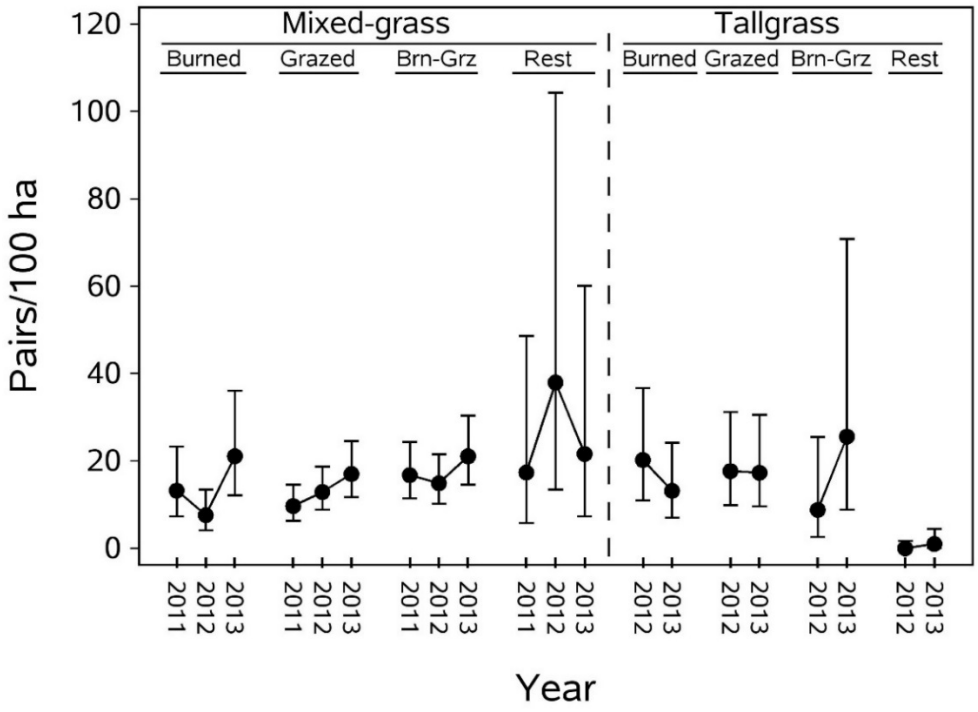
Effect	Sources of variation[1]	Numerator degrees of freedom	Denominator degrees of freedom[2]	*F*-statistic	*p*-value
Overall	Grass type × regime × year	19	182.9	3.73	<0.0001**
Contrasts:	Mixed: regime effect	3	78.9	1.16	0.3301
	Mixed: year effect	2	131.3	2.06	0.1315
	Mixed: interaction	6	134.1	2.74	0.0151**
	Tall: regime effect	3	98.9	9.20	<0.0001**
	Tall: year effect	1	126.4	2.87	0.0929*
	Tall: interaction	3	126.4	3.05	0.0309**
	Mixed versus tall: burned only	1	89.7	0.42	0.5209
	Mixed versus tall: grazed only	1	94.3	1.00	0.3211
	Mixed versus tall: burned-grazed	1	96.8	0.08	0.7830
	Mixed versus tall: rest	1	88.0	22.11	<0.0001**

[1]Sources of variation for the model: Y=Unit(Grass type × Regime) + Grass type × Regime × Year + Year × Unit(Grass type × Regime), where Grass type × Regime × Year is a fixed effect, Unit(Grass type × Regime) and Year × Unit(Grass type × Regime) are random effects in a mixed-model framework, and Year is a repeated-measures factor.
[2]Degrees of freedom are based on Kenward-Roger correction for repeated-measures models (Littell and others, 2006).

Table 5.10. Least squares mean (standard error) densities (pairs per 100 hectares) and back-transformed least squares mean (95-percent confidence intervals) densities (pairs per 100 hectares) of Savannah sparrows (*Passerculus sandwichensis*), by grassland type (mixed-grass, tallgrass), overall treatment regime (burned only, grazed only, burned-grazed, or rest), and year (2011, 2012, 2013), 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	Regime	Year	LSMean	SE	LSMean	LCL	UCL
Mixed	Burned only	2011	2.66	0.27	13.23	7.33	23.33
		2012	2.15	0.26	7.61	4.12	13.46
		2013	3.10	0.26	21.10	12.15	36.12
	Grazed only	2011	2.37	0.19	9.68	6.32	14.60
		2012	2.63	0.18	12.90	8.81	18.71
		2013	2.89	0.18	17.03	11.70	24.60
	Burned-grazed	2011	2.88	0.18	16.77	11.47	24.32
		2012	2.77	0.18	14.92	10.23	21.56
		2013	3.09	0.18	21.08	14.55	30.34
	Rest	2011	2.91	0.51	17.36	5.80	48.58
		2012	3.66	0.51	37.97	13.43	104.25
		2013	3.12	0.51	21.61	7.37	60.07
Tall	Burned only	2012	3.06	0.29	20.24	10.97	36.70
		2013	2.65	0.29	13.17	6.98	24.14
	Grazed only	2012	2.93	0.28	17.69	9.85	31.21
		2013	2.91	0.28	17.31	9.63	30.56
	Burned-grazed	2012	2.28	0.51	8.82	2.64	25.52
		2013	3.28	0.51	25.58	8.84	70.78
	Rest	2012	0.00	0.51	0.00	0.00	1.70
		2013	0.70	0.51	1.01	0.00	4.43



[Brn-Grz, burned-grazed]

Figure 5.5. Back-transformed least squares mean densities (pairs per 100 hectares) of Savannah sparrows (*Passerculus sandwichensis*) 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.

F. Western Meadowlark (*Sturnella neglecta*)

Table 5.11. Generalized linear mixed model (assuming a gamma distribution with a log link) testing the influence of management regime and year on breeding densities (pairs per 100 hectares) of western meadowlarks (*Sturnella neglecta*) on two grass types (mixed-grass, tallgrass) 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 ($p\leq0.05$)]

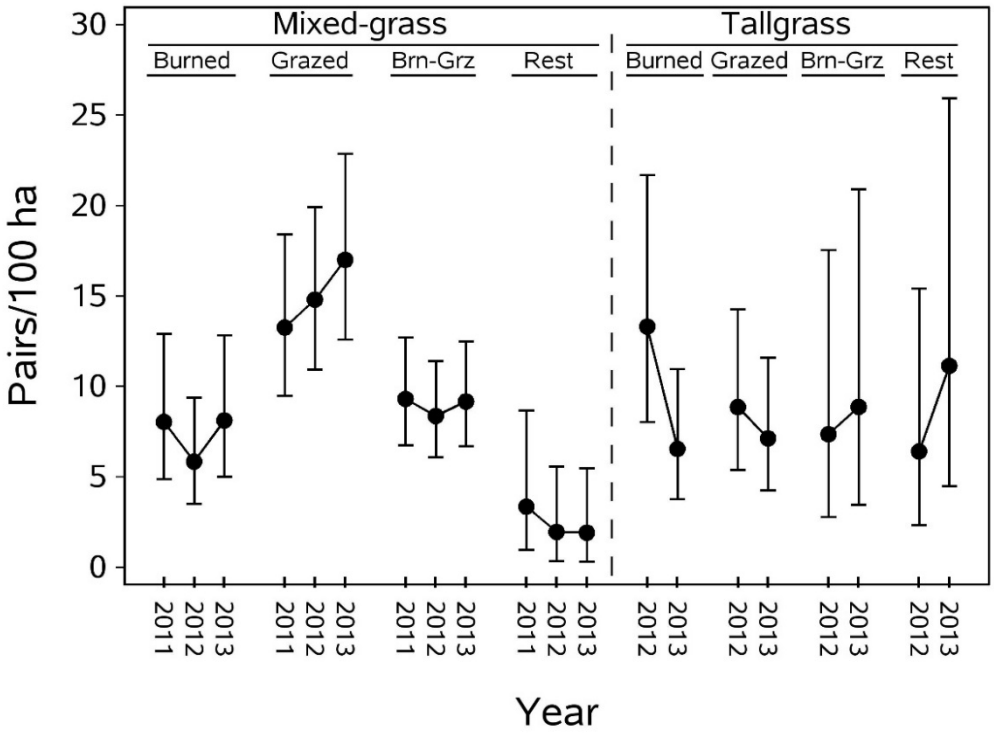
Effect	Sources of variation[1]	Numerator degrees of freedom	Denominator degrees of freedom[2]	*F*-statistic	*p*-value
Overall	Grass type × regime × year	19	181.5	2.37	0.0017**
Contrasts:	Mixed: regime effect	3	74.9	9.48	<0.0001**
	Mixed: year effect	2	128.1	1.06	0.3479
	Mixed: interaction	6	131.6	0.59	0.7394
	Tall: regime effect	3	97.6	0.10	0.9590
	Tall: year effect	1	121.4	0.07	0.7935
	Tall: interaction	3	121.4	2.42	0.0695*
	Mixed versus tall: burned only	1	87.5	0.76	0.3861
	Mixed versus tall: grazed only	1	92.4	6.65	0.0115**
	Mixed versus tall: burned-grazed	1	95.3	0.06	0.8082
	Mixed versus tall: rest	1	85.3	4.80	0.0313**

[1]Sources of variation for the model: Y=Unit(Grass type × Regime) + Grass type × Regime × Year + Year × Unit(Grass type × Regime), where Grass type × Regime × Year is a fixed effect, Unit(Grass type × Regime) and Year × Unit(Grass type × Regime) are random effects in a mixed-model framework, and Year is a repeated-measures factor.
[2]Degrees of freedom are based on Kenward-Roger correction for repeated-measures models (Littell and others, 2006).

Table 5.12. Least squares mean (standard error) densities (pairs per 100 hectares) and back-transformed least squares mean (95-percent confidence intervals) densities (pairs per 100 hectares) of western meadowlarks (*Sturnella neglecta*), by grassland type (mixed-grass, tallgrass), overall treatment regime (burned only, grazed only, burned-grazed, or rest), and year (2011, 2012, 2013), 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	Regime	Year	LSMean	SE	LSMean	LCL	UCL
Mixed	Burned only	2011	2.20	0.22	8.04	4.88	12.92
		2012	1.92	0.21	5.85	3.52	9.38
		2013	2.21	0.21	8.12	5.01	12.82
	Grazed only	2011	2.66	0.16	13.26	9.49	18.39
		2012	2.76	0.14	14.80	10.94	19.92
		2013	2.89	0.14	17.00	12.59	22.85
	Burned-grazed	2011	2.33	0.15	9.31	6.75	12.70
		2012	2.24	0.14	8.37	6.08	11.39
		2013	2.32	0.14	9.17	6.68	12.48
	Rest	2011	1.47	0.41	3.36	0.97	8.67
		2012	1.09	0.41	1.96	0.34	5.57
		2013	1.07	0.41	1.92	0.32	5.47
Tall	Burned only	2012	2.66	0.23	13.31	8.04	21.67
		2013	2.02	0.23	6.55	3.77	10.96
	Grazed only	2012	2.29	0.22	8.86	5.38	14.26
		2013	2.10	0.22	7.13	4.26	11.58
	Burned-grazed	2012	2.12	0.41	7.36	2.77	17.54
		2013	2.29	0.41	8.87	3.45	20.89
	Rest	2012	2.00	0.41	6.41	2.34	15.42
		2013	2.50	0.41	11.14	4.48	25.92



[Brn-Grz, burned-grazed]

Figure 5.6. Back-transformed least squares mean densities (pairs per 100 hectares) of western meadowlarks (*Sturnella neglecta*) 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.

G. Brown-headed Cowbird (*Molothrus ater*)

Table 5.13. Generalized linear mixed model (assuming a gamma distribution with a log link) testing the influence of management regime and year on breeding densities (pairs per 100 hectares) of Brown-headed Cowbirds (*Molothrus ater*) on two grass types (mixed-grass, tallgrass) 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 ($p\leq0.05$)]

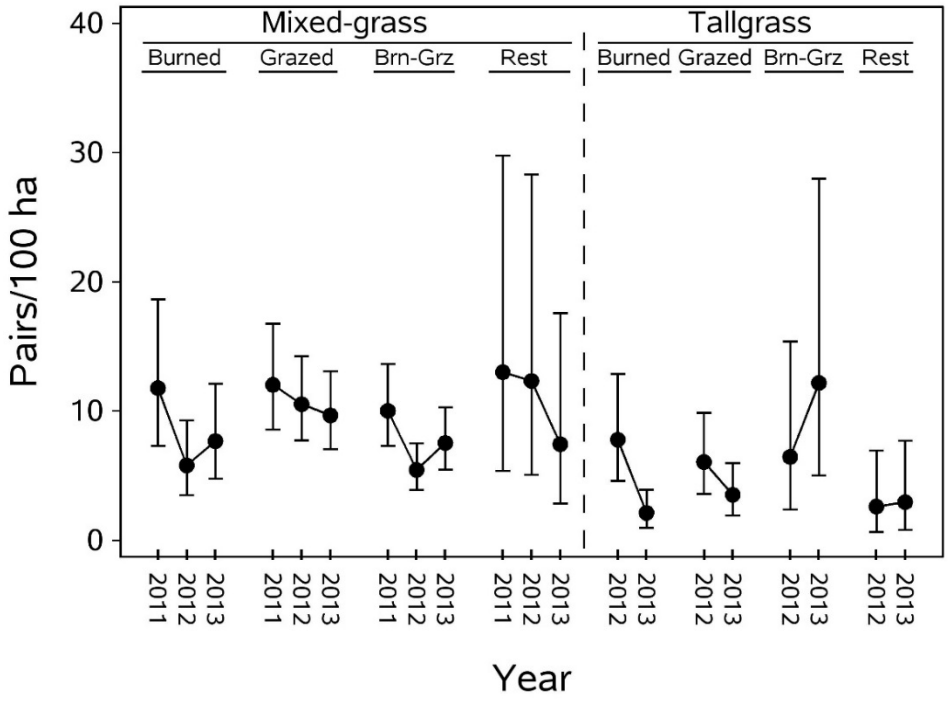
Effect	Sources of variation[1]	Numerator degrees of freedom	Denominator degrees of freedom[2]	*F*-statistic	*p*-value
Overall	Grass type × regime × year	19	182.3	3.47	<0.0001**
Contrasts:	Mixed: regime effect	3	77.7	1.94	0.1305
	Mixed: year effect	2	131.7	2.89	0.0588*
	Mixed: interaction	6	137.0	1.07	0.3808
	Tall: regime effect	3	105.5	1.55	0.2048
	Tall: year effect	1	120.1	1.13	0.2889
	Tall: interaction	3	120.1	3.51	0.0175**
	Mixed versus tall: burned only	1	93.4	5.30	0.0236**
	Mixed versus tall: grazed only	1	99.5	12.58	0.0006**
	Mixed versus tall: burned-grazed	1	102.8	0.21	0.6441
	Mixed versus tall: rest	1	90.9	6.82	0.0105**

[1]Sources of variation for the model: Y=Unit(Grass type × Regime) + Grass type × Regime × Year + Year × Unit(Grass type × Regime), where Grass type × Regime × Year is a fixed effect, Unit(Grass type × Regime) and Year × Unit(Grass type × Regime) are random effects in a mixed-model framework, and Year is a repeated-measures factor.
[2]Degrees of freedom are based on Kenward-Roger correction for repeated-measures models (Littell and others, 2006).

Table 5.14. Least squares mean (standard error) densities (pairs per 100 hectares) and back-transformed least squares mean (95-percent confidence intervals) densities (pairs per 100 hectares) of brown-headed cowbirds (*Molothrus ater*), by grassland type (mixed-grass, tallgrass), overall treatment regime (burned only, grazed only, burned-grazed, or rest), and year (2011, 2012, 2013), 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	Regime	Year	LSMean	SE	LSMean	LCL	UCL
Mixed	Burned only	2011	2.55	0.22	11.79	7.32	18.65
		2012	1.92	0.21	5.81	3.51	9.27
		2013	2.16	0.21	7.69	4.76	12.10
	Grazed only	2011	2.57	0.16	12.04	8.57	16.77
		2012	2.45	0.14	10.54	7.74	14.24
		2013	2.37	0.14	9.68	7.08	13.10
	Burned-grazed	2011	2.40	0.14	10.03	7.31	13.65
		2012	1.87	0.14	5.46	3.90	7.53
		2013	2.15	0.14	7.55	5.47	10.29
	Rest	2011	2.64	0.40	13.02	5.38	29.78
		2012	2.59	0.40	12.34	5.07	28.30
		2013	2.13	0.40	7.45	2.85	17.57
Tall	Burned only	2012	2.17	0.23	7.80	4.59	12.86
		2013	1.14	0.23	2.14	0.99	3.94
	Grazed only	2012	1.96	0.22	6.07	3.60	9.88
		2013	1.51	0.22	3.54	1.95	5.98
	Burned-grazed	2012	2.01	0.40	6.47	2.40	15.40
		2013	2.58	0.40	12.19	5.01	27.98
	Rest	2012	1.29	0.40	2.62	0.65	6.96
		2013	1.38	0.40	2.97	0.81	7.71



[Brn-Grz, burned-grazed]

Figure 5.7. Back-transformed least squares mean densities (pairs per 100 hectares) of brown-headed cowbirds (*Molothrus ater*) 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.

H. Sedge Wren (*Cistothorus platensis*)

Table 5.15. Generalized linear mixed model (assuming a gamma distribution with a log link) testing the influence of management regime and year on breeding densities (pairs per 100 hectares) of sedge wrens (*Cistothorus platensis*) on two grass types (mixed-grass, tallgrass) 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 strong effect ($p \leq 0.05$)]

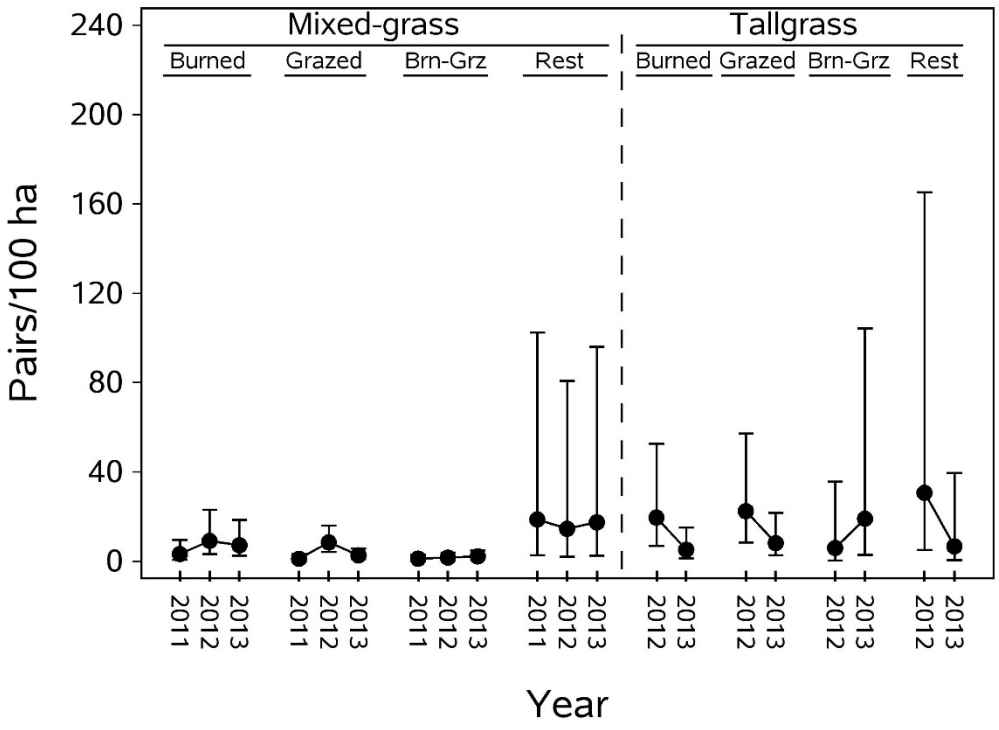
Effect	Sources of variation[1]	Numerator degrees of freedom	Denominator degrees of freedom[2]	*F*-statistic	*p*-value
Overall	Grass type × regime × year	19	186.0	3.31	<0.0001**
Contrasts:	Mixed: regime effect	3	88.0	4.25	0.0075**
	Mixed: year effect	2	141.5	1.74	0.1792
	Mixed: interaction	6	146.2	1.68	0.1287
	Tall: regime effect	3	115.7	0.10	0.9579
	Tall: year effect	1	131.2	2.49	0.1168
	Tall: interaction	3	131.2	1.52	0.2112
	Mixed versus tall: burned only	1	103.7	0.83	0.3637
	Mixed versus tall: grazed only	1	109.8	8.05	0.0054**
	Mixed versus tall: burned-grazed	1	113.1	4.15	0.0440**
	Mixed versus tall: rest	1	101.2	0.02	0.8852

[1]Sources of variation for the model: Y=Unit(Grass type × Regime) + Grass type × Regime × Year + Year × Unit(Grass type × Regime), where Grass type × Regime × Year is a fixed effect, Unit(Grass type × Regime) and Year × Unit(Grass type × Regime) are random effects in a mixed-model framework, and Year is a repeated-measures factor.
[2]Degrees of freedom are based on Kenward-Roger correction for repeated-measures models (Littell and others, 2006).

Table 5.16. Least squares mean (standard error) densities (pairs per 100 hectares) and back-transformed least squares mean (95-percent confidence intervals) densities (pairs per 100 hectares) of sedge wrens (*Cistothorus platensis*), by grassland type (mixed-grass, tallgrass), overall treatment regime (burned only, grazed only, burned-grazed, or rest), and year (2011, 2012, 2013), 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	Regime	Year	LSMean	SE	LSMean	LCL	UCL
Mixed	Burned only	2011	1.46	0.46	3.31	0.75	9.64
		2012	2.32	0.44	9.16	3.28	23.14
		2013	2.11	0.44	7.23	2.47	18.55
	Grazed only	2011	0.78	0.33	1.18	0.14	3.18
		2012	2.25	0.30	8.49	4.29	16.03
		2013	1.32	0.30	2.73	1.08	5.70
	Burned-grazed	2011	0.81	0.30	1.25	0.24	3.09
		2012	1.00	0.30	1.71	0.51	3.85
		2013	1.19	0.30	2.29	0.83	4.91
	Rest	2011	2.98	0.85	18.76	2.77	102.52
		2012	2.75	0.85	14.60	1.98	80.74
		2013	2.92	0.85	17.51	2.53	95.99
Tall	Burned only	2012	3.03	0.49	19.61	6.92	52.62
		2013	1.83	0.49	5.24	1.40	15.24
	Grazed only	2012	3.16	0.46	22.49	8.48	57.20
		2013	2.22	0.46	8.20	2.71	21.79
	Burned-grazed	2012	1.95	0.85	6.00	0.34	35.69
		2013	3.00	0.85	19.08	2.83	104.24
	Rest	2012	3.46	0.85	30.70	5.05	165.12
		2013	2.04	0.85	6.72	0.47	39.47



[Brn-Grz, burned-grazed]

Figure 5.8. Back-transformed least squares mean densities (pairs per 100 hectares) of sedge wrens (*Cistothorus platensis*) 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.

I. Common Yellowthroat (*Geothlypis trichas*)

Table 5.17. Generalized linear mixed model (assuming a gamma distribution with a log link) testing the influence of management regime and year on breeding densities (pairs per 100 hectares) of common yellowthroats (*Geothlypis trichas*) on two grass types (mixed-grass, tallgrass) 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 strong effect ($p \leq 0.05$)]

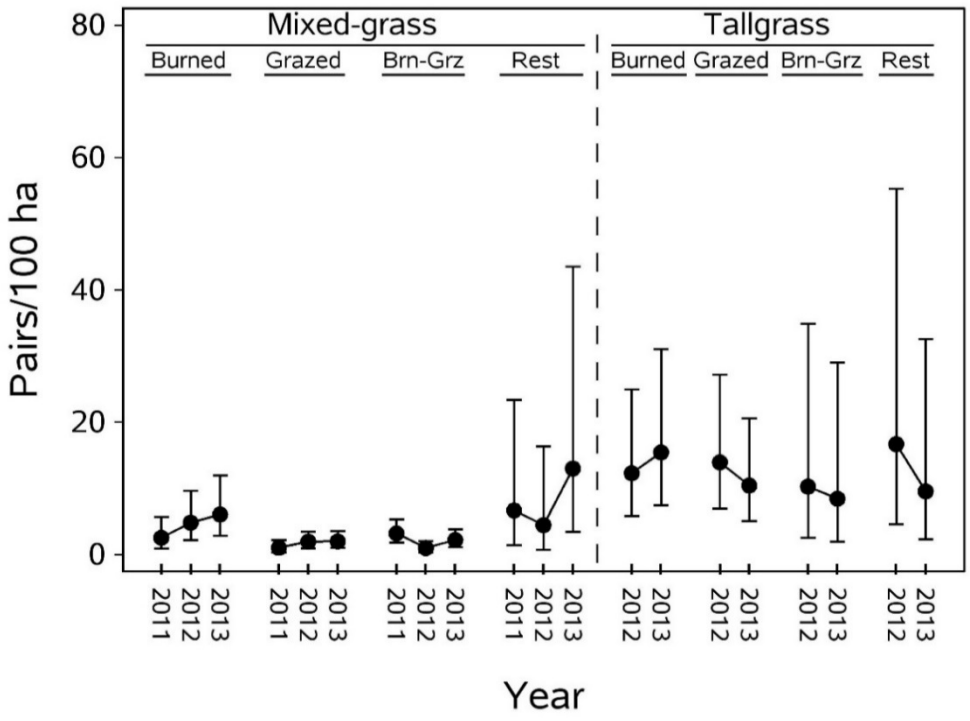
Effect	Sources of variation[1]	Numerator degrees of freedom	Denominator degrees of freedom[2]	*F*-statistic	*p*-value
Overall	Grass type × regime × year	19	182.1	4.29	<0.0001**
Contrasts:	Mixed: regime effect	3	77.0	3.02	0.0348**
	Mixed: year effect	2	129.3	3.07	0.0500**
	Mixed: interaction	6	132.0	3.87	0.0014**
	Tall: regime effect	3	96.3	0.12	0.9486
	Tall: year effect	1	124.6	0.76	0.3845
	Tall: interaction	3	124.6	0.67	0.5705
	Mixed versus tall: burned only	1	87.4	6.73	0.0111**
	Mixed versus tall: grazed only	1	91.9	22.70	<0.0001**
	Mixed versus tall: burned-grazed	1	94.3	4.94	0.0286**
	Mixed versus tall: rest	1	85.8	0.47	0.4964

[1]Sources of variation for the model: Y=Unit(Grass type × Regime) + Grass type × Regime × Year + Year × Unit(Grass type × Regime), where Grass type × Regime × Year is a fixed effect, Unit(Grass type × Regime) and Year × Unit(Grass type × Regime) are random effects in a mixed-model framework, and Year is a repeated-measures factor.
[2]Degrees of freedom are based on Kenward-Roger correction for repeated-measures models (Littell and others, 2006).

Table 5.18. Least squares mean (standard error) densities (pairs per 100 hectares) and back-transformed least squares mean (95-percent confidence intervals) densities (pairs per 100 hectares) of common yellowthroats (*Geothlypis trichas*), by grassland type (mixed-grass, tallgrass), overall treatment regime (burned only, grazed only, burned-grazed, or rest), and year (2011, 2012, 2013), 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	Regime	Year	LSMean	SE	LSMean	LCL	UCL
Mixed	Burned only	2011	1.27	0.32	2.57	0.92	5.66
		2012	1.76	0.31	4.84	2.19	9.67
		2013	1.96	0.31	6.08	2.87	11.95
	Grazed only	2011	0.72	0.22	1.05	0.32	2.18
		2012	1.09	0.21	1.98	0.99	3.48
		2013	1.10	0.21	2.01	1.00	3.52
	Burned-grazed	2011	1.44	0.21	3.22	1.79	5.36
		2012	0.70	0.21	1.02	0.35	2.03
		2013	1.17	0.21	2.22	1.14	3.84
	Rest	2011	2.04	0.59	6.69	1.42	23.41
		2012	1.70	0.59	4.47	0.72	16.38
		2013	2.64	0.59	13.02	3.41	43.53
Tall	Burned only	2012	2.59	0.34	12.31	5.83	24.94
		2013	2.80	0.34	15.46	7.44	31.07
	Grazed only	2012	2.71	0.32	13.96	6.95	27.18
		2013	2.44	0.32	10.46	5.08	20.57
	Burned-grazed	2012	2.42	0.59	10.29	2.55	34.85
		2013	2.25	0.59	8.46	1.98	29.05
	Rest	2012	2.87	0.59	16.71	4.58	55.26
		2013	2.36	0.59	9.57	2.33	32.57



[Brn-Grz, burned-grazed]

Figure 5.9. Back-transformed least squares mean densities (pairs per 100 hectares) of common yellowthroats (*Geothlypis trichas*) 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.

J. Dickcissel (*Spiza americana*)

Table 5.19. Generalized linear mixed model (assuming a gamma distribution with a log link) testing the influence of management regime and year on breeding densities (pairs per 100 hectares) of dickcissels (*Spiza americana*) on two grass types (mixed-grass, tallgrass) 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 ($p\leq0.05$)]

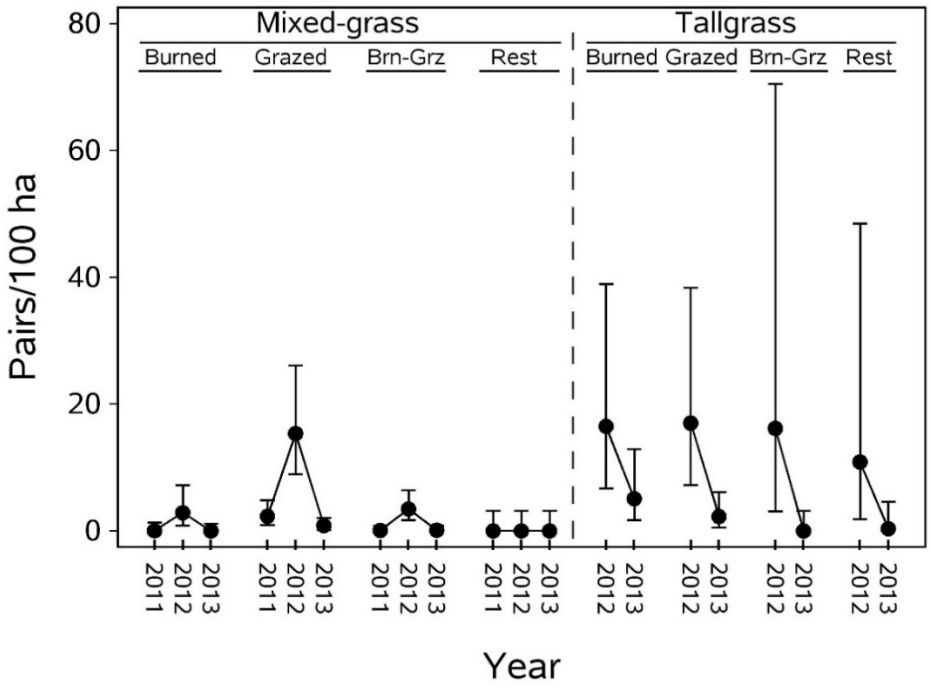
Effect	Sources of variation[1]	Numerator degrees of freedom	Denominator degrees of freedom[2]	*F*-statistic	*p*-value
Overall	Grass type × regime × year	19	187.5	9.47	<0.0001**
Contrasts:	Mixed: regime effect	3	93.9	7.36	0.0002**
	Mixed: year effect	2	146.4	13.21	<0.0001**
	Mixed: interaction	6	151.6	1.45	0.1993
	Tall: regime effect	3	122.7	1.05	0.3751
	Tall: year effect	1	134.5	29.51	<0.0001**
	Tall: interaction	3	134.5	1.18	0.3184
	Mixed versus tall: burned only	1	110.5	19.37	<0.0001**
	Mixed versus tall: grazed only	1	116.8	1.91	0.1694
	Mixed versus tall: burned-grazed	1	120.0	2.01	0.1589
	Mixed versus tall: rest	1	107.9	3.32	0.0714*

[1]Sources of variation for the model: Y=Unit(Grass type × Regime) + Grass type × Regime × Year + Year × Unit(Grass type × Regime), where Grass type × Regime × Year is a fixed effect, Unit(Grass type × Regime) and Year × Unit(Grass type × Regime) are random effects in a mixed-model framework, and Year is a repeated-measures factor.
[2]Degrees of freedom are based on Kenward-Roger correction for repeated-measures models (Littell and others, 2006).

Table 5.20. Least squares mean (standard error) densities (pairs per 100 hectares) and back-transformed least squares mean (95-percent confidence intervals) densities (pairs per 100 hectares) of dickcissels (*Spiza americana*), by grassland type (mixed-grass, tallgrass), overall treatment regime (burned only, grazed only, burned-grazed, or rest), and year (2011, 2012, 2013), 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	Regime	Year	LSMean	SE	LSMean	LCL	UCL
Mixed	Burned only	2011	0.04	0.40	0.04	0.00	1.28
		2012	1.36	0.38	2.88	0.84	7.17
		2013	0.00	0.38	0.00	0.00	1.11
	Grazed only	2011	1.20	0.29	2.31	0.89	4.81
		2012	2.80	0.26	15.37	8.90	26.09
		2013	0.61	0.26	0.84	0.11	2.04
	Burned-grazed	2011	0.08	0.26	0.08	0.00	0.81
		2012	1.50	0.26	3.47	1.70	6.39
		2013	0.12	0.26	0.12	0.00	0.86
	Rest	2011	0.00	0.73	0.00	0.00	3.16
		2012	0.00	0.73	0.00	0.00	3.16
		2013	0.00	0.73	0.00	0.00	3.16
Tall	Burned only	2012	2.86	0.42	16.51	6.69	38.89
		2013	1.81	0.42	5.09	1.67	12.88
	Grazed only	2012	2.89	0.40	17.01	7.25	38.34
		2013	1.18	0.40	2.27	0.50	6.13
	Burned-grazed	2012	2.84	0.73	16.17	3.12	70.47
		2013	0.00	0.73	0.00	0.00	3.16
	Rest	2012	2.47	0.73	10.88	1.85	48.46
		2013	0.30	0.73	0.35	0.00	4.62



[Brn-Grz, burned-grazed]

Figure 5.10. Back-transformed least squares mean densities (pairs per 100 hectares) of dickcissels (*Spiza americana*) 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.

K. Chestnut-collared Longspur (*Calcarius ornatus*)

Table 5.21. Generalized linear mixed model (assuming a gamma distribution with a log link) testing the influence of management regime and year on breeding densities (pairs per 100 hectares) of chestnut-collared longspurs (*Calcarius ornatus*) on two grass types (mixed-grass, tallgrass) 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 strong effect ($p \leq 0.05$)]

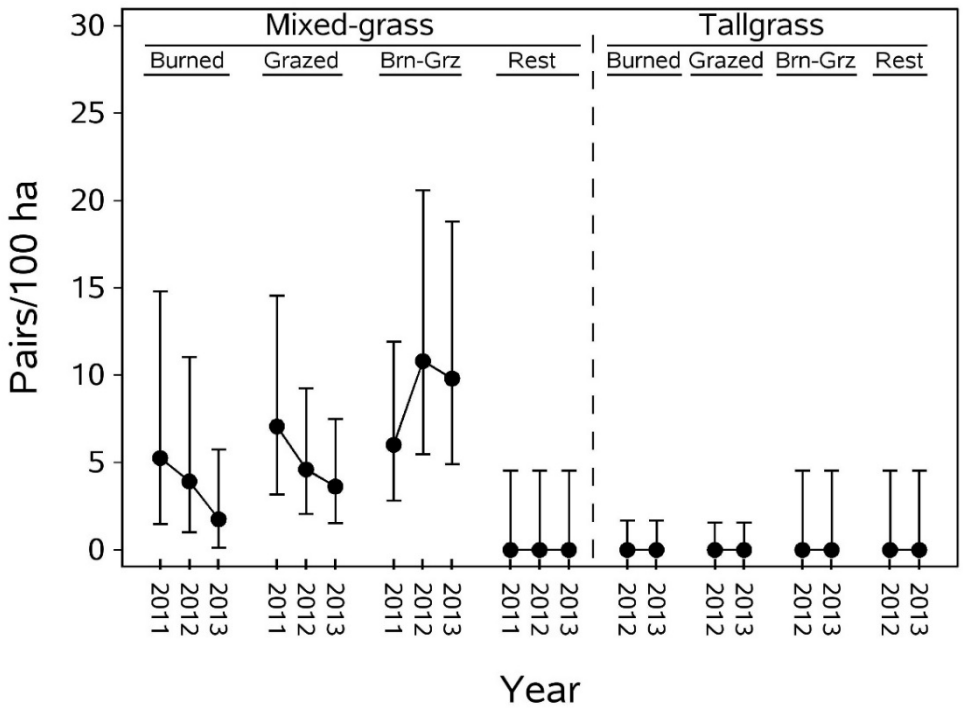
Effect	Sources of variation[1]	Numerator degrees of freedom	Denominator degrees of freedom[2]	*F*-statistic	*p*-value
Overall	Grass type × regime × year	19	180.1	2.70	0.0003**
Contrasts:	Mixed: regime effect	3	71.64	3.60	0.0173**
	Mixed: year effect	2	124.2	0.40	0.6769
	Mixed: interaction	6	127.4	1.03	0.4079
	Tall: regime effect	3	92.3	0.00	1.0000
	Tall: year effect	1	118.5	0.00	1.0000
	Tall: interaction	3	118.5	0.00	1.0000
	Mixed versus tall: burned only	1	82.8	6.56	0.0122**
	Mixed versus tall: grazed only	1	87.53	13.20	0.0005**
	Mixed versus tall: burned-grazed	1	90.18	7.84	0.0062**
	Mixed versus tall: rest	1	81.02	0.00	1.0000

[1]Sources of variation for the model: Y=Unit(Grass type × Regime) + Grass type × Regime × Year + Year × Unit(Grass type × Regime), where Grass type × Regime × Year is a fixed effect, Unit(Grass type × Regime) and Year × Unit(Grass type × Regime) are random effects in a mixed-model framework, and Year is a repeated-measures factor.
[2]Degrees of freedom are based on Kenward-Roger correction for repeated-measures models (Littell and others, 2006).

Table 5.22. Least squares mean (standard error) densities (pairs per 100 hectares) and back-transformed least squares mean (95-percent confidence intervals) densities (pairs per 100 hectares) of chestnut-collared longspurs (*Calcarius ornatus*), by grassland type (mixed-grass, tallgrass), overall treatment regime (burned only, grazed only, burned-grazed, or rest), and year (2011, 2012, 2013), 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	Regime	Year	LSMean	SE	LSMean	LCL	UCL
Mixed	Burned only	2011	1.83	0.47	5.26	1.48	14.81
		2012	1.59	0.46	3.92	1.01	11.05
		2013	1.01	0.46	1.76	0.13	5.75
	Grazed only	2011	2.09	0.34	7.07	3.18	14.56
		2012	1.73	0.31	4.61	2.07	9.26
		2013	1.53	0.31	3.63	1.53	7.48
	Burned-grazed	2011	1.95	0.31	6.02	2.81	11.93
		2012	2.47	0.31	10.81	5.47	20.58
		2013	2.38	0.31	9.81	4.90	18.79
	Rest	2011	0.00	0.87	0.00	0.00	4.55
		2012	0.00	0.87	0.00	0.00	4.55
		2013	0.00	0.87	0.00	0.00	4.55
Tall	Burned only	2012	0.00	0.50	0.00	0.00	1.69
		2013	0.00	0.50	0.00	0.00	1.69
	Grazed only	2012	0.00	0.48	0.00	0.00	1.56
		2013	0.00	0.48	0.00	0.00	1.56
	Burned-grazed	2012	0.00	0.87	0.00	0.00	4.55
		2013	0.00	0.87	0.00	0.00	4.55
	Rest	2012	0.00	0.87	0.00	0.00	4.55
		2013	0.00	0.87	0.00	0.00	4.55



[Brn-Grz, burned-grazed]

Figure 5.11. Back-transformed least squares mean densities (pairs per 100 hectares) of chestnut-collared longspurs (*Calcarius ornatus*) 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.

L. Eastern Kingbird (*Tyrannus tyrannus*)

Table 5.23. Generalized linear mixed model (assuming a gamma distribution with a log link) testing the influence of management regime and year on breeding densities (pairs per 100 hectares) of eastern kingbirds (*Tyrannus tyrannus*) on two grass types (mixed-grass, tallgrass) 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.

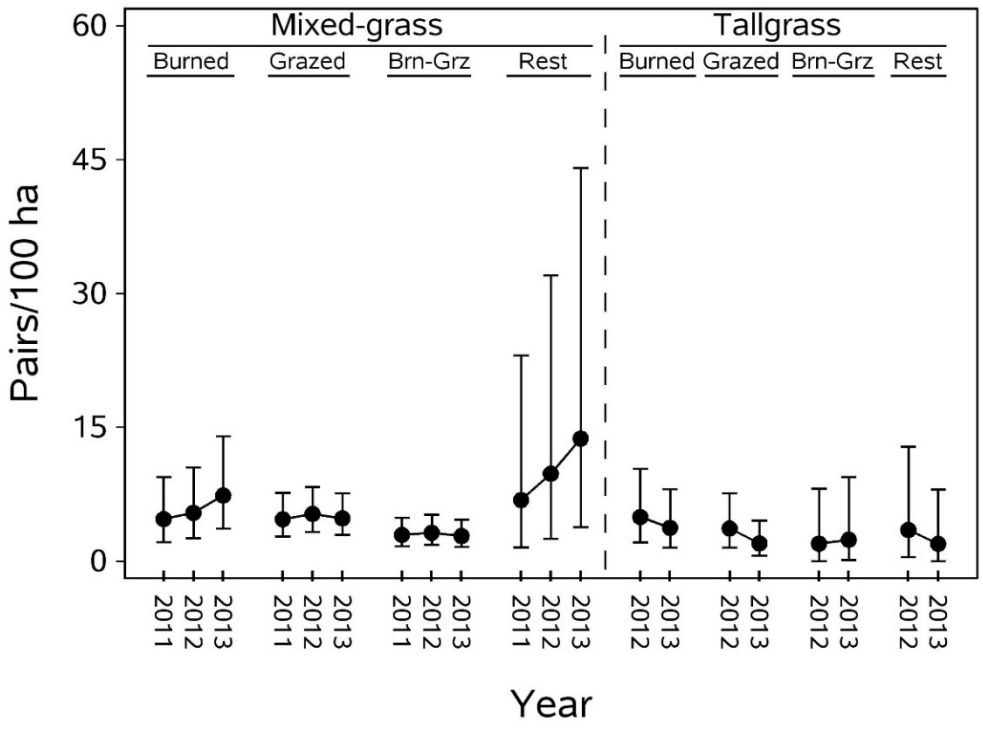
Effect	Sources of variation[1]	Numerator degrees of freedom	Denominator degrees of freedom[2]	*F*-statistic	*p*-value
Overall	Grass type × regime × year	19	181.8	0.95	0.5271
Contrasts:	Mixed: regime effect	3	77.0	1.99	0.1230
	Mixed: year effect	2	128.0	0.99	0.3733
	Mixed: interaction	6	129.8	0.51	0.8019
	Tall: regime effect	3	91.7	0.37	0.7777
	Tall: year effect	1	125.2	1.83	0.1784
	Tall: interaction	3	125.2	0.51	0.6783
	Mixed versus tall: burned only	1	84.9	0.36	0.5521
	Mixed versus tall: grazed only	1	88.3	1.86	0.1766
	Mixed versus tall: burned-grazed	1	90.2	0.17	0.6834
	Mixed versus tall: rest	1	83.6	2.24	0.1386

[1]Sources of variation for the model: Y=Unit(Grass type × Regime) + Grass type × Regime × Year + Year × Unit(Grass type × Regime), where Grass type × Regime × Year is a fixed effect, Unit(Grass type × Regime) and Year × Unit(Grass type × Regime) are random effects in a mixed-model framework, and Year is a repeated-measures factor.
[2]Degrees of freedom are based on Kenward-Roger correction for repeated-measures models (Littell and others, 2006).

Table 5.24. Least squares mean (standard error) densities (pairs per 100 hectares) and back-transformed least squares mean (95-percent confidence intervals) densities (pairs per 100 hectares) of eastern kingbirds (*Tyrannus tyrannus*), by grassland type (mixed-grass, tallgrass), overall treatment regime (burned only, grazed only, burned-grazed, or rest), and year (2011, 2012, 2013), 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	Regime	Year	LSMean	SE	LSMean	LCL	UCL
Mixed	Burned only	2011	1.75	0.30	4.74	2.16	9.44
		2012	1.86	0.30	5.43	2.59	10.51
		2013	2.13	0.30	7.38	3.68	14.01
	Grazed only	2011	1.74	0.21	4.71	2.77	7.67
		2012	1.84	0.20	5.32	3.28	8.35
		2013	1.76	0.20	4.82	2.93	7.63
	Burned-grazed	2011	1.38	0.20	2.97	1.67	4.89
		2012	1.44	0.20	3.21	1.85	5.22
		2013	1.35	0.20	2.84	1.60	4.69
	Rest	2011	2.06	0.57	6.87	1.58	23.05
		2012	2.38	0.57	9.82	2.54	32.05
		2013	2.69	0.57	13.76	3.83	44.07
Tall	Burned only	2012	1.79	0.33	4.96	2.13	10.36
		2013	1.56	0.33	3.76	1.50	8.07
	Grazed only	2012	1.54	0.31	3.68	1.54	7.63
		2013	1.10	0.31	2.01	0.63	4.56
	Burned-grazed	2012	1.09	0.57	1.98	0.00	8.11
		2013	1.23	0.57	2.42	0.12	9.44
	Rest	2012	1.51	0.57	3.52	0.48	12.81
		2013	1.08	0.57	1.96	0.00	8.03



[Brn-Grz, burned-grazed]

Figure 5.12. Back-transformed least squares mean densities (pairs per 100 hectares) of eastern kingbirds (*Tyrannus tyrannus*) 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.

M. Yellow Warbler (*Setophaga petechia*)

Table 5.25. Generalized linear mixed model (assuming a gamma distribution with a log link) testing the influence of management regime and year on breeding densities (pairs per 100 hectares) of yellow warblers (*Setophaga petechia*) on two grass types (mixed-grass, tallgrass) 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 strong effect ($p \leq 0.05$)]

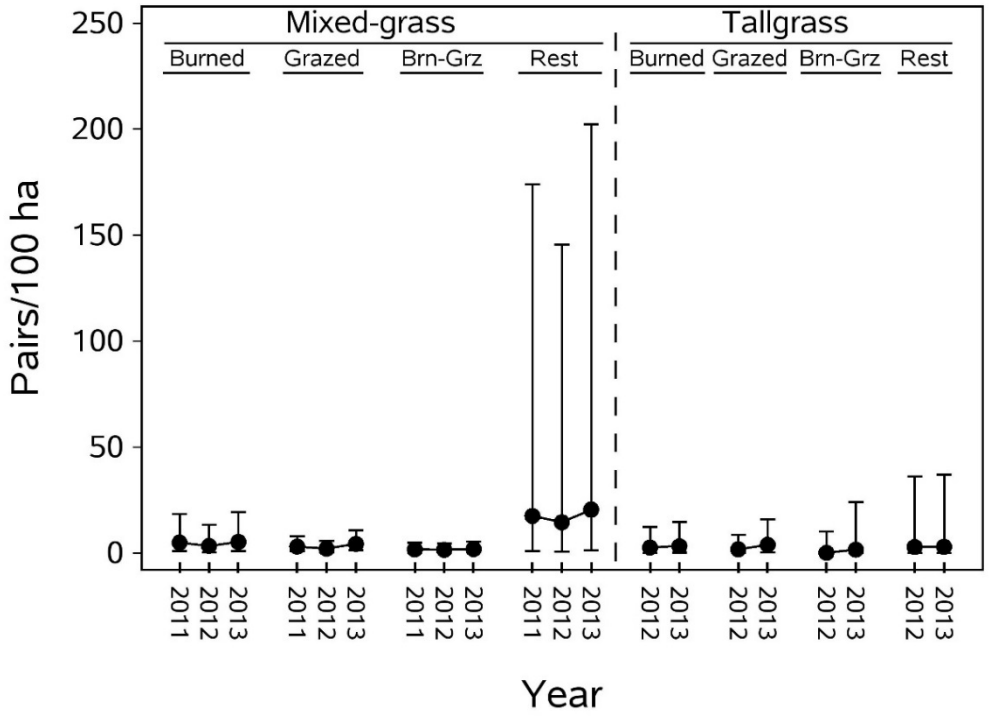
Effect	Sources of variation[1]	Numerator degrees of freedom	Denominator degrees of freedom[2]	*F*-statistic	*p*-value
Overall	Grass type × regime × year	19	181.8	2.95	<0.0001**
Contrasts:	Mixed: regime effect	3	80.9	1.02	0.3870
	Mixed: year effect	2	128.4	7.62	0.0007**
	Mixed: interaction	6	128.6	1.22	0.3010
	Tall: regime effect	3	83.1	0.14	0.9354
	Tall: year effect	1	128.2	8.60	0.0040**
	Tall: interaction	3	128.2	1.71	0.1692
	Mixed versus tall: burned only	1	82.1	0.14	0.7085
	Mixed versus tall: grazed only	1	82.6	0.01	0.9035
	Mixed versus tall: burned-grazed	1	82.9	0.13	0.7146
	Mixed versus tall: rest	1	81.9	0.92	0.3402

[1]Sources of variation for the model: Y=Unit(Grass type × Regime) + Grass type × Regime × Year + Year × Unit(Grass type × Regime), where Grass type × Regime × Year is a fixed effect, Unit(Grass type × Regime) and Year × Unit(Grass type × Regime) are random effects in a mixed-model framework, and Year is a repeated-measures factor.
[2]Degrees of freedom are based on Kenward-Roger correction for repeated-measures models (Littell and others, 2006).

Table 5.26. Least squares mean (standard error) densities (pairs per 100 hectares) and back-transformed least squares mean (95-percent confidence intervals) densities (pairs per 100 hectares) of yellow warblers (*Setophaga petechia*), by grassland type (mixed-grass, tallgrass), overall treatment regime (burned only, grazed only, burned-grazed, or rest), and year (2011, 2012, 2013), 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	Regime	Year	LSMean	SE	LSMean	LCL	UCL
Mixed	Burned only	2011	1.79	0.60	5.01	0.85	18.48
		2012	1.49	0.60	3.43	0.37	13.30
		2013	1.84	0.60	5.29	0.95	19.29
	Grazed only	2011	1.41	0.40	3.09	0.86	7.98
		2012	1.14	0.40	2.12	0.43	5.80
		2013	1.68	0.40	4.37	1.46	10.72
	Burned-grazed	2011	1.01	0.40	1.75	0.26	4.99
		2012	0.94	0.40	1.55	0.17	4.55
		2013	1.09	0.40	1.96	0.36	5.47
	Rest	2011	2.92	1.14	17.56	0.97	174.00
		2012	2.74	1.14	14.55	0.65	145.61
		2013	3.07	1.14	20.57	1.29	202.38
Tall	Burned only	2012	1.29	0.66	2.64	0.00	12.30
		2013	1.46	0.66	3.31	0.18	14.75
	Grazed only	2012	1.04	0.63	1.83	0.00	8.67
		2013	1.60	0.63	3.95	0.45	15.91
	Burned-grazed	2012	0.17	1.14	0.18	0.00	10.16
		2013	0.97	1.14	1.65	0.00	23.97
	Rest	2012	1.37	1.14	2.93	0.00	36.07
		2013	1.39	1.14	3.03	0.00	36.97



[Brn-Grz, burned-grazed]

Figure 5.13. Back-transformed least squares mean densities (pairs per 100 hectares) of yellow warblers (*Setophaga petechia*) 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.

N. Brewer's Blackbird (*Euphagus cyanocephalus*)

Table 5.27. Generalized linear mixed model (assuming a gamma distribution with a log link) testing the influence of management regime and year on breeding densities (pairs per 100 hectares) of Brewer's blackbirds (*Euphagus cyanocephalus*) on two grass types (mixed-grass, tallgrass) 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 ($0.05<p\leq0.10$); **, evidence for strong effect ($p\leq0.05$)]

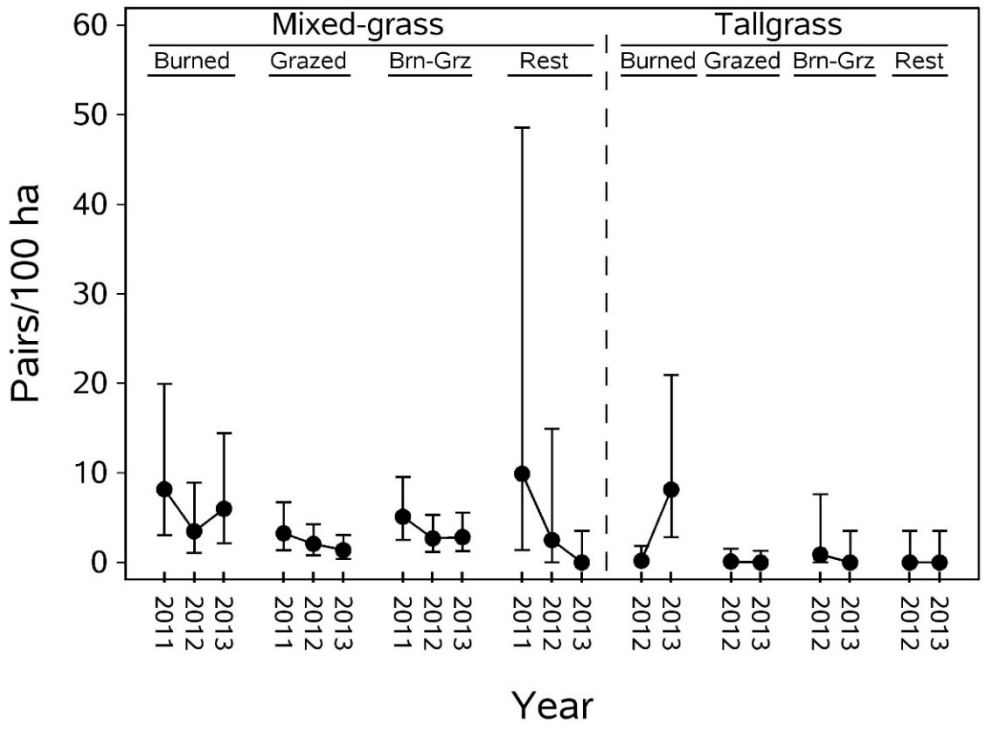
Effect	Sources of variation[1]	Numerator degrees of freedom	Denominator degrees of freedom[2]	*F*-statistic	*p*-value
Overall	Grass type × regime × year	19	180.4	2.84	0.0002**
Contrasts:	Mixed: regime effect	3	72.8	1.60	0.1966
	Mixed: year effect	2	126.7	4.48	0.0132**
	Mixed: interaction	6	132.0	0.84	0.5435
	Tall: regime effect	3	99.9	2.02	0.1157
	Tall: year effect	1	115.5	0.80	0.3729
	Tall: interaction	3	115.5	4.05	0.0089**
	Mixed versus tall: burned only	1	87.9	2.24	0.1382
	Mixed versus tall: grazed only	1	94.0	7.64	0.0069**
	Mixed versus tall: burned-grazed	1	97.2	3.15	0.0790*
	Mixed versus tall: rest	1	85.5	2.12	0.1486

[1]Sources of variation for the model: Y=Unit(Grass type × Regime) + Grass type × Regime × Year + Year × Unit(Grass type × Regime), where Grass type × Regime × Year is a fixed effect, Unit(Grass type × Regime) and Year × Unit(Grass type × Regime) are random effects in a mixed-model framework, and Year is a repeated-measures factor.
[2]Degrees of freedom are based on Kenward-Roger correction for repeated-measures models (Littell and others, 2006).

Table 5.28. Least squares mean (standard error) densities (pairs per 100 hectares) and back-transformed least squares mean (95-percent confidence intervals) densities (pairs per 100 hectares) of Brewer's blackbirds (*Euphagus cyanocephalus*), by grassland type (mixed-grass, tallgrass), overall treatment regime (burned only, grazed only, burned-grazed, or rest), and year (2011, 2012, 2013), 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	Regime	Year	LSMean	SE	LSMean	LCL	UCL
Mixed	Burned only	2011	2.22	0.42	8.18	3.02	19.95
		2012	1.50	0.40	3.49	1.04	8.90
		2013	1.95	0.40	6.00	2.17	14.43
	Grazed only	2011	1.45	0.30	3.26	1.35	6.73
		2012	1.13	0.27	2.08	0.81	4.26
		2013	0.87	0.27	1.38	0.40	3.07
	Burned-grazed	2011	1.81	0.28	5.12	2.55	9.56
		2012	1.31	0.27	2.69	1.17	5.30
		2013	1.34	0.27	2.84	1.25	5.55
	Rest	2011	2.39	0.77	9.91	1.40	48.55
		2012	1.26	0.77	2.51	0.00	14.94
		2013	0.00	0.77	0.00	0.00	3.54
Tall	Burned only	2012	0.17	0.45	0.19	0.00	1.85
		2013	2.21	0.45	8.15	2.82	20.94
	Grazed only	2012	0.10	0.42	0.11	0.00	1.53
		2013	0.00	0.42	0.00	0.00	1.29
	Burned-grazed	2012	0.64	0.77	0.89	0.00	7.61
		2013	0.00	0.77	0.00	0.00	3.54
	Rest	2012	0.00	0.77	0.00	0.00	3.54
		2013	0.00	0.77	0.00	0.00	3.54



[Brn-Grz, burned-grazed]

Figure 5.14. Back-transformed least squares mean densities (pairs per 100 hectares) of Brewer's blackbirds (*Euphagus cyanocephalus*) 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.

O. Common Grackle (*Quiscalus quiscula*)

Table 5.29. Generalized linear mixed model (assuming a gamma distribution with a log link) testing the influence of management regime and year on breeding densities (pairs per 100 hectares) of common grackles (*Quiscalus quiscula*) on two grass types (mixed-grass, tallgrass) 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.

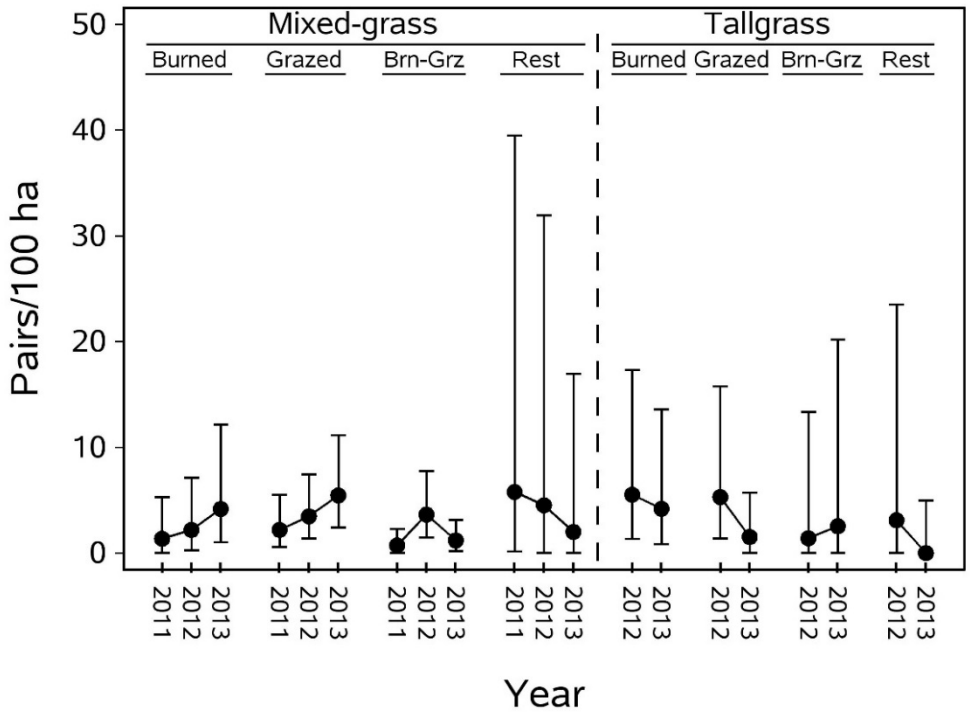
Effect	Sources of variation[1]	Numerator degrees of freedom	Denominator degrees of freedom[2]	*F*-statistic	*p*-value
Overall	Grass type × regime × year	19	185.4	1.05	0.4012
Contrasts:	Mixed: regime effect	3	91.8	1.36	0.2615
	Mixed: year effect	2	142.2	0.43	0.6487
	Mixed: interaction	6	149.2	0.89	0.5005
	Tall: regime effect	3	120.4	0.72	0.5440
	Tall: year effect	1	125.1	1.19	0.2773
	Tall: interaction	3	125.1	0.53	0.6628
	Mixed versus tall: burned only	1	108.7	1.21	0.2733
	Mixed versus tall: grazed only	1	114.9	0.09	0.7672
	Mixed versus tall: burned-grazed	1	117.8	0.03	0.8731
	Mixed versus tall: rest	1	105.9	0.97	0.3261

[1]Sources of variation for the model: Y=Unit(Grass type × Regime) + Grass type × Regime × Year + Year × Unit(Grass type × Regime), where Grass type × Regime × Year is a fixed effect, Unit(Grass type × Regime) and Year × Unit(Grass type × Regime) are random effects in a mixed-model framework, and Year is a repeated-measures factor.
[2]Degrees of freedom are based on Kenward-Roger correction for repeated-measures models (Littell and others, 2006).

Table 5.30. Least squares mean (standard error) densities (pairs per 100 hectares) and back-transformed least squares mean (95-percent confidence intervals) densities (pairs per 100 hectares) of common grackles (*Quiscalus quiscula*), by grassland type (mixed-grass, tallgrass), overall treatment regime (burned only, grazed only, burned-grazed, or rest), and year (2011, 2012, 2013), 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	Regime	Year	LSMean	SE	LSMean	LCL	UCL
Mixed	Burned only	2011	0.86	0.50	1.36	0.00	5.29
		2012	1.16	0.48	2.19	0.25	7.12
		2013	1.64	0.48	4.18	1.03	12.17
	Grazed only	2011	1.16	0.36	2.20	0.57	5.52
		2012	1.50	0.32	3.48	1.38	7.43
		2013	1.87	0.32	5.46	2.43	11.16
	Burned-grazed	2011	0.55	0.33	0.73	0.00	2.30
		2012	1.54	0.32	3.65	1.47	7.75
		2013	0.79	0.32	1.20	0.17	3.13
	Rest	2011	1.91	0.91	5.78	0.13	39.50
		2012	1.71	0.91	4.52	0.00	31.97
		2013	1.10	0.91	2.01	0.00	16.97
Tall	Burned only	2012	1.88	0.53	5.53	1.33	17.33
		2013	1.65	0.53	4.20	0.85	13.61
	Grazed only	2012	1.84	0.50	5.30	1.37	15.78
		2013	0.93	0.50	1.53	0.00	5.73
	Burned-grazed	2012	0.88	0.91	1.40	0.00	13.37
		2013	1.27	0.91	2.54	0.00	20.18
	Rest	2012	1.41	0.91	3.10	0.00	23.52
		2013	0.00	0.91	0.00	0.00	4.98



[Brn-Grz, burned-grazed]

Figure 5.15. Back-transformed least squares mean densities (pairs per 100 hectares) of common grackles (*Quiscalus quiscula*) 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.

P. Yellow-headed Blackbird (*Xanthocephalus xanthocephalus*)

Table 5.31. Generalized linear mixed model (assuming a gamma distribution with a log link) testing the influence of management regime and year on breeding densities (pairs per 100 hectares) of yellow-headed blackbirds (*Xanthocephalus xanthocephalus*) on two grass types (mixed-grass, tallgrass) 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 ($p\leq0.05$)]

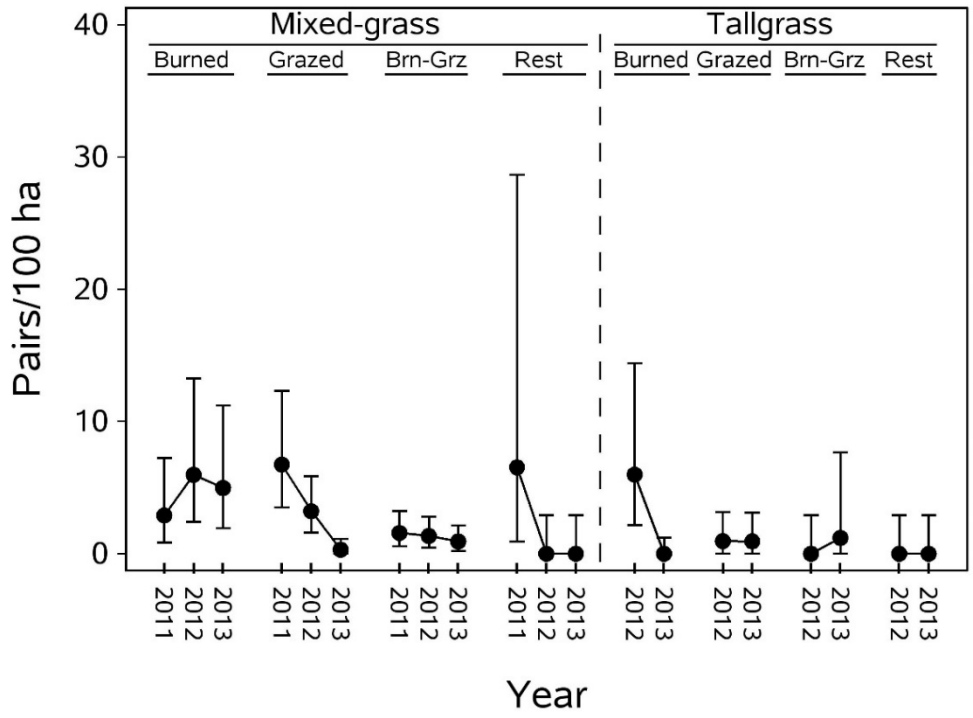
Effect	Sources of variation[1]	Numerator degrees of freedom	Denominator degrees of freedom[2]	*F*-statistic	*p*-value
Overall	Grass type × regime × year	19	184.8	3.52	<0.0001**
Contrasts:	Mixed: regime effect	3	85.8	3.38	0.0219**
	Mixed: year effect	2	139.1	4.68	0.0108**
	Mixed: interaction	6	144.8	3.39	0.0037**
	Tall: regime effect	3	114.8	0.88	0.4552
	Tall: year effect	1	126.0	0.70	0.4048
	Tall: interaction	3	126.0	3.99	0.0094**
	Mixed versus tall: burned only	1	102.4	3.23	0.0752*
	Mixed versus tall: grazed only	1	108.8	2.85	0.0940*
	Mixed versus tall: burned-grazed	1	112.0	0.55	0.4605
	Mixed versus tall: rest	1	99.7	0.86	0.3548

[1]Sources of variation for the model: Y=Unit(Grass type × Regime) + Grass type × Regime × Year + Year × Unit(Grass type × Regime), where Grass type × Regime × Year is a fixed effect, Unit(Grass type × Regime) and Year × Unit(Grass type × Regime) are random effects in a mixed-model framework, and Year is a repeated-measures factor.
[2]Degrees of freedom are based on Kenward-Roger correction for repeated-measures models (Littell and others, 2006).

Table 5.32. Least squares mean (standard error) densities (pairs per 100 hectares) and back-transformed least squares mean (95-percent confidence intervals) densities (pairs per 100 hectares) of yellow-headed blackbirds (*Xanthocephalus xanthocephalus*), by grassland type (mixed-grass, tallgrass), overall treatment regime (burned only, grazed only, burned-grazed, or rest), and year (2011, 2012, 2013), 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	Regime	Year	LSMean	SE	LSMean	LCL	UCL
Mixed	Burned only	2011	1.36	0.38	2.90	0.85	7.25
		2012	1.94	0.36	5.98	2.41	13.26
		2013	1.79	0.36	4.98	1.93	11.23
	Grazed only	2011	2.05	0.28	6.75	3.51	12.32
		2012	1.44	0.25	3.22	1.60	5.85
		2013	0.27	0.25	0.31	0.00	1.13
	Burned-grazed	2011	0.95	0.25	1.58	0.57	3.22
		2012	0.86	0.25	1.35	0.45	2.82
		2013	0.66	0.25	0.93	0.19	2.14
	Rest	2011	2.02	0.70	6.54	0.92	28.65
		2012	0.00	0.70	0.00	0.00	2.93
		2013	0.00	0.70	0.00	0.00	2.93
Tall	Burned only	2012	1.94	0.40	5.99	2.17	14.41
		2013	0.00	0.40	0.00	0.00	1.21
	Grazed only	2012	0.67	0.38	0.96	0.00	3.15
		2013	0.66	0.38	0.94	0.00	3.11
	Burned-grazed	2012	0.00	0.70	0.00	0.00	2.93
		2013	0.79	0.70	1.20	0.00	7.66
	Rest	2012	0.00	0.70	0.00	0.00	2.93
		2013	0.00	0.70	0.00	0.00	2.93



[Brn-Grz, burned-grazed]

Figure 5.16. Back-transformed least squares mean densities (pairs per 100 hectares) of yellow-headed blackbirds (*Xanthocephalus xanthocephalus*) 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.

Q. Cliff Swallow (*Petrochelidon pyrrhonota*)

Table 5.33. Generalized linear mixed model (assuming a gamma distribution with a log link) testing the influence of management regime and year on breeding densities (pairs per 100 hectares) of cliff swallows (*Petrochelidon pyrrhonota*) on two grass types (mixed-grass, tallgrass) 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 strong effect ($p \leq 0.05$)]

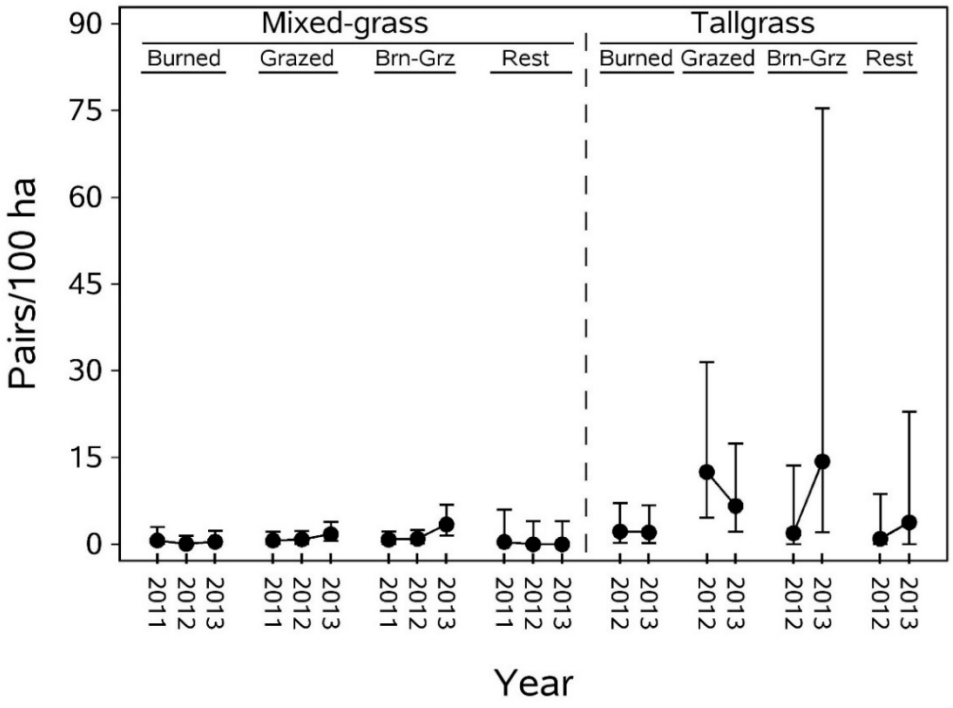
Effect	Sources of variation[1]	Numerator degrees of freedom	Denominator degrees of freedom[2]	*F*-statistic	*p*-value
Overall	Grass type × regime × year	19	177.7	2.01	0.0099**
Contrasts:	Mixed: regime effect	3	66.5	1.18	0.3254
	Mixed: year effect	2	119.8	0.89	0.4121
	Mixed: interaction	6	124.6	0.56	0.7624
	Tall: regime effect	3	91.9	1.86	0.1416
	Tall: year effect	1	109.7	1.70	0.1954
	Tall: interaction	3	109.7	1.82	0.1468
	Mixed versus tall: burned only	1	80.4	2.73	0.1024
	Mixed versus tall: grazed only	1	86.1	13.99	0.0003**
	Mixed versus tall: burned-grazed	1	89.3	1.93	0.1684
	Mixed versus tall: rest	1	78.2	1.23	0.2705

[1]Sources of variation for the model: Y=Unit(Grass type × Regime) + Grass type × Regime × Year + Year × Unit(Grass type × Regime), where Grass type × Regime × Year is a fixed effect, Unit(Grass type × Regime) and Year × Unit(Grass type × Regime) are random effects in a mixed-model framework, and Year is a repeated-measures factor.
[2]Degrees of freedom are based on Kenward-Roger correction for repeated-measures models (Littell and others, 2006).

Table 5.34. Least squares mean (standard error) densities (pairs per 100 hectares) and back-transformed least squares mean (95-percent confidence intervals) densities (pairs per 100 hectares) of cliff swallows (*Petrochelidon pyrrhonota*), by grassland type (mixed-grass, tallgrass), overall treatment regime (burned only, grazed only, burned-grazed, or rest), and year (2011, 2012, 2013), 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	Regime	Year	LSMean	SE	LSMean	LCL	UCL
Mixed	Burned only	2011	0.51	0.45	0.66	0.00	2.97
		2012	0.07	0.43	0.08	0.00	1.49
		2013	0.36	0.43	0.44	0.00	2.33
	Grazed only	2011	0.51	0.32	0.67	0.00	2.13
		2012	0.61	0.29	0.85	0.05	2.25
		2013	1.01	0.29	1.75	0.56	3.84
	Burned-grazed	2011	0.59	0.29	0.80	0.01	2.20
		2012	0.67	0.29	0.96	0.11	2.45
		2013	1.49	0.29	3.44	1.52	6.84
	Rest	2011	0.34	0.82	0.41	0.00	6.02
		2012	0.00	0.82	0.00	0.00	3.98
		2013	0.00	0.82	0.00	0.00	3.98
Tall	Burned only	2012	1.17	0.47	2.22	0.27	7.14
		2013	1.12	0.47	2.07	0.21	6.75
	Grazed only	2012	2.60	0.45	12.49	4.60	31.51
		2013	2.03	0.45	6.64	2.17	17.42
	Burned-grazed	2012	1.08	0.82	1.94	0.00	13.64
		2013	2.73	0.82	14.34	2.08	75.39
	Rest	2012	0.67	0.82	0.95	0.00	8.71
		2013	1.57	0.82	3.79	0.00	22.88



[Brn-Grz, burned-grazed]

Figure 5.17. Back-transformed least squares mean densities (pairs per 100 hectares) of cliff swallows (*Petrochelidon pyrrhonota*) 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.

R. Song Sparrow (*Melospiza melodia*)

Table 5.35. Generalized linear mixed model (assuming a gamma distribution with a log link) testing the influence of management regime and year on breeding densities (pairs per 100 hectares) of song sparrows (*Melospiza melodia*) on two grass types (mixed-grass, tallgrass) 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 strong effect ($p \leq 0.05$)]

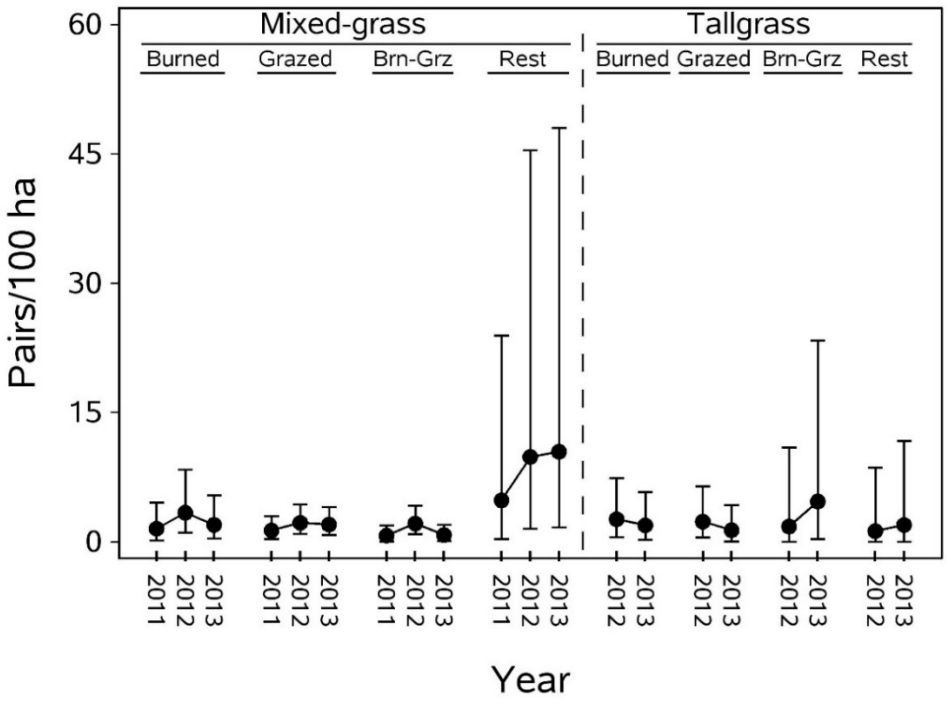
Effect	Sources of variation[1]	Numerator degrees of freedom	Denominator degrees of freedom[2]	*F*-statistic	*p*-value
Overall	Grass type × regime × year	19	183.5	1.69	0.0403**
Contrasts:	Mixed: regime effect	3	81.7	1.59	0.1992
	Mixed: year effect	2	132.4	4.94	0.0085**
	Mixed: interaction	6	134.1	0.72	0.6312
	Tall: regime effect	3	95.9	0.09	0.9637
	Tall: year effect	1	129.9	0.22	0.6396
	Tall: interaction	3	129.9	1.15	0.3316
	Mixed versus tall: burned only	1	89.3	0.00	0.9821
	Mixed versus tall: grazed only	1	92.6	0.00	0.9928
	Mixed versus tall: burned-grazed	1	94.5	0.74	0.3931
	Mixed versus tall: rest	1	88.1	1.73	0.1923

[1]Sources of variation for the model: Y=Unit(Grass type × Regime) + Grass type × Regime × Year + Year × Unit(Grass type × Regime), where Grass type × Regime × Year is a fixed effect, Unit(Grass type × Regime) and Year × Unit(Grass type × Regime) are random effects in a mixed-model framework, and Year is a repeated-measures factor.
[2]Degrees of freedom are based on Kenward-Roger correction for repeated-measures models (Littell and others, 2006).

Table 5.36. Least squares mean (standard error) densities (pairs per 100 hectares) and back-transformed least squares mean (95-percent confidence intervals) densities (pairs per 100 hectares) of song sparrows (*Melospiza melodia*), by grassland type (mixed-grass, tallgrass), overall treatment regime (burned only, grazed only, burned-grazed, or rest), and year (2011, 2012, 2013), 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	Regime	Year	LSMean	SE	LSMean	LCL	UCL
Mixed	Burned only	2011	0.94	0.40	1.55	0.17	4.54
		2012	1.48	0.39	3.39	1.06	8.38
		2013	1.10	0.39	1.99	0.40	5.39
	Grazed only	2011	0.85	0.28	1.34	0.36	3.01
		2012	1.17	0.26	2.22	0.93	4.35
		2013	1.11	0.26	2.02	0.81	4.04
	Burned-grazed	2011	0.55	0.26	0.74	0.04	1.91
		2012	1.14	0.26	2.14	0.89	4.22
		2013	0.59	0.26	0.80	0.08	2.00
	Rest	2011	1.76	0.74	4.83	0.36	23.92
		2012	2.38	0.74	9.86	1.54	45.40
		2013	2.44	0.74	10.47	1.68	48.00
Tall	Burned only	2012	1.29	0.43	2.64	0.57	7.42
		2013	1.07	0.43	1.93	0.26	5.77
	Grazed only	2012	1.21	0.41	2.36	0.52	6.44
		2013	0.86	0.41	1.37	0.07	4.25
	Burned-grazed	2012	1.03	0.74	1.79	0.00	10.94
		2013	1.74	0.74	4.69	0.33	23.33
	Rest	2012	0.81	0.74	1.26	0.00	8.64
		2013	1.09	0.74	1.97	0.00	11.71



[Brn-Grz, burned-grazed]

Figure 5.18. Back-transformed least squares mean densities (pairs per 100 hectares) of song sparrows (*Melospiza melodia*) 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.

S. American Goldfinch (*Spinus tristis*)

Table 5.37. Generalized linear mixed model (assuming a gamma distribution with a log link) testing the influence of management regime and year on breeding densities (pairs per 100 hectares) of American goldfinches (*Spinus tristis*) on two grass types (mixed-grass, tallgrass) 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 strong effect ($p \leq 0.05$)]

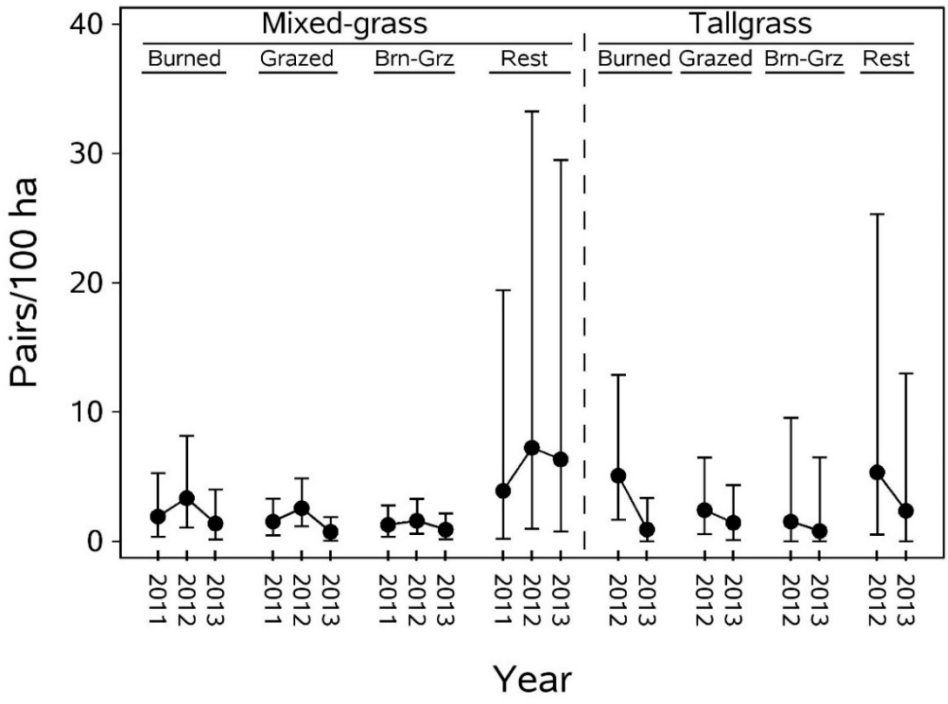
Effect	Sources of variation[1]	Numerator degrees of freedom	Denominator degrees of freedom[2]	*F*-statistic	*p*-value
Overall	Grass type × regime × year	19	182.7	2.27	0.0029**
Contrasts:	Mixed: regime effect	3	79.3	0.99	0.4012
	Mixed: year effect	2	130.3	4.53	0.0125**
	Mixed: interaction	6	132.1	0.60	0.7286
	Tall: regime effect	3	94.2	0.25	0.8601
	Tall: year effect	1	127.5	7.42	0.0074**
	Tall: interaction	3	127.5	1.27	0.2877
	Mixed versus tall: burned only	1	87.3	0.03	0.8561
	Mixed versus tall: grazed only	1	90.7	0.11	0.7413
	Mixed versus tall: burned-grazed	1	92.7	0.01	0.9438
	Mixed versus tall: rest	1	86.0	0.16	0.6903

[1]Sources of variation for the model: Y=Unit(Grass type × Regime) + Grass type × Regime × Year + Year × Unit(Grass type × Regime), where Grass type × Regime × Year is a fixed effect, Unit(Grass type × Regime) and Year × Unit(Grass type × Regime) are random effects in a mixed-model framework, and Year is a repeated-measures factor.
[2]Degrees of freedom are based on Kenward-Roger correction for repeated-measures models (Littell and others, 2006).

Table 5.38. Least squares mean (standard error) densities (pairs per 100 hectares) and back-transformed least squares mean (95-percent confidence intervals) densities (pairs per 100 hectares) of American goldfinches (*Spinus tristis*), by grassland type (mixed-grass, tallgrass), overall treatment regime (burned only, grazed only, burned-grazed, or rest), and year (2011, 2012, 2013), 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	Regime	Year	LSMean	SE	LSMean	LCL	UCL
Mixed	Burned only	2011	1.08	0.39	1.93	0.37	5.28
		2012	1.47	0.38	3.35	1.07	8.15
		2013	0.87	0.38	1.39	0.14	4.02
	Grazed only	2011	0.93	0.27	1.54	0.49	3.32
		2012	1.28	0.25	2.58	1.17	4.89
		2013	0.56	0.26	0.75	0.06	1.88
	Burned-grazed	2011	0.83	0.26	1.29	0.38	2.79
		2012	0.96	0.25	1.60	0.58	3.28
		2013	0.65	0.26	0.92	0.16	2.17
	Rest	2011	1.59	0.73	3.92	0.19	19.43
		2012	2.11	0.73	7.25	0.99	33.24
		2013	1.99	0.73	6.35	0.77	29.50
Tall	Burned only	2012	1.81	0.42	5.09	1.68	12.86
		2013	0.66	0.42	0.93	0.00	3.38
	Grazed only	2012	1.23	0.40	2.43	0.57	6.47
		2013	0.90	0.40	1.45	0.12	4.34
	Burned-grazed	2012	0.93	0.73	1.54	0.00	9.55
		2013	0.59	0.73	0.81	0.00	6.50
	Rest	2012	1.85	0.73	5.34	0.53	25.31
		2013	1.21	0.73	2.37	0.00	12.99



[Brn-Grz, burned-grazed]

Figure 5.19. Back-transformed least squares mean densities (pairs per 100 hectares) of American goldfinches (*Spinus tristis*) 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.

T. Upland Sandpiper (*Bartramia longicauda*)

Table 5.39. Generalized linear mixed model (assuming a gamma distribution with a log link) testing the influence of management regime and year on breeding densities (pairs per 100 hectares) of upland sandpipers (*Bartramia longicauda*) on two grass types (mixed-grass, tallgrass) 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 strong effect ($p \leq 0.05$)]

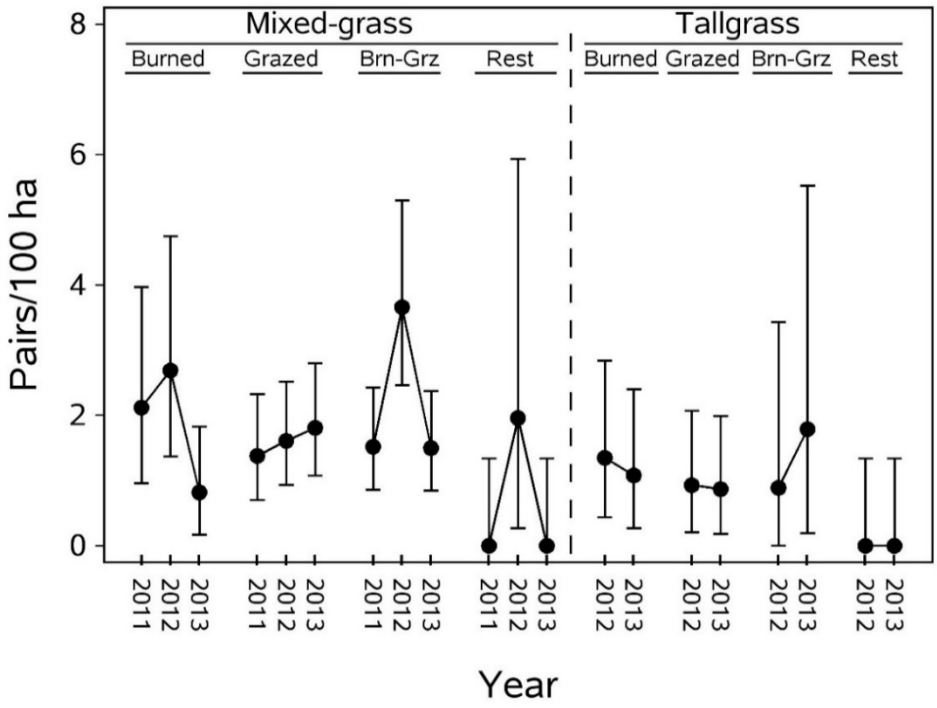
Effect	Sources of variation[1]	Numerator degrees of freedom	Denominator degrees of freedom[2]	*F*-statistic	*p*-value
Overall	Grass type × regime × year	19	182.1	2.47	0.0011**
Contrasts:	Mixed: regime effect	3	78.1	2.14	0.1023
	Mixed: year effect	2	131.8	7.98	0.0005**
	Mixed: interaction	6	137.7	2.37	0.0329**
	Tall: regime effect	3	106.7	1.47	0.2276
	Tall: year effect	1	118.6	0.08	0.7838
	Tall: interaction	3	118.6	0.23	0.8730
	Mixed versus tall: burned only	1	94.3	0.77	0.3839
	Mixed versus tall: grazed only	1	100.7	2.08	0.1527
	Mixed versus tall: burned-grazed	1	103.9	0.67	0.4136
	Mixed versus tall: rest	1	91.7	0.64	0.4244

[1]Sources of variation for the model: Y=Unit(Grass type × Regime) + Grass type × Regime × Year + Year × Unit(Grass type × Regime), where Grass type × Regime × Year is a fixed effect, Unit(Grass type × Regime) and Year × Unit(Grass type × Regime) are random effects in a mixed-model framework, and Year is a repeated-measures factor.
[2]Degrees of freedom are based on Kenward-Roger correction for repeated-measures models (Littell and others, 2006).

Table 5.40. Least squares mean (standard error) densities (pairs per 100 hectares) and back-transformed least squares mean (95-percent confidence intervals) densities (pairs per 100 hectares) of upland sandpipers (*Bartramia longicauda*), by grassland type (mixed-grass, tallgrass), overall treatment regime (burned only, grazed only, burned-grazed, or rest), and year (2011, 2012, 2013), 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	Regime	Year	LSMean	SE	LSMean	LCL	UCL
Mixed	Burned only	2011	1.14	0.24	2.12	0.96	3.97
		2012	1.31	0.23	2.69	1.37	4.75
		2013	0.60	0.23	0.82	0.17	1.83
	Grazed only	2011	0.87	0.17	1.38	0.70	2.33
		2012	0.96	0.15	1.61	0.93	2.52
		2013	1.03	0.15	1.81	1.08	2.80
	Burned-grazed	2011	0.93	0.16	1.52	0.86	2.43
		2012	1.54	0.15	3.66	2.46	5.30
		2013	0.91	0.15	1.50	0.85	2.37
	Rest	2011	0.00	0.43	0.00	0.00	1.34
		2012	1.09	0.43	1.96	0.27	5.93
		2013	0.00	0.43	0.00	0.00	1.34
Tall	Burned only	2012	0.86	0.25	1.35	0.44	2.84
		2013	0.73	0.25	1.08	0.27	2.40
	Grazed only	2012	0.66	0.24	0.93	0.21	2.07
		2013	0.63	0.24	0.87	0.18	1.99
	Burned-grazed	2012	0.64	0.43	0.89	0.00	3.43
		2013	1.03	0.43	1.79	0.19	5.52
	Rest	2012	0.00	0.43	0.00	0.00	1.34
		2013	0.00	0.43	0.00	0.00	1.34



[Brn-Grz, burned-grazed]

Figure 5.20. Back-transformed least squares mean densities (pairs per 100 hectares) of upland sandpipers (*Bartramia longicauda*) 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.

U. Killdeer (*Charadrius vociferus*)

Table 5.41. Generalized linear mixed model (assuming a gamma distribution with a log link) testing the influence of management regime and year on breeding densities (pairs per 100 hectares) of killdeer (*Charadrius vociferus*) on two grass types (mixed-grass, tallgrass) 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 strong effect ($p \leq 0.05$)]

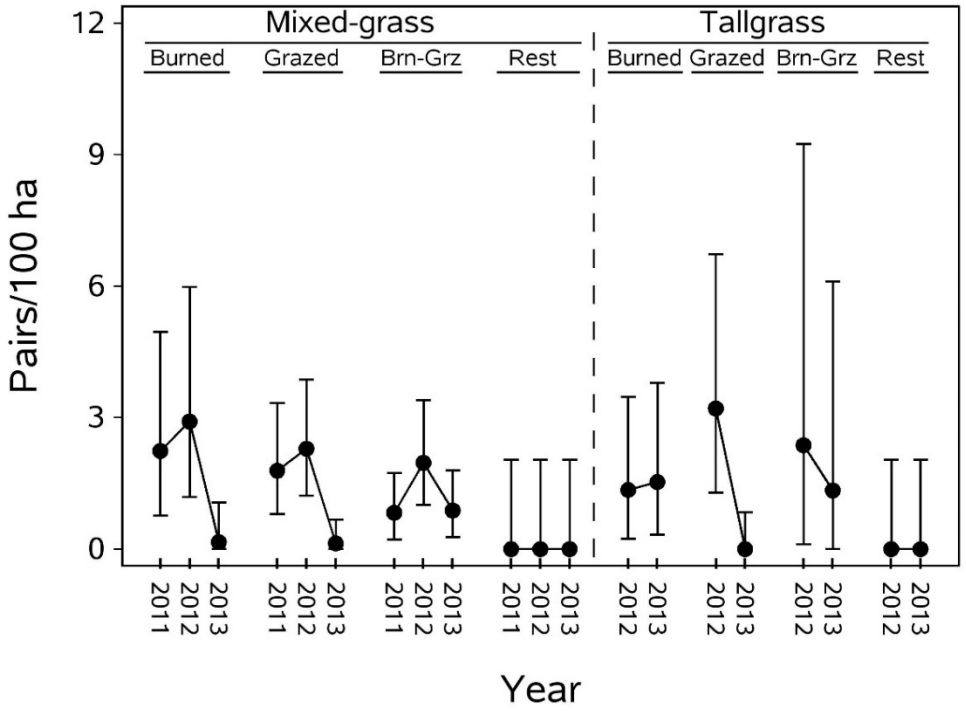
Effect	Sources of variation[1]	Numerator degrees of freedom	Denominator degrees of freedom[2]	*F*-statistic	*p*-value
Overall	Grass type × regime × year	19	183.7	3.00	<0.0001**
Contrasts:	Mixed: regime effect	3	83.3	1.54	0.2100
	Mixed: year effect	2	136.5	4.94	0.0085**
	Mixed: interaction	6	142.6	1.48	0.1874
	Tall: regime effect	3	112.4	1.21	0.3110
	Tall: year effect	1	122.3	2.25	0.1360
	Tall: interaction	3	122.3	2.70	0.0487**
	Mixed versus tall: burned only	1	100.0	0.00	0.9925
	Mixed versus tall: grazed only	1	106.4	0.05	0.8287
	Mixed versus tall: burned-grazed	1	109.7	0.31	0.5761
	Mixed versus tall: rest	1	97.4	0.00	1.0000

[1]Sources of variation for the model: Y=Unit(Grass type × Regime) + Grass type × Regime × Year + Year × Unit(Grass type × Regime), where Grass type × Regime × Year is a fixed effect, Unit(Grass type × Regime) and Year × Unit(Grass type × Regime) are random effects in a mixed-model framework, and Year is a repeated-measures factor.
[2]Degrees of freedom are based on Kenward-Roger correction for repeated-measures models (Littell and others, 2006).

Table 5.42. Least squares mean (standard error) densities (pairs per 100 hectares) and back-transformed least squares mean (confidence intervals) densities (pairs per 100 hectares) of killdeer (*Charadrius vociferus*), by grassland type (mixed-grass, tallgrass), overall treatment regime (burned only, grazed only, burned-grazed, or rest), and year (2011, 2012, 2013), 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	Regime	Year	LSMean	SE	LSMean	LCL	UCL
Mixed	Burned only	2011	1.18	0.31	2.24	0.77	4.95
		2012	1.36	0.30	2.91	1.19	5.98
		2013	0.14	0.30	0.16	0.00	1.06
	Grazed only	2011	1.03	0.22	1.79	0.80	3.33
		2012	1.19	0.20	2.29	1.22	3.87
		2013	0.12	0.20	0.13	0.00	0.67
	Burned-grazed	2011	0.60	0.20	0.83	0.22	1.73
		2012	1.09	0.20	1.97	1.01	3.40
		2013	0.63	0.20	0.88	0.27	1.79
	Rest	2011	0.00	0.57	0.00	0.00	2.04
		2012	0.00	0.57	0.00	0.00	2.04
		2013	0.00	0.57	0.00	0.00	2.04
Tall	Burned only	2012	0.86	0.33	1.35	0.24	3.47
		2013	0.93	0.33	1.53	0.33	3.79
	Grazed only	2012	1.44	0.31	3.21	1.29	6.73
		2013	0.00	0.31	0.00	0.00	0.84
	Burned-grazed	2012	1.22	0.57	2.37	0.11	9.24
		2013	0.85	0.57	1.34	0.00	6.11
	Rest	2012	0.00	0.57	0.00	0.00	2.04
		2013	0.00	0.57	0.00	0.00	2.04



[Brn-Grz, burned-grazed]

Figure 5.21. Back-transformed least squares mean densities (pairs per 100 hectares) of killdeer (*Charadrius vociferus*) 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.

V. Tree Swallow (*Tachycineta bicolor*)

Table 5.43. Generalized linear mixed model (assuming a gamma distribution with a log link) testing the influence of management regime and year on breeding densities (pairs per 100 hectares) of tree swallows (*Tachycineta bicolor*) on two grass types (mixed-grass, tallgrass) 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 strong effect ($p \leq 0.05$)]

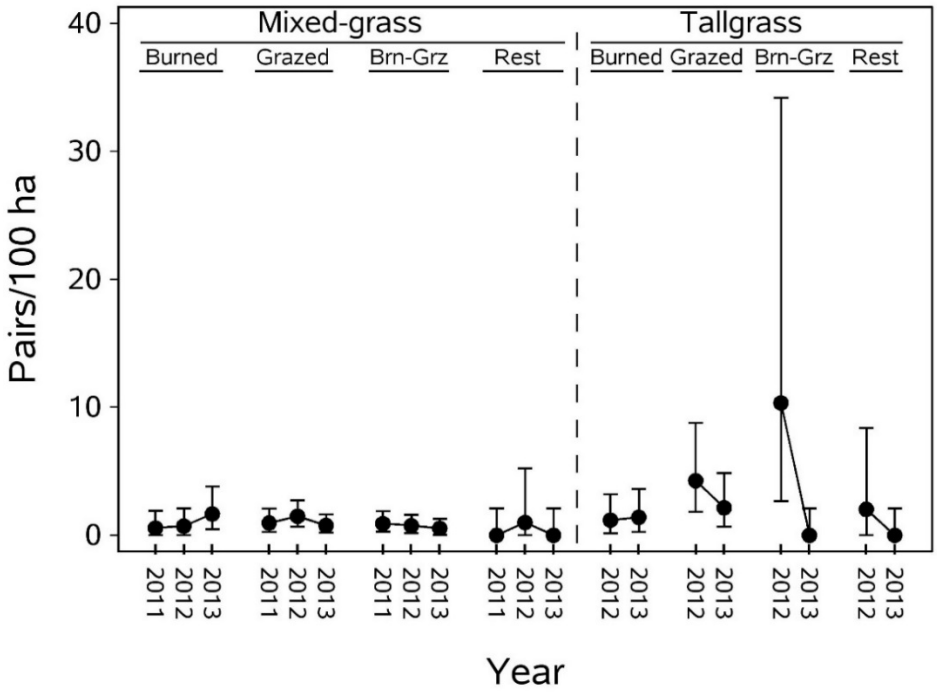
Effect	Sources of variation[1]	Numerator degrees of freedom	Denominator degrees of freedom[2]	*F*-statistic	*p*-value
Overall	Grass type × regime × year	19	186.3	1.70	0.0393**
Contrasts:	Mixed: regime effect	3	96.7	0.75	0.5229
	Mixed: year effect	2	145.1	0.49	0.6116
	Mixed: interaction	6	152.4	0.71	0.6438
	Tall: regime effect	3	124.3	1.57	0.1988
	Tall: year effect	1	126.9	9.45	0.0026**
	Tall: interaction	3	126.9	2.70	0.0483**
	Mixed versus tall: burned only	1	113.2	0.33	0.5694
	Mixed versus tall: grazed only	1	119.3	6.79	0.0103**
	Mixed versus tall: burned-grazed	1	121.9	2.32	0.1305
	Mixed versus tall: rest	1	110.5	0.35	0.5549

[1]Sources of variation for the model: Y=Unit(Grass type × Regime) + Grass type × Regime × Year + Year × Unit(Grass type × Regime), where Grass type × Regime × Year is a fixed effect, Unit(Grass type × Regime) and Year × Unit(Grass type × Regime) are random effects in a mixed-model framework, and Year is a repeated-measures factor.
[2]Degrees of freedom are based on Kenward-Roger correction for repeated-measures models (Littell and others, 2006).

Table 5.44. Least squares mean (standard error) densities (pairs per 100 hectares) and back-transformed least squares mean (95-percent confidence intervals) densities (pairs per 100 hectares) of tree swallows (*Tachycineta bicolor*), by grassland type (mixed-grass, tallgrass), overall treatment regime (burned only, grazed only, burned-grazed, or rest), and year (2011, 2012, 2013), 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	Regime	Year	LSMean	SE	LSMean	LCL	UCL
Mixed	Burned only	2011	0.45	0.32	0.57	0.00	1.92
		2012	0.54	0.30	0.72	0.00	2.10
		2013	0.98	0.30	1.67	0.48	3.81
	Grazed only	2011	0.68	0.23	0.97	0.25	2.08
		2012	0.91	0.20	1.49	0.67	2.71
		2013	0.57	0.20	0.77	0.19	1.64
	Burned-grazed	2011	0.65	0.21	0.92	0.28	1.89
		2012	0.56	0.20	0.75	0.17	1.61
		2013	0.43	0.20	0.54	0.03	1.30
	Rest	2011	0.00	0.58	0.00	0.00	2.10
		2012	0.69	0.58	1.00	0.00	5.21
		2013	0.00	0.58	0.00	0.00	2.10
Tall	Burned only	2012	0.78	0.33	1.18	0.14	3.20
		2013	0.88	0.33	1.41	0.25	3.63
	Grazed only	2012	1.66	0.32	4.27	1.84	8.79
		2013	1.15	0.32	2.15	0.69	4.85
	Burned-grazed	2012	2.43	0.58	10.34	2.66	34.16
		2013	0.00	0.58	0.00	0.00	2.10
	Rest	2012	1.11	0.58	2.03	0.00	8.38
		2013	0.00	0.58	0.00	0.00	2.10



[Brn-Grz, burned-grazed]

Figure 5.22. Back-transformed least squares mean densities (pairs per 100 hectares) of tree swallows (*Tachycineta bicolor*) 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.

W. Barn Swallow (*Hirundo rustica*)

Table 5.45. Generalized linear mixed model (assuming a gamma distribution with a log link) testing the influence of management regime and year on breeding densities (pairs per 100 hectares) of barn swallows (*Hirundo rustica*) on two grass types (mixed-grass, tallgrass) 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.

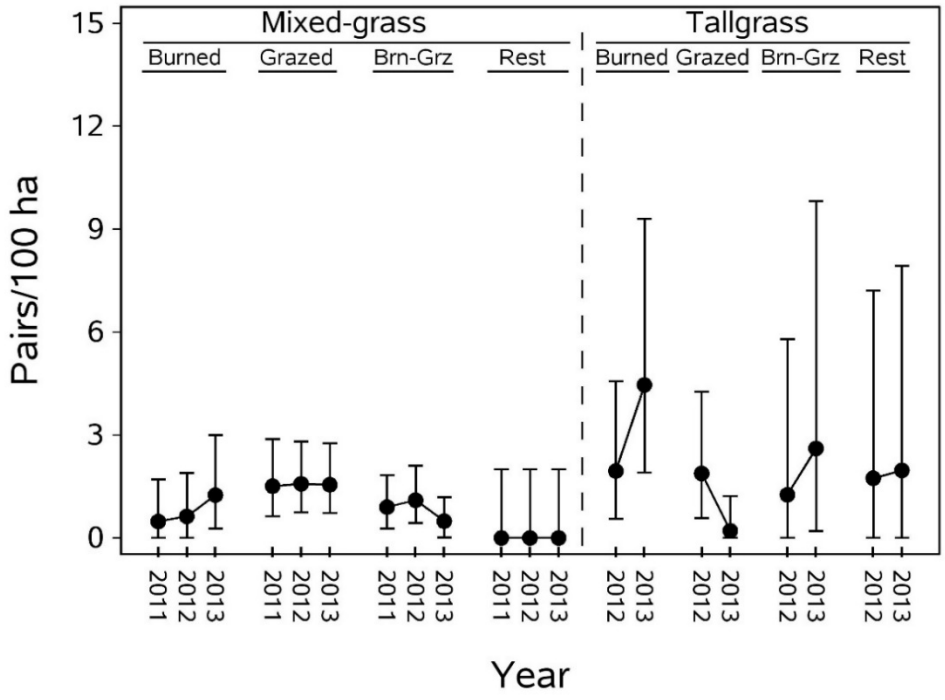
Effect	Sources of variation[1]	Numerator degrees of freedom	Denominator degrees of freedom[2]	*F*-statistic	*p*-value
Overall	Grass type × regime × year	19	183.8	1.41	0.1256
Contrasts:	Mixed: regime effect	3	82.4	2.41	0.0725
	Mixed: year effect	2	136.1	0.04	0.9655
	Mixed: interaction	6	141.6	0.50	0.8082
	Tall: regime effect	3	111.0	1.54	0.2071
	Tall: year effect	1	123.6	0.08	0.7835
	Tall: interaction	3	123.6	2.78	0.0441
	Mixed versus tall: burned only	1	98.6	6.33	0.0135
	Mixed versus tall: grazed only	1	104.9	1.20	0.2750
	Mixed versus tall: burned-grazed	1	108.2	0.95	0.3319
	Mixed versus tall: rest	1	96.0	3.17	0.0781

[1]Sources of variation for the model: Y=Unit(Grass type × Regime) + Grass type × Regime × Year + Year × Unit(Grass type × Regime), where Grass type × Regime × Year is a fixed effect, Unit(Grass type × Regime) and Year × Unit(Grass type × Regime) are random effects in a mixed-model framework, and Year is a repeated-measures factor.
[2]Degrees of freedom are based on Kenward-Roger correction for repeated-measures models (Littell and others, 2006).

Table 5.46. Least squares mean (standard error) densities (pairs per 100 hectares) and back-transformed least squares mean (95-percent confidence intervals) densities (pairs per 100 hectares) of barn swallows (*Hirundo rustica*), by grassland type (mixed-grass, tallgrass), overall treatment regime (burned only, grazed only, burned-grazed, or rest), and year (2011, 2012, 2013), 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	Regime	Year	LSMean	SE	LSMean	LCL	UCL
Mixed	Burned only	2011	0.39	0.31	0.48	0.00	1.70
		2012	0.49	0.29	0.63	0.00	1.89
		2013	0.81	0.29	1.25	0.27	3.00
	Grazed only	2011	0.92	0.22	1.51	0.63	2.88
		2012	0.95	0.20	1.58	0.75	2.81
		2013	0.94	0.20	1.55	0.73	2.76
	Burned-grazed	2011	0.64	0.20	0.90	0.28	1.83
		2012	0.74	0.20	1.10	0.43	2.10
		2013	0.40	0.20	0.49	0.01	1.19
	Rest	2011	0.00	0.56	0.00	0.00	2.00
		2012	0.00	0.56	0.00	0.00	2.00
		2013	0.00	0.56	0.00	0.00	2.00
Tall	Burned only	2012	1.08	0.32	1.95	0.56	4.56
		2013	1.70	0.32	4.46	1.90	9.30
	Grazed only	2012	1.06	0.31	1.88	0.58	4.26
		2013	0.19	0.31	0.21	0.00	1.22
	Burned-grazed	2012	0.82	0.56	1.26	0.00	5.79
		2013	1.28	0.56	2.61	0.20	9.82
	Rest	2012	1.01	0.56	1.74	0.00	7.21
		2013	1.09	0.56	1.97	0.00	7.93



[Brn-Grz, burned-grazed]

Figure 5.23. Back-transformed least squares mean densities (pairs per 100 hectares) of barn swallows (*Hirundo rustica*) 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.

X. Mourning Dove (*Zenaida macroura*)

Table 5.47. Generalized linear mixed model (assuming a gamma distribution with a log link) testing the influence of management regime and year on breeding densities (pairs per 100 hectares) of mourning doves (*Zenaida macroura*) on two grass types (mixed-grass, tallgrass) 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.

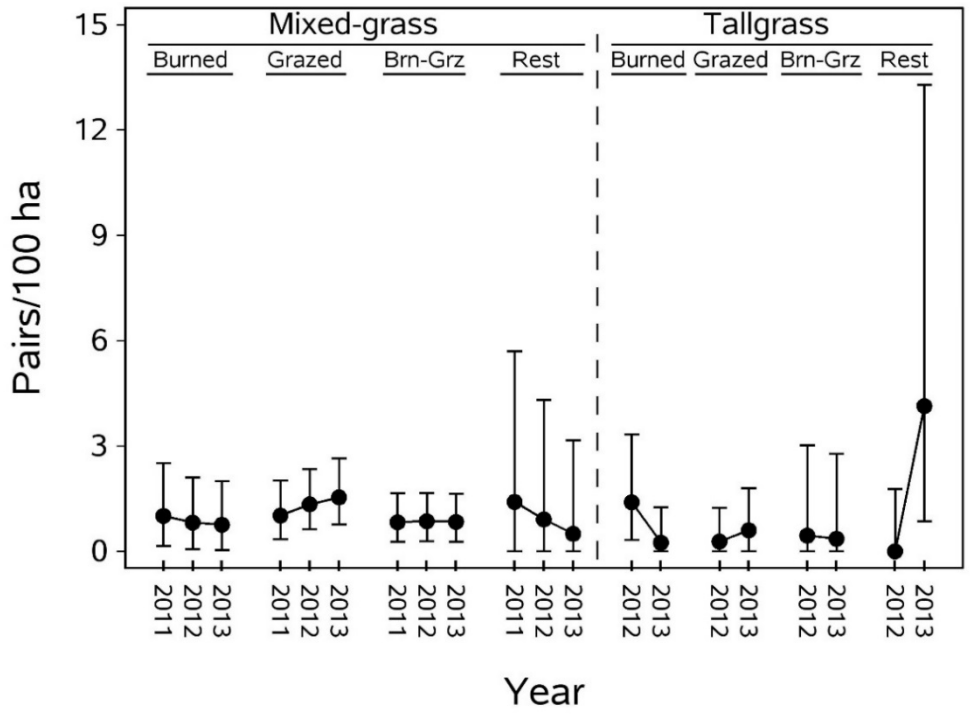
Effect	Sources of variation[1]	Numerator degrees of freedom	Denominator degrees of freedom[2]	*F*-statistic	*p*-value
Overall	Grass type × regime × year	19	185.8	0.90	0.5859
Contrasts:	Mixed: regime effect	3	87.6	0.53	0.6627
	Mixed: year effect	2	141.1	0.09	0.9110
	Mixed: interaction	6	145.9	0.22	0.9699
	Tall: regime effect	3	115.6	0.37	0.7750
	Tall: year effect	1	130.4	1.35	0.2471
	Tall: interaction	3	130.4	3.73	0.0129
	Mixed versus tall: burned only	1	103.4	0.05	0.8194
	Mixed versus tall: grazed only	1	109.6	3.11	0.0808
	Mixed versus tall: burned-grazed	1	112.9	0.38	0.5399
	Mixed versus tall: rest	1	100.9	0.10	0.7571

[1]Sources of variation for the model: Y=Unit(Grass type × Regime) + Grass type × Regime × Year + Year × Unit(Grass type × Regime), where Grass type × Regime × Year is a fixed effect, Unit(Grass type × Regime) and Year × Unit(Grass type × Regime) are random effects in a mixed-model framework, and Year is a repeated-measures factor.
[2]Degrees of freedom are based on Kenward-Roger correction for repeated-measures models (Littell and others, 2006).

Table 5.48. Least squares mean (standard error) densities (pairs per 100 hectares) and back-transformed least squares mean (95-percent confidence intervals) densities (pairs per 100 hectares) of mourning doves (*Zenaida macroura*), by grassland type (mixed-grass, tallgrass), overall treatment regime (burned only, grazed only, burned-grazed, or rest), and year (2011, 2012, 2013), 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	Regime	Year	LSMean	SE	LSMean	LCL	UCL
Mixed	Burned only	2011	0.70	0.28	1.01	0.15	2.51
		2012	0.60	0.27	0.82	0.07	2.10
		2013	0.56	0.27	0.76	0.03	2.00
	Grazed only	2011	0.70	0.20	1.02	0.35	2.02
		2012	0.85	0.18	1.34	0.63	2.35
		2013	0.93	0.18	1.54	0.77	2.65
	Burned-grazed	2011	0.61	0.19	0.83	0.27	1.65
		2012	0.62	0.18	0.86	0.29	1.66
		2013	0.61	0.18	0.84	0.28	1.64
	Rest	2011	0.88	0.52	1.41	0.00	5.70
		2012	0.65	0.52	0.91	0.00	4.31
		2013	0.41	0.52	0.50	0.00	3.17
Tall	Burned only	2012	0.88	0.30	1.40	0.33	3.33
		2013	0.22	0.30	0.25	0.00	1.25
	Grazed only	2012	0.25	0.29	0.28	0.00	1.24
		2013	0.47	0.29	0.60	0.00	1.80
	Burned-grazed	2012	0.37	0.52	0.45	0.00	3.02
		2013	0.31	0.52	0.36	0.00	2.78
	Rest	2012	0.00	0.52	0.00	0.00	1.78
		2013	1.64	0.52	4.14	0.85	13.29



[Brn-Grz, burned-grazed]

Figure 5.24. Back-transformed least squares mean densities (pairs per 100 hectares) of mourning doves (*Zenaida macroura*) 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.

Y. Ring-necked Pheasant (*Phasianus colchicus*)

Table 5.49. Generalized linear mixed model (assuming a gamma distribution with a log link) testing the influence of management regime and year on breeding densities (pairs per 100 hectares) of ring-necked pheasants (*Phasianus colchicus*) on two grass types (mixed-grass, tallgrass) 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 strong effect (≤0.05)]

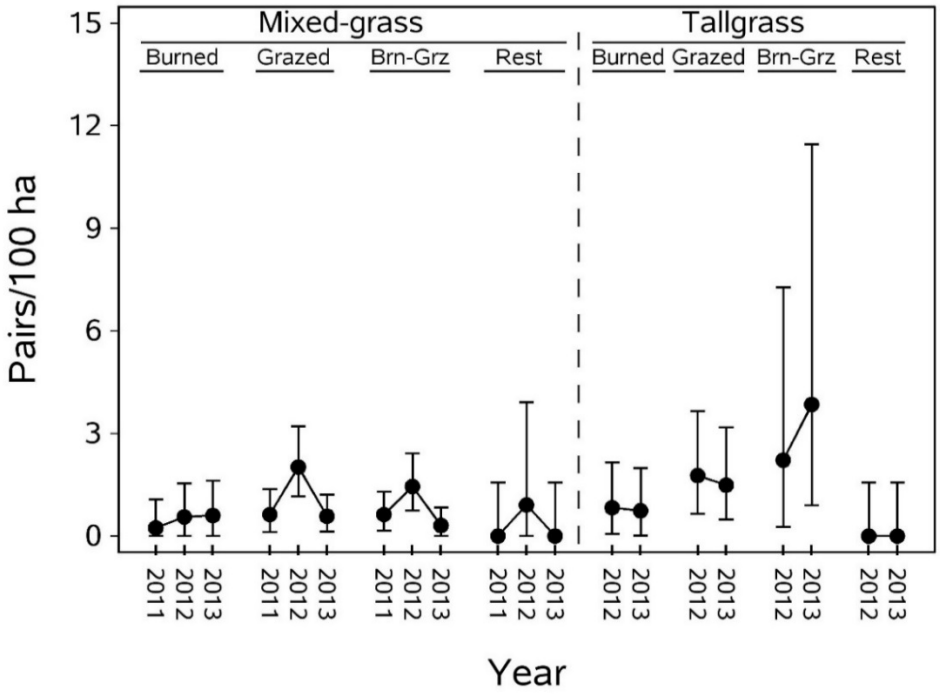
Effect	Sources of variation[1]	Numerator degrees of freedom	Denominator degrees of freedom[2]	*F*-statistic	*p*-value
Overall	Grass type × regime × year	19	186.1	1.98	0.0112**
Contrasts:	Mixed: regime effect	3	91.2	1.21	0.3098
	Mixed: year effect	2	143.4	4.42	0.0138**
	Mixed: interaction	6	149.4	0.68	0.6680
	Tall: regime effect	3	120.5	2.90	0.0379**
	Tall: year effect	1	129.0	0.06	0.8023
	Tall: interaction	3	129.0	0.19	0.9048
	Mixed versus tall: burned only	1	108.2	0.57	0.4532
	Mixed versus tall: grazed only	1	114.6	1.47	0.2283
	Mixed versus tall: burned-grazed	1	117.8	4.52	0.0356**
	Mixed versus tall: rest	1	105.5	0.20	0.6576

[1]Sources of variation for the model: Y=Unit(Grass type × Regime) + Grass type × Regime × Year + Year × Unit(Grass type × Regime), where Grass type × Regime × Year is a fixed effect, Unit(Grass type × Regime) and Year × Unit(Grass type × Regime) are random effects in a mixed-model framework, and Year is a repeated-measures factor.
[2]Degrees of freedom are based on Kenward-Roger correction for repeated-measures models (Littell and others, 2006).

Table 5.50. Least squares mean (standard error) densities (pairs per 100 hectares) and back-transformed least squares mean (95-percent confidence intervals) densities (pairs per 100 hectares) of ring-necked pheasants (*Phasianus colchicus*), by grassland type (mixed-grass, tallgrass), overall treatment regime (burned only, grazed only, burned-grazed, or rest), and year (2011, 2012, 2013), 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	Regime	Year	LSMean	SE	LSMean	LCL	UCL
Mixed	Burned only	2011	0.21	0.26	0.24	0.00	1.07
		2012	0.44	0.25	0.56	0.00	1.54
		2013	0.47	0.25	0.60	0.00	1.62
	Grazed only	2011	0.49	0.19	0.63	0.12	1.37
		2012	1.11	0.17	2.02	1.16	3.21
		2013	0.46	0.17	0.58	0.13	1.21
	Burned-grazed	2011	0.49	0.17	0.63	0.16	1.29
		2012	0.90	0.17	1.45	0.75	2.42
		2013	0.27	0.17	0.31	0.00	0.83
	Rest	2011	0.00	0.48	0.00	0.00	1.57
		2012	0.65	0.48	0.91	0.00	3.91
		2013	0.00	0.48	0.00	0.00	1.57
Tall	Burned only	2012	0.61	0.28	0.83	0.06	2.16
		2013	0.55	0.28	0.74	0.01	1.99
	Grazed only	2012	1.02	0.26	1.77	0.65	3.65
		2013	0.91	0.26	1.49	0.49	3.18
	Burned-grazed	2012	1.17	0.48	2.22	0.26	7.28
		2013	1.58	0.48	3.85	0.89	11.46
	Rest	2012	0.00	0.48	0.00	0.00	1.57
		2013	0.00	0.48	0.00	0.00	1.57



[Brn-Grz, burned-grazed]

Figure 5.25. Back-transformed least squares mean densities (pairs per 100 hectares) of ring-necked pheasants (*Phasianus colchicus*) 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.

Z. Baird's Sparrow (*Centronyx bairdii*)

Table 5.51. Generalized linear mixed model (assuming a gamma distribution with a log link) testing the influence of management regime and year on breeding densities (pairs per 100 hectares) of Baird's sparrows (*Centronyx bairdii*) on two grass types (mixed-grass, tallgrass) 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.

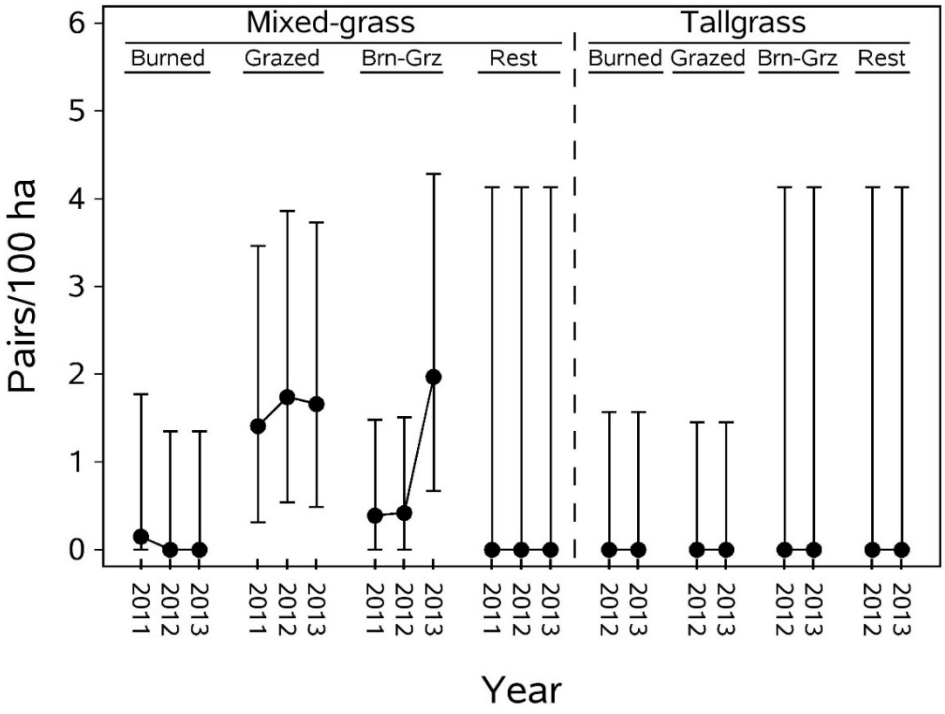
Effect	Sources of variation[1]	Numerator degrees of freedom	Denominator degrees of freedom[2]	*F*-statistic	*p*-value
Overall	Grass type × regime × year	19	183.1	1.02	0.4345
Contrasts:	Mixed: regime effect	3	80.2	1.61	0.1939
	Mixed: year effect	2	131.5	0.38	0.6821
	Mixed: interaction	6	133.5	1.15	0.3395
	Tall: regime effect	3	96.3	0.00	1.0000
	Tall: year effect	1	128.4	0.00	1.0000
	Tall: interaction	3	128.4	0.00	1.0000
	Mixed versus tall: burned only	1	88.8	0.01	0.9356
	Mixed versus tall: grazed only	1	92.6	3.80	0.0542
	Mixed versus tall: burned-grazed	1	94.6	0.53	0.4672
	Mixed versus tall: rest	1	87.5	0.00	1.0000

[1]Sources of variation for the model: Y=Unit(Grass type × Regime) + Grass type × Regime × Year + Year × Unit(Grass type × Regime), where Grass type × Regime × Year is a fixed effect, Unit(Grass type × Regime) and Year × Unit(Grass type × Regime) are random effects in a mixed-model framework, and Year is a repeated-measures factor.
[2]Degrees of freedom are based on Kenward-Roger correction for repeated-measures models (Littell and others, 2006).

Table 5.52. Least squares mean (standard error) densities (pairs per 100 hectares) and back-transformed least squares mean (95-percent confidence intervals) densities (pairs per 100 hectares) of Baird's sparrows (Centronyx *bairdii*), by grassland type (mixed-grass, tallgrass), overall treatment regime (burned only, grazed only, burned-grazed, or rest), and year (2011, 2012, 2013), 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	Regime	Year	LSMean	SE	LSMean	LCL	UCL
Mixed	Burned only	2011	0.14	0.45	0.15	0.00	1.77
		2012	0.00	0.44	0.00	0.00	1.35
		2013	0.00	0.44	0.00	0.00	1.35
	Grazed only	2011	0.88	0.31	1.41	0.31	3.46
		2012	1.01	0.29	1.74	0.54	3.86
		2013	0.98	0.29	1.66	0.49	3.73
	Burned-grazed	2011	0.33	0.30	0.39	0.00	1.48
		2012	0.35	0.29	0.42	0.00	1.51
		2013	1.09	0.29	1.97	0.67	4.28
	Rest	2011	0.00	0.83	0.00	0.00	4.13
		2012	0.00	0.83	0.00	0.00	4.13
		2013	0.00	0.83	0.00	0.00	4.13
Tall	Burned only	2012	0.00	0.48	0.00	0.00	1.57
		2013	0.00	0.48	0.00	0.00	1.57
	Grazed only	2012	0.00	0.46	0.00	0.00	1.45
		2013	0.00	0.46	0.00	0.00	1.45
	Burned-grazed	2012	0.00	0.83	0.00	0.00	4.13
		2013	0.00	0.83	0.00	0.00	4.13
	Rest	2012	0.00	0.83	0.00	0.00	4.13
		2013	0.00	0.83	0.00	0.00	4.13



[Brn-Grz, burned-grazed]

Figure 5.26. Back-transformed least squares mean densities (pairs per 100 hectares) of Baird's sparrows (Centronyx *bairdii*) 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.

AA. Sharp-tailed Grouse (*Tympanuchus phasianellus*)

Table 5.53. Generalized linear mixed model (assuming a gamma distribution with a log link) testing the influence of management regime and year on breeding densities (pairs per 100 hectares) of sharp-tailed grouse (*Tympanuchus phasianellus*) on two grass types (mixed-grass, tallgrass) 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.

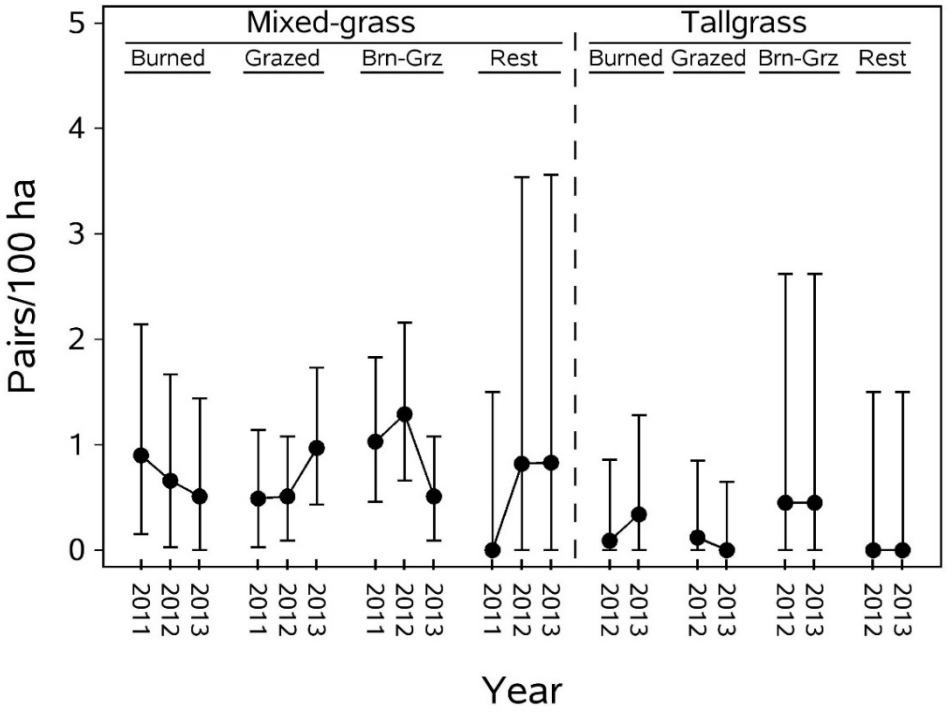
Effect	Sources of variation[1]	Numerator degrees of freedom	Denominator degrees of freedom[2]	*F*-statistic	*p*-value
Overall	Grass type × regime × year	19	185.9	1.00	0.4665
Contrasts:	Mixed: regime effect	3	92.4	0.49	0.6921
	Mixed: year effect	2	143.3	0.29	0.7473
	Mixed: interaction	6	150.0	1.16	0.3335
	Tall: regime effect	3	121.3	0.28	0.8385
	Tall: year effect	1	127.0	0.01	0.9276
	Tall: interaction	3	127.0	0.14	0.9349
	Mixed versus tall: burned only	1	109.4	1.65	0.2020
	Mixed versus tall: grazed only	1	115.7	3.99	0.0480
	Mixed versus tall: burned-grazed	1	118.7	0.58	0.4461
	Mixed versus tall: rest	1	106.7	0.77	0.3828

[1]Sources of variation for the model: Y=Unit(Grass type × Regime) + Grass type × Regime × Year + Year × Unit(Grass type × Regime), where Grass type × Regime × Year is a fixed effect, Unit(Grass type × Regime) and Year × Unit(Grass type × Regime) are random effects in a mixed-model framework, and Year is a repeated-measures factor.
[2]Degrees of freedom are based on Kenward-Roger correction for repeated-measures models (Littell and others, 2006).

Table 5.54. Least squares mean (standard error) densities (pairs per 100 hectares) and back-transformed least squares mean (95-percent confidence intervals) densities (pairs per 100 hectares) of sharp-tailed grouse (*Tympanuchus phasianellus*), by grassland type (mixed-grass, tallgrass), overall treatment regime (burned only, grazed only, burned-grazed, or rest), and year (2011, 2012, 2013), 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	Regime	Year	LSMean	SE	LSMean	LCL	UCL
Mixed	Burned only	2011	0.64	0.26	0.90	0.15	2.14
		2012	0.50	0.24	0.66	0.03	1.67
		2013	0.41	0.24	0.51	0.00	1.44
	Grazed only	2011	0.40	0.19	0.49	0.03	1.14
		2012	0.41	0.17	0.51	0.09	1.08
		2013	0.68	0.17	0.97	0.43	1.73
	Burned-grazed	2011	0.71	0.17	1.03	0.46	1.83
		2012	0.83	0.17	1.29	0.66	2.16
		2013	0.41	0.17	0.51	0.09	1.08
	Rest	2011	0.00	0.47	0.00	0.00	1.50
		2012	0.60	0.47	0.82	0.00	3.54
		2013	0.60	0.47	0.83	0.00	3.56
Tall	Burned only	2012	0.09	0.27	0.09	0.00	0.86
		2013	0.30	0.27	0.34	0.00	1.28
	Grazed only	2012	0.11	0.26	0.12	0.00	0.85
		2013	0.00	0.26	0.00	0.00	0.65
	Burned-grazed	2012	0.37	0.47	0.45	0.00	2.62
		2013	0.37	0.47	0.45	0.00	2.62
	Rest	2012	0.00	0.47	0.00	0.00	1.50
		2013	0.00	0.47	0.00	0.00	1.50



[Brn-Grz, burned-grazed]

Figure 5.27. Back-transformed least squares mean densities (pairs per 100 hectares) of sharp-tailed grouse (*Tympanuchus phasianellus*) 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.

BB. Nelson's Sparrow (*Ammospiza nelsoni*)

Table 5.55. Generalized linear mixed model (assuming a gamma distribution with a log link) testing the influence of management regime and year on breeding densities (pairs per 100 hectares) of Nelson's sparrows (*Ammospiza nelsoni*) on two grass types (mixed-grass, tallgrass) 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 ($0.05<p\leq0.10$); **, evidence for strong effect ($p\leq0.05$)]

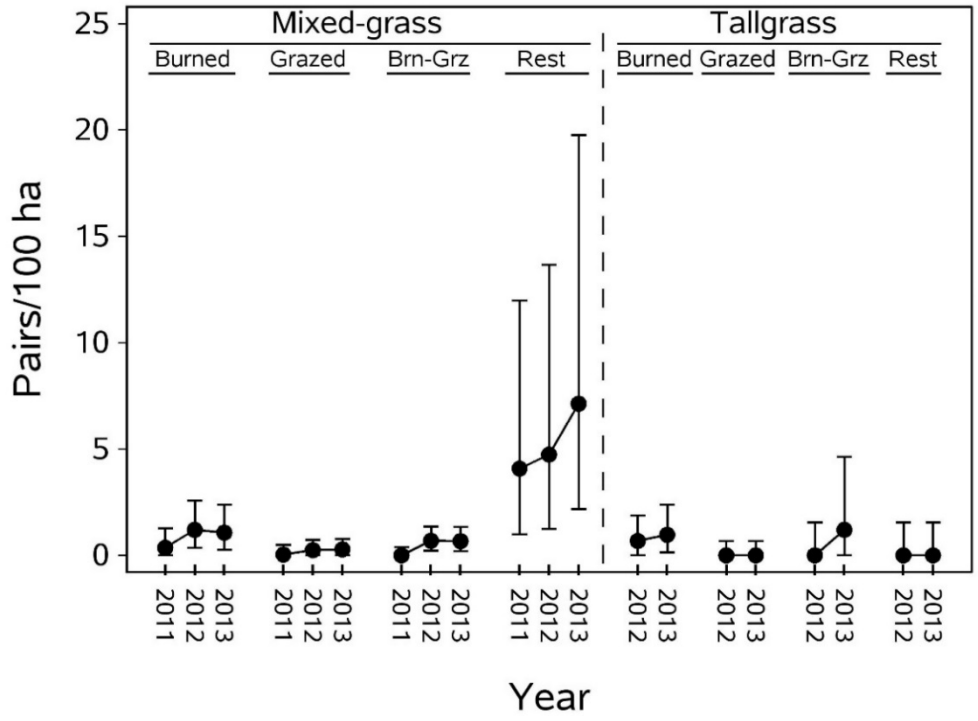
Effect	Sources of variation[1]	Numerator degrees of freedom	Denominator degrees of freedom[2]	*F*-statistic	*p*-value
Overall	Grass type × regime × year	19	186.9	2.20	0.0040**
Contrasts:	Mixed: regime effect	3	90.4	7.05	0.0003**
	Mixed: year effect	2	143.5	2.60	0.0776*
	Mixed: interaction	6	147.7	0.39	0.8821
	Tall: regime effect	3	117.0	1.36	0.2583
	Tall: year effect	1	134.8	1.23	0.2690
	Tall: interaction	3	134.8	0.61	0.6105
	Mixed versus tall: burned only	1	105.3	0.00	0.9682
	Mixed versus tall: grazed only	1	111.2	0.45	0.5056
	Mixed versus tall: burned-grazed	1	114.4	0.02	0.9001
	Mixed versus tall: rest	1	103.0	11.73	0.0009**

[1]Sources of variation for the model: Y=Unit(Grass type × Regime) + Grass type × Regime × Year + Year × Unit(Grass type × Regime), where Grass type × Regime × Year is a fixed effect, Unit(Grass type × Regime) and Year × Unit(Grass type × Regime) are random effects in a mixed-model framework, and Year is a repeated-measures factor.
[2]Degrees of freedom are based on Kenward-Roger correction for repeated-measures models (Littell and others, 2006).

Table 5.56. Least squares mean (standard error) densities (pairs per 100 hectares) and back-transformed least squares mean (95-percent confidence intervals) densities (pairs per 100 hectares) of Nelson's sparrows (*Ammospiza nelsoni*), by grassland type (mixed-grass, tallgrass), overall treatment regime (burned only, grazed only, burned-grazed, or rest), and year (2011, 2012, 2013), 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	Regime	Year	LSMean	SE	LSMean	LCL	UCL
Mixed	Burned only	2011	0.31	0.26	0.36	0.00	1.27
		2012	0.79	0.25	1.20	0.35	2.58
		2013	0.73	0.25	1.07	0.27	2.38
	Grazed only	2011	0.04	0.19	0.04	0.00	0.50
		2012	0.22	0.17	0.25	0.00	0.73
		2013	0.25	0.17	0.28	0.00	0.78
	Burned-grazed	2011	0.00	0.17	−0.01	0.00	0.38
		2012	0.52	0.17	0.69	0.21	1.35
		2013	0.52	0.17	0.67	0.20	1.33
	Rest	2011	1.63	0.48	4.08	0.99	11.98
		2012	1.75	0.48	4.74	1.25	13.67
		2013	2.10	0.48	7.13	2.18	19.76
Tall	Burned only	2012	0.52	0.28	0.68	0.00	1.88
		2013	0.68	0.28	0.97	0.14	2.38
	Grazed only	2012	0.00	0.26	0.00	0.00	0.67
		2013	0.00	0.26	0.00	0.00	0.67
	Burned-grazed	2012	0.00	0.48	0.00	0.00	1.55
		2013	0.79	0.48	1.20	0.00	4.62
	Rest	2012	0.00	0.48	0.00	0.00	1.55
		2013	0.00	0.48	0.00	0.00	1.55



[Brn-Grz, burned-grazed]

Figure 5.28. Back-transformed least squares mean densities (pairs per 100 hectares) of Nelson's sparrows (*Ammospiza nelsoni*) 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.

CC. Marbled Godwit (*Limosa fedoa*)

Table 5.57. Generalized linear mixed model (assuming a gamma distribution with a log link) testing the influence of management regime and year on breeding densities (pairs per 100 hectares) of marbled godwits (*Limosa fedoa*) on two grass types (mixed-grass, tallgrass) 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.

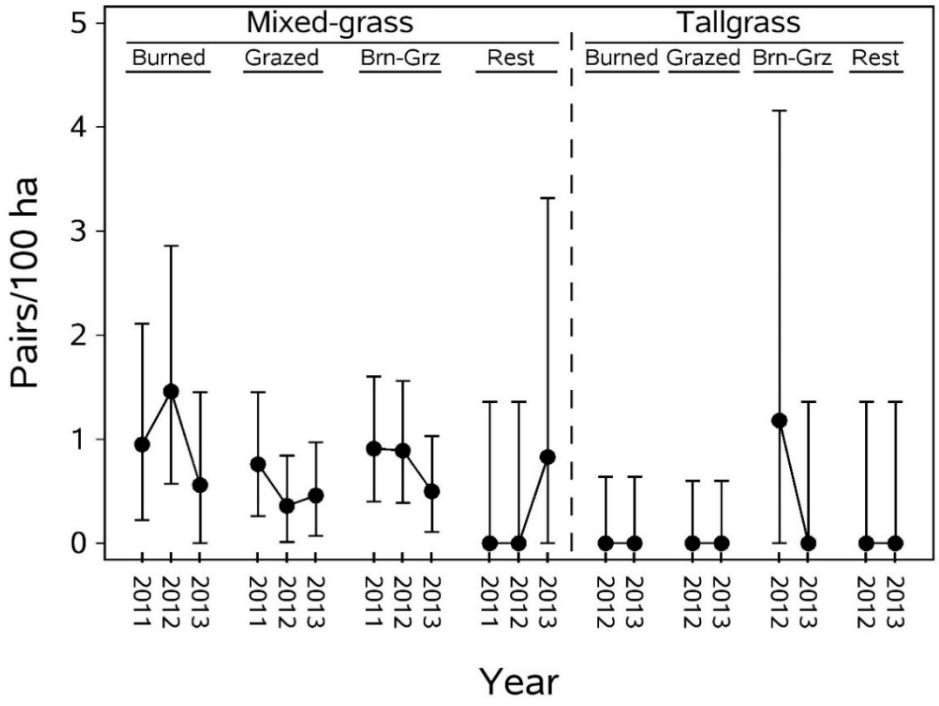
Effect	Sources of variation[1]	Numerator degrees of freedom	Denominator degrees of freedom[2]	*F*-statistic	*p*-value
Overall	Grass type × regime × year	19	184.9	1.29	0.1957
Contrasts:	Mixed: regime effect	3	84.3	0.86	0.4645
	Mixed: year effect	2	137.9	0.00	0.9978
	Mixed: interaction	6	141.9	1.27	0.2756
	Tall: regime effect	3	109.8	0.32	0.8077
	Tall: year effect	1	129.7	1.05	0.3067
	Tall: interaction	3	129.7	0.81	0.4885
	Mixed versus tall: burned only	1	98.5	5.93	0.0167
	Mixed versus tall: grazed only	1	104.2	3.13	0.0800
	Mixed versus tall: burned-grazed	1	107.3	0.20	0.6591
	Mixed versus tall: rest	1	96.3	0.16	0.6868

[1]Sources of variation for the model: Y=Unit(Grass type × Regime) + Grass type × Regime × Year + Year × Unit(Grass type × Regime), where Grass type × Regime × Year is a fixed effect, Unit(Grass type × Regime) and Year × Unit(Grass type × Regime) are random effects in a mixed-model framework, and Year is a repeated-measures factor.
[2]Degrees of freedom are based on Kenward-Roger correction for repeated-measures models (Littell and others, 2006).

Table 5.58. Least squares mean (standard error) densities (pairs per 100 hectares) and back-transformed least squares mean (95-percent confidence intervals) densities (pairs per 100 hectares) of marbled godwits (*Limosa fedoa*), by grassland type (mixed-grass, tallgrass), overall treatment regime (burned only, grazed only, burned-grazed, or rest), and year (2011, 2012, 2013), 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	Regime	Year	LSMean	SE	LSMean	LCL	UCL
Mixed	Burned only	2011	0.67	0.24	0.95	0.22	2.11
		2012	0.90	0.23	1.46	0.57	2.86
		2013	0.45	0.23	0.56	0.00	1.45
	Grazed only	2011	0.56	0.17	0.76	0.26	1.45
		2012	0.31	0.15	0.36	0.01	0.84
		2013	0.38	0.16	0.46	0.07	0.97
	Burned-grazed	2011	0.65	0.16	0.91	0.40	1.60
		2012	0.64	0.15	0.89	0.39	1.56
		2013	0.41	0.16	0.50	0.11	1.03
	Rest	2011	0.00	0.44	0.00	0.00	1.36
		2012	0.00	0.44	0.00	0.00	1.36
		2013	0.60	0.44	0.83	0.00	3.32
Tall	Burned only	2012	0.00	0.25	0.00	0.00	0.64
		2013	0.00	0.25	0.00	0.00	0.64
	Grazed only	2012	0.00	0.24	0.00	0.00	0.60
		2013	0.00	0.24	0.00	0.00	0.60
	Burned-grazed	2012	0.78	0.44	1.18	0.00	4.16
		2013	0.00	0.44	0.00	0.00	1.36
	Rest	2012	0.00	0.44	0.00	0.00	1.36
		2013	0.00	0.44	0.00	0.00	1.36



[Brn-Grz, burned-grazed]

Figure 5.29. Back-transformed least squares mean densities (pairs per 100 hectares) of marbled godwits (*Limosa fedoa*) 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.

DD. Vesper Sparrow (*Pooecetes gramineus*)

Table 5.59. Generalized linear mixed model (assuming a gamma distribution with a log link) testing the influence of management regime and year on breeding densities (pairs per 100 hectares) of vesper sparrows (*Pooecetes gramineus*) on two grass types (mixed-grass, tallgrass) 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.

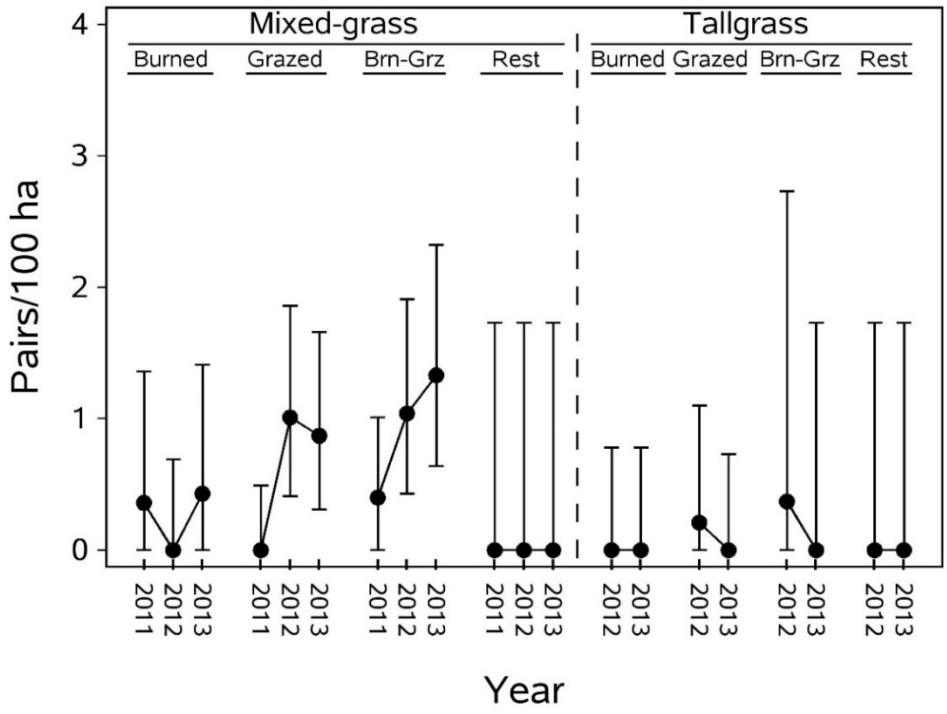
Effect	Sources of variation[1]	Numerator degrees of freedom	Denominator degrees of freedom[2]	*F*-statistic	*p*-value
Overall	Grass type × regime × year	19	185.0	1.44	0.1125
Contrasts:	Mixed: regime effect	3	89.1	2.04	0.1146
	Mixed: year effect	2	141.1	0.90	0.4096
	Mixed: interaction	6	147.5	0.97	0.4478
	Tall: regime effect	3	118.3	0.06	0.9799
	Tall: year effect	1	125.6	0.22	0.6396
	Tall: interaction	3	125.6	0.08	0.9682
	Mixed versus tall: burned only	1	106.2	0.61	0.4364
	Mixed versus tall: grazed only	1	112.5	1.98	0.1620
	Mixed versus tall: burned-grazed	1	115.6	1.37	0.2443
	Mixed versus tall: rest	1	103.4	0.00	1.0000

[1]Sources of variation for the model: Y=Unit(Grass type × Regime) + Grass type × Regime × Year + Year × Unit(Grass type × Regime), where Grass type × Regime × Year is a fixed effect, Unit(Grass type × Regime) and Year × Unit(Grass type × Regime) are random effects in a mixed-model framework, and Year is a repeated-measures factor.
[2]Degrees of freedom are based on Kenward-Roger correction for repeated-measures models (Littell and others, 2006).

Table 5.60. Least squares mean (standard error) densities (pairs per 100 hectares) and back-transformed least squares mean (95-percent confidence intervals) densities (pairs per 100 hectares) of vesper sparrows (*Pooecetes gramineus*), by grassland type (mixed-grass, tallgrass), overall treatment regime (burned only, grazed only, burned-grazed, or rest), and year (2011, 2012, 2013), 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	Regime	Year	LSMean	SE	LSMean	LCL	UCL
Mixed	Burned only	2011	0.31	0.28	0.36	0.00	1.36
		2012	0.00	0.27	0.00	0.00	0.69
		2013	0.36	0.27	0.43	0.00	1.41
	Grazed only	2011	0.00	0.20	0.00	0.00	0.49
		2012	0.70	0.18	1.01	0.41	1.86
		2013	0.62	0.18	0.87	0.31	1.66
	Burned-grazed	2011	0.34	0.18	0.40	0.00	1.01
		2012	0.71	0.18	1.04	0.43	1.91
		2013	0.85	0.18	1.33	0.64	2.32
	Rest	2011	0.00	0.51	0.00	0.00	1.73
		2012	0.00	0.51	0.00	0.00	1.73
		2013	0.00	0.51	0.00	0.00	1.73
Tall	Burned only	2012	0.00	0.30	0.00	0.00	0.78
		2013	0.00	0.30	0.00	0.00	0.78
	Grazed only	2012	0.19	0.28	0.21	0.00	1.10
		2013	0.00	0.28	0.00	0.00	0.73
	Burned-grazed	2012	0.31	0.51	0.37	0.00	2.73
		2013	0.00	0.51	0.00	0.00	1.73
	Rest	2012	0.00	0.51	0.00	0.00	1.73
		2013	0.00	0.51	0.00	0.00	1.73



[Brn-Grz, burned-grazed]

Figure 5.30. Back-transformed least squares mean densities (pairs per 100 hectares) of vesper sparrows (*Pooecetes gramineus*) 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.

EE. LeConte's Sparrow (*Ammospiza leconteii*)

Table 5.61. Generalized linear mixed model (assuming a gamma distribution with a log link) testing the influence of management regime and year on breeding densities (pairs per 100 hectares) of LeConte's sparrows (*Ammospiza leconteii*) on two grass types (mixed-grass, tallgrass) 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 strong effect ($p \leq 0.05$)]

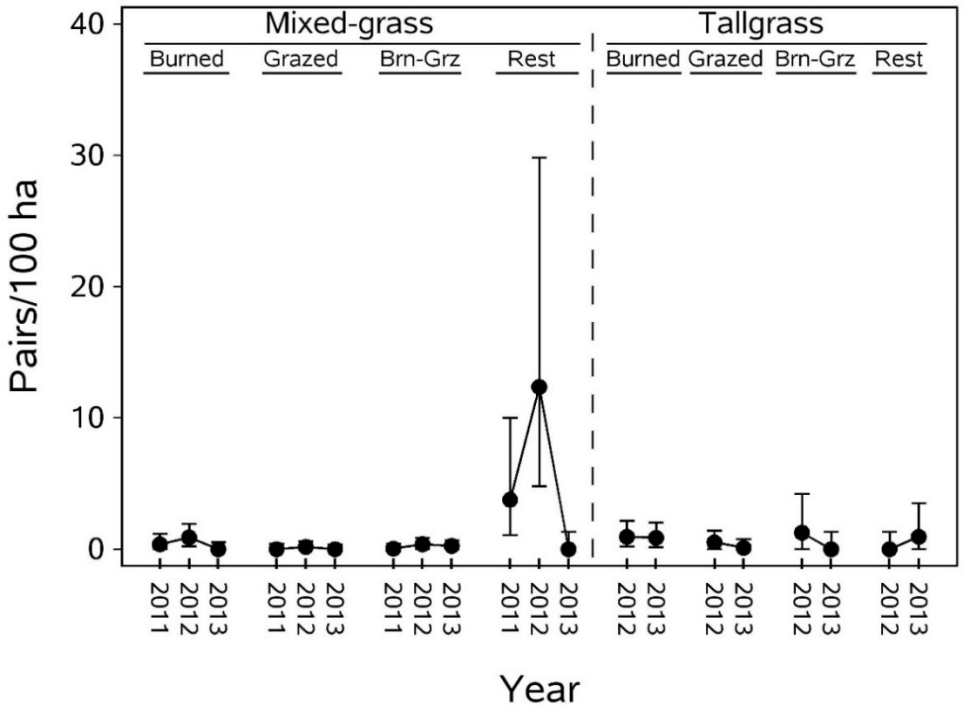
Effect	Sources of variation[1]	Numerator degrees of freedom	Denominator degrees of freedom[2]	*F*-statistic	*p*-value
Overall	Grass type × regime × year	19	186.8	3.16	<0.0001**
Contrasts:	Mixed: regime effect	3	100.2	8.52	<0.0001**
	Mixed: year effect	2	146.9	11.25	<0.0001**
	Mixed: interaction	6	154.5	3.04	0.0078**
	Tall: regime effect	3	126.8	0.86	0.4614
	Tall: year effect	1	127.9	0.28	0.5958
	Tall: interaction	3	127.9	1.17	0.3237
	Mixed versus tall: burned only	1	116.3	2.19	0.1416
	Mixed versus tall: grazed only	1	122.1	1.20	0.2746
	Mixed versus tall: burned-grazed	1	124.5	0.43	0.5155
	Mixed versus tall: rest	1	113.6	7.10	0.0088**

[1]Sources of variation for the model: Y=Unit(Grass type × Regime) + Grass type × Regime × Year + Year × Unit(Grass type × Regime), where Grass type × Regime × Year is a fixed effect, Unit(Grass type × Regime) and Year × Unit(Grass type × Regime) are random effects in a mixed-model framework, and Year is a repeated-measures factor.
[2]Degrees of freedom are based on Kenward-Roger correction for repeated-measures models (Littell and others, 2006).

Table 5.62. Least squares mean (standard error) densities (pairs per 100 hectares) and back-transformed least squares mean (95-percent confidence intervals) densities (pairs per 100 hectares) of LeConte's sparrows (*Ammospiza leconteii*), by grassland type (mixed-grass, tallgrass), overall treatment regime (burned only, grazed only, burned-grazed, or rest), and year (2011, 2012, 2013), 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	Regime	Year	LSMean	SE	LSMean	LCL	UCL
Mixed	Burned only	2011	0.32	0.23	0.38	0.00	1.18
		2012	0.64	0.22	0.90	0.22	1.93
		2013	0.00	0.22	0.00	0.00	0.55
	Grazed only	2011	0.00	0.17	0.00	0.00	0.39
		2012	0.16	0.15	0.18	0.00	0.59
		2013	0.00	0.15	0.00	0.00	0.34
	Burned-grazed	2011	0.05	0.15	0.05	0.00	0.42
		2012	0.32	0.15	0.38	0.03	0.86
		2013	0.23	0.15	0.26	0.00	0.69
	Rest	2011	1.56	0.43	3.77	1.07	10.01
		2012	2.59	0.43	12.36	4.79	29.84
		2013	0.00	0.43	0.00	0.00	1.31
Tall	Burned only	2012	0.67	0.25	0.95	0.20	2.16
		2013	0.63	0.25	0.87	0.15	2.03
	Grazed only	2012	0.43	0.23	0.53	0.00	1.42
		2013	0.10	0.23	0.11	0.00	0.75
	Burned-grazed	2012	0.82	0.43	1.26	0.00	4.22
		2013	0.00	0.43	0.00	0.00	1.31
	Rest	2012	0.00	0.43	0.00	0.00	1.31
		2013	0.67	0.43	0.95	0.00	3.50



[Brn-Grz, burned-grazed]

Figure 5.31. Back-transformed least squares mean densities (pairs per 100 hectares) of LeConte's sparrows (*Ammospiza leconteii*) 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.

FF. Willet (*Tringa semipalmata*)

Table 5.63. Generalized linear mixed model (assuming a gamma distribution with a log link) testing the influence of management regime and year on breeding densities (pairs per 100 hectares) of willets (*Tringa semipalmata*) on two grass types (mixed-grass, tallgrass) 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 strong effect ($p \leq 0.05$)]

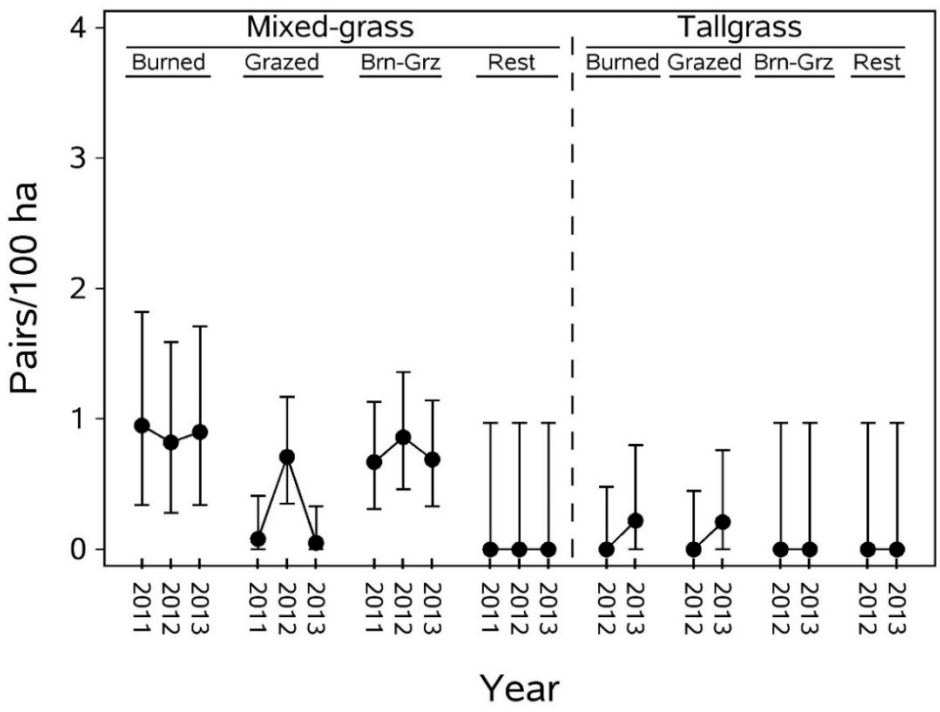
Effect	Sources of variation[1]	Numerator degrees of freedom	Denominator degrees of freedom[2]	*F*-statistic	*p*-value
Overall	Grass type × regime × year	19	184.2	2.17	0.0046**
Contrasts:	Mixed: regime effect	3	87.6	5.62	0.0014**
	Mixed: year effect	2	138.7	0.59	0.5568
	Mixed: interaction	6	145.8	1.03	0.4108
	Tall: regime effect	3	116.3	0.07	0.9738
	Tall: year effect	1	121.7	0.28	0.5974
	Tall: interaction	3	121.7	0.09	0.9635
	Mixed versus tall: burned only	1	104.4	8.24	0.0050**
	Mixed versus tall: grazed only	1	110.8	0.59	0.4453
	Mixed versus tall: burned-grazed	1	113.7	4.20	0.0427**
	Mixed versus tall: rest	1	101.7	0.00	1.0000

[1]Sources of variation for the model: Y=Unit(Grass type × Regime) + Grass type × Regime × Year + Year × Unit(Grass type × Regime), where Grass type × Regime × Year is a fixed effect, Unit(Grass type × Regime) and Year × Unit(Grass type × Regime) are random effects in a mixed-model framework, and Year is a repeated-measures factor.
[2]Degrees of freedom are based on Kenward-Roger correction for repeated-measures models (Littell and others, 2006).

Table 5.64. Least squares mean (standard error) densities (pairs per 100 hectares) and back-transformed least squares mean (95-percent confidence intervals) densities (pairs per 100 hectares) of willets (*Tringa semipalmata*), by grassland type (mixed-grass, tallgrass), overall treatment regime (burned only, grazed only, burned-grazed, or rest), and year (2011, 2012, 2013), 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	Regime	Year	LSMean	SE	LSMean	LCL	UCL
Mixed	Burned only	2011	0.67	0.19	0.95	0.34	1.82
		2012	0.60	0.18	0.82	0.28	1.59
		2013	0.64	0.18	0.90	0.34	1.71
	Grazed only	2011	0.08	0.14	0.08	0.00	0.41
		2012	0.54	0.12	0.71	0.35	1.17
		2013	0.05	0.12	0.05	0.00	0.33
	Burned-grazed	2011	0.51	0.12	0.67	0.31	1.13
		2012	0.62	0.12	0.86	0.46	1.36
		2013	0.52	0.12	0.69	0.33	1.14
	Rest	2011	0.00	0.34	0.00	0.00	0.97
		2012	0.00	0.34	0.00	0.00	0.97
		2013	0.00	0.34	0.00	0.00	0.97
Tall	Burned only	2012	0.00	0.20	0.00	0.00	0.48
		2013	0.20	0.20	0.22	0.00	0.80
	Grazed only	2012	0.00	0.19	0.00	0.00	0.45
		2013	0.19	0.19	0.21	0.00	0.76
	Burned-grazed	2012	0.00	0.34	0.00	0.00	0.97
		2013	0.00	0.34	0.00	0.00	0.97
	Rest	2012	0.00	0.34	0.00	0.00	0.97
		2013	0.00	0.34	0.00	0.00	0.97



[Brn-Grz, burned-grazed]

Figure 5.32. Back-transformed least squares mean densities (pairs per 100 hectares) of willets (*Tringa semipalmata*) 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.

GG. Horned Lark (*Eremophila alpestris*)

Table 5.65. Generalized linear mixed model (assuming a gamma distribution with a log link) testing the influence of management regime and year on breeding densities (pairs per 100 hectares) of horned larks (*Eremophila alpestris*) on two grass types (mixed-grass, tallgrass) 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.

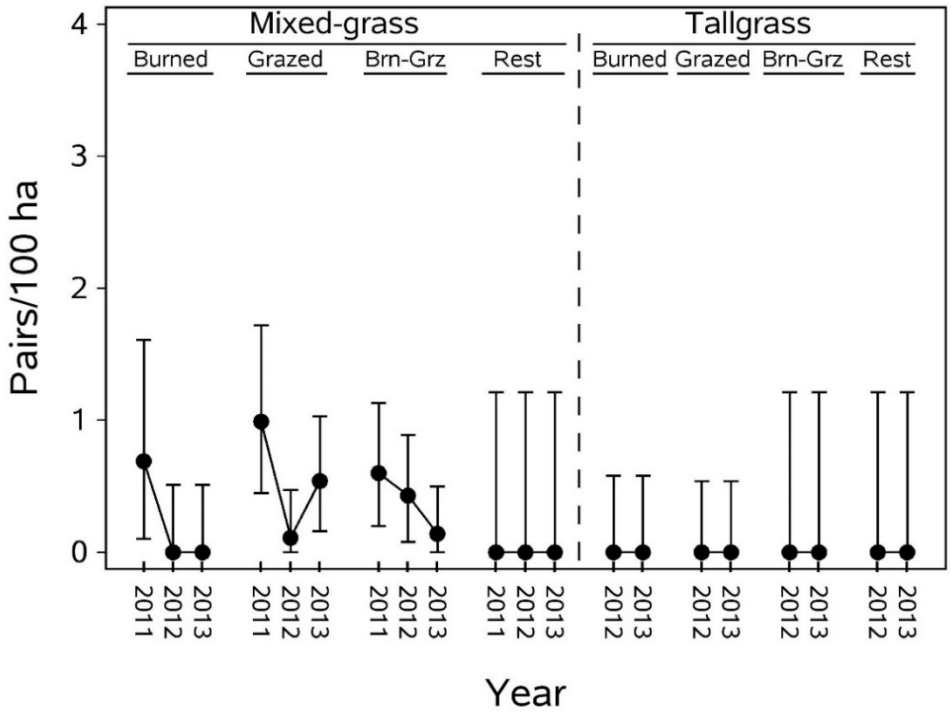
Effect	Sources of variation[1]	Numerator degrees of freedom	Denominator degrees of freedom[2]	*F*-statistic	*p*-value
Overall	Grass type × regime × year	19	183.5	1.33	0.1714
Contrasts:	Mixed: regime effect	3	88.0	1.31	0.2773
	Mixed: year effect	2	137.5	1.85	0.1604
	Mixed: interaction	6	145.3	0.94	0.4693
	Tall: regime effect	3	115.8	0.00	1.0000
	Tall: year effect	1	118.6	0.00	1.0000
	Tall: interaction	3	118.6	0.00	1.0000
	Mixed versus tall: burned only	1	104.4	0.68	0.4131
	Mixed versus tall: grazed only	1	110.6	4.87	0.0294
	Mixed versus tall: burned-grazed	1	113.3	1.08	0.3014
	Mixed versus tall: rest	1	101.7	0.00	1.0000

[1]Sources of variation for the model: Y=Unit(Grass type × Regime) + Grass type × Regime × Year + Year × Unit(Grass type × Regime), where Grass type × Regime × Year is a fixed effect, Unit(Grass type × Regime) and Year × Unit(Grass type × Regime) are random effects in a mixed-model framework, and Year is a repeated-measures factor.
[2]Degrees of freedom are based on Kenward-Roger correction for repeated-measures models (Littell and others, 2006).

Table 5.66. Least squares mean (standard error) densities (pairs per 100 hectares) and back-transformed least squares mean (95-percent confidence intervals) densities (pairs per 100 hectares) of horned larks (*Eremophila alpestris*), by grassland type (mixed-grass, tallgrass), overall treatment regime (burned only, grazed only, burned-grazed, or rest), and year (2011, 2012, 2013), 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	Regime	Year	LSMean	SE	LSMean	LCL	UCL
Mixed	Burned only	2011	0.52	0.22	0.69	0.10	1.61
		2012	0.00	0.21	0.00	0.00	0.51
		2013	0.00	0.21	0.00	0.00	0.51
	Grazed only	2011	0.69	0.16	0.99	0.45	1.72
		2012	0.10	0.14	0.11	0.00	0.47
		2013	0.43	0.14	0.54	0.16	1.03
	Burned-grazed	2011	0.47	0.15	0.60	0.20	1.13
		2012	0.35	0.14	0.43	0.08	0.89
		2013	0.13	0.14	0.14	0.00	0.50
	Rest	2011	0.00	0.40	0.00	0.00	1.21
		2012	0.00	0.40	0.00	0.00	1.21
		2013	0.00	0.40	0.00	0.00	1.21
Tall	Burned only	2012	0.00	0.23	0.00	0.00	0.58
		2013	0.00	0.23	0.00	0.00	0.58
	Grazed only	2012	0.00	0.22	0.00	0.00	0.54
		2013	0.00	0.22	0.00	0.00	0.54
	Burned-grazed	2012	0.00	0.40	0.00	0.00	1.21
		2013	0.00	0.40	0.00	0.00	1.21
	Rest	2012	0.00	0.40	0.00	0.00	1.21
		2013	0.00	0.40	0.00	0.00	1.21



[Brn-Grz, burned-grazed]

Figure 5.33. Back-transformed least squares mean densities (pairs per 100 hectares) of horned larks (*Eremophila alpestris*) 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.

HH. Northern Harrier (*Circus hudsonius*)

Table 5.67. Generalized linear mixed model (assuming a gamma distribution with a log link) testing the influence of management regime and year on breeding densities (pairs per 100 hectares) of northern harriers (*Circus hudsonius*) on two grass types (mixed-grass, tallgrass) 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.

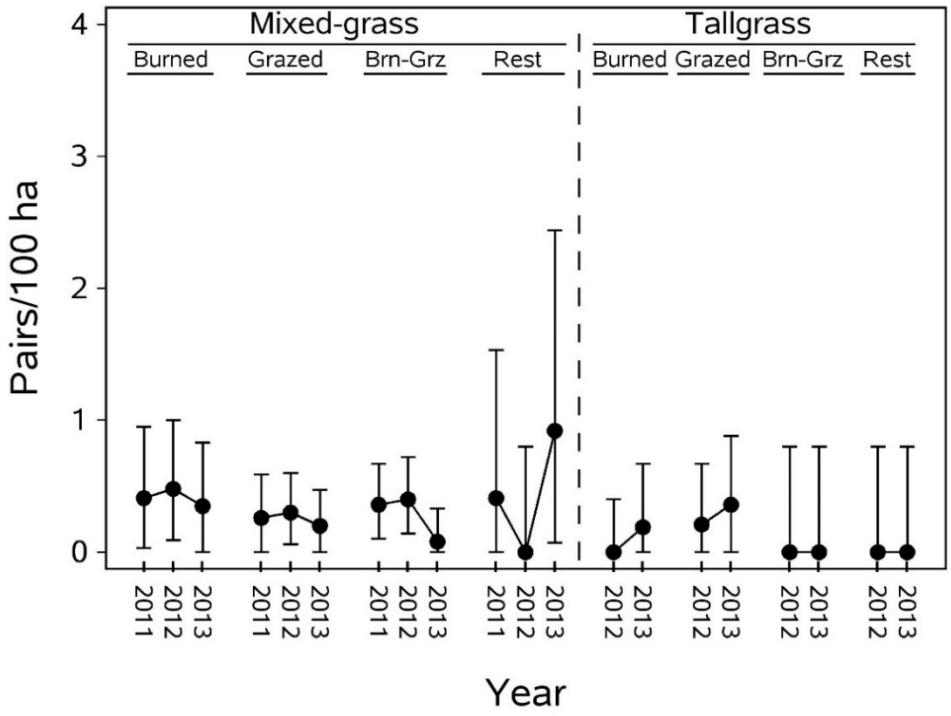
Effect	Sources of variation[1]	Numerator degrees of freedom	Denominator degrees of freedom[2]	*F*-statistic	*p*-value
Overall	Grass type × regime × year	19	182.9	0.68	0.8390
Contrasts:	Mixed: regime effect	3	92.3	0.51	0.6730
	Mixed: year effect	2	137.1	0.12	0.8834
	Mixed: interaction	6	146.0	0.74	0.6206
	Tall: regime effect	3	116.6	0.68	0.5643
	Tall: year effect	1	114.9	0.18	0.6733
	Tall: interaction	3	114.9	0.07	0.9768
	Mixed versus tall: burned only	1	107.0	2.97	0.0878
	Mixed versus tall: grazed only	1	112.5	0.04	0.8387
	Mixed versus tall: burned-grazed	1	114.5	1.22	0.2724
	Mixed versus tall: rest	1	104.4	1.54	0.2177

[1]Sources of variation for the model: Y=Unit(Grass type × Regime) + Grass type × Regime × Year + Year × Unit(Grass type × Regime), where Grass type × Regime × Year is a fixed effect, Unit(Grass type × Regime) and Year × Unit(Grass type × Regime) are random effects in a mixed-model framework, and Year is a repeated-measures factor.
[2]Degrees of freedom are based on Kenward-Roger correction for repeated-measures models (Littell and others, 2006).

Table 5.68. Least squares mean (standard error) densities (pairs per 100 hectares) and back-transformed least squares mean (95-percent confidence intervals) densities (pairs per 100 hectares) of northern harriers (*Circus hudsonius*), by grassland type (mixed-grass, tallgrass), overall treatment regime (burned only, grazed only, burned-grazed, or rest), and year (2011, 2012, 2013), 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	Regime	Year	LSMean	SE	LSMean	LCL	UCL
Mixed	Burned only	2011	0.35	0.16	0.41	0.03	0.95
		2012	0.39	0.16	0.48	0.09	1.00
		2013	0.30	0.16	0.35	0.00	0.83
	Grazed only	2011	0.23	0.12	0.26	0.00	0.59
		2012	0.26	0.11	0.30	0.06	0.60
		2013	0.18	0.11	0.20	0.00	0.47
	Burned-grazed	2011	0.30	0.11	0.36	0.10	0.67
		2012	0.33	0.11	0.40	0.14	0.72
		2013	0.08	0.11	0.08	0.00	0.33
	Rest	2011	0.34	0.30	0.41	0.00	1.53
		2012	0.00	0.30	0.00	0.00	0.80
		2013	0.65	0.30	0.92	0.07	2.44
Tall	Burned only	2012	0.00	0.17	0.00	0.00	0.40
		2013	0.18	0.17	0.19	0.00	0.67
	Grazed only	2012	0.19	0.16	0.21	0.00	0.67
		2013	0.31	0.16	0.36	0.00	0.88
	Burned-grazed	2012	0.00	0.30	0.00	0.00	0.80
		2013	0.00	0.30	0.00	0.00	0.80
	Rest	2012	0.00	0.30	0.00	0.00	0.80
		2013	0.00	0.30	0.00	0.00	0.80



[Brn-Grz, burned-grazed]

Figure 5.34. Back-transformed least squares mean densities (pairs per 100 hectares) of northern harriers (*Circus hudsonius*) 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.

II. Sprague's Pipit (*Anthus spragueii*)

Table 5.69. Generalized linear mixed model (assuming a gamma distribution with a log link) testing the influence of management regime and year on breeding densities (pairs per 100 hectares) of Sprague's pipits (*Anthus spragueii*) on two grass types (mixed-grass, tallgrass) 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.

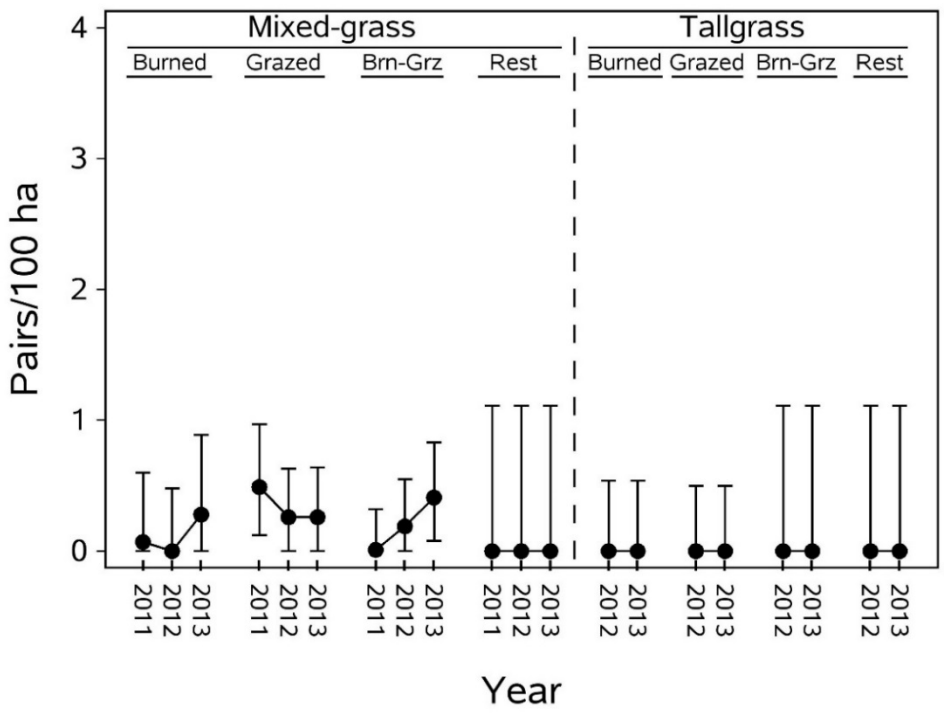
Effect	Sources of variation[1]	Numerator degrees of freedom	Denominator degrees of freedom[2]	*F*-statistic	*p*-value
Overall	Grass type × regime × year	19	183.2	0.67	0.8498
Contrasts:	Mixed: regime effect	3	80.2	0.43	0.7338
	Mixed: year effect	2	131.7	0.57	0.5649
	Mixed: interaction	6	133.8	1.15	0.3372
	Tall: regime effect	3	97.0	0.00	1.0000
	Tall: year effect	1	128.2	0.00	1.0000
	Tall: interaction	3	128.2	0.00	1.0000
	Mixed versus tall: burned only	1	89.2	0.16	0.6895
	Mixed versus tall: grazed only	1	93.1	1.65	0.2024
	Mixed versus tall: burned-grazed	1	95.3	0.23	0.6309
	Mixed versus tall: rest	1	87.8	0.00	1.0000

[1]Sources of variation for the model: Y=Unit(Grass type × Regime) + Grass type × Regime × Year + Year × Unit(Grass type × Regime), where Grass type × Regime × Year is a fixed effect, Unit(Grass type × Regime) and Year × Unit(Grass type × Regime) are random effects in a mixed-model framework, and Year is a repeated-measures factor.
[2]Degrees of freedom are based on Kenward-Roger correction for repeated-measures models (Littell and others, 2006).

Table 5.70. Least squares mean (standard error) densities (pairs per 100 hectares) and back-transformed least squares mean (95-percent confidence intervals) densities (pairs per 100 hectares) of Sprague's pipits (*Anthus spragueii*), by grassland type (mixed-grass, tallgrass), overall treatment regime (burned only, grazed only, burned-grazed, or rest), and year (2011, 2012, 2013), 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	Regime	Year	LSMean	SE	LSMean	LCL	UCL
Mixed	Burned only	2011	0.07	0.20	0.07	0.00	0.60
		2012	0.00	0.20	0.00	0.00	0.48
		2013	0.25	0.20	0.28	0.00	0.89
	Grazed only	2011	0.40	0.14	0.49	0.12	0.97
		2012	0.23	0.13	0.26	0.00	0.63
		2013	0.23	0.13	0.26	0.00	0.64
	Burned-grazed	2011	0.01	0.13	0.01	0.00	0.32
		2012	0.18	0.13	0.19	0.00	0.55
		2013	0.34	0.13	0.41	0.08	0.83
	Rest	2011	0.00	0.38	0.00	0.00	1.11
		2012	0.00	0.38	0.00	0.00	1.11
		2013	0.00	0.38	0.00	0.00	1.11
Tall	Burned only	2012	0.00	0.22	0.00	0.00	0.54
		2013	0.00	0.22	0.00	0.00	0.54
	Grazed only	2012	0.00	0.21	0.00	0.00	0.50
		2013	0.00	0.21	0.00	0.00	0.50
	Burned-grazed	2012	0.00	0.38	0.00	0.00	1.11
		2013	0.00	0.38	0.00	0.00	1.11
	Rest	2012	0.00	0.38	0.00	0.00	1.11
		2013	0.00	0.38	0.00	0.00	1.11



[Brn-Grz, burned-grazed]

Figure 5.35. Back-transformed least squares mean densities (pairs per 100 hectares) of Sprague's pipits (*Anthus spragueii*) 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.

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