Appendix 1

For:
Effects of short-interval disturbances continue to accumulate, overwhelming variability in local resilience

Katherine Hayes, Brian Buma

Table S1. Fire sequence history and size across upland and lowland plots.

Site	Plot ID #	# of Fires	Fire	Year	Fire Size (ac)
Upland	12, 41, 48, 50, 52, 64, 65	1	Fish Creek	2005	101,585
	42	1	Erickson	2003	117,156
	56, 57, 47, 16, 8, 39	2	Rogers	1967	28,675
			Fish Creek	2005	101,585
	32, 40	2	Rogers	1967	28,675
			Erickson	2003	117,156
	7, 14, 15, 54, 55	3	Rogers	1967	28,675
			132376	1991	55,978
			Fish Creek	2005	101,585
Lowland	33, 29, 28, 18, 5	1	Boglen Creek	2004	201,894
	20, 36	1	Graveyard Creek	2006	11,362
	26, 27, 4, 3, 19	2	Crazy Mountain	1953	16,702
			Boglen Creek	2004	201,894
	34	2	Central W-10	1957	49,701
			Boglen Creek	2004	201,894
	22, 17, 25, 35, 24, 23, 2	3	Central W-10	1957	49,701
			Albert Creek	1974	28,675
			Boglen Creek	2004	201,894

Table S2. Climate data from nearest Western Regional Climate Center monitoring station. Upland data comes from Seven Mile Alaska Station and Lowland data is from the Preacher Creek Station. Variables are averaged across data from January 1993 to January 2019. Winter temperature (°F) includes averages from October through March, while summer temperature (°F) extends from June through August.

Metric	Site	Mean	SD	Max	Min
Annual Precipitation (cm)	Upland	18.8	8.6	37.1	8.6
	Lowland	26.9	11.7	62	15
Winter Temp (°F)	Upland	-13.8	-7.3	8.2	-33.5
	Lowland	-12.9	-6.9	9.3	-31.5
Summer Temp (°F)	Upland	10.2	-10.2	20.3	-7.6
	Lowland	11	-10.7	19.8	-7.8

Table S3. Results from Moran's I for spatial autocorrelation in density (stem count per hectare) and basal area (square meters per hectare) of trees within upland and lowland sites.

Site	Burn History	Variable	Observed	Expected	P-value	sd
Upland	0	Density	-0.002	-0.03	0.32	0.03
		Basal Area	-0.21	-0.33	0.18	0.09
	1	Density	-0.02	-0.01	0.49	0.01
		Basal Area	-0.03	-0.14	0.19	0.09
	2	Density	-0.02	-0.01	0.76	0.01
		Basal Area	-0.07	-0.14	0.54	0.11
	3	Density	-0.02	-0.02	0.65	0.01
		Basal Area	-0.08	-0.20	0.36	0.13
Lowland	0	Density	< -0.01	-0.03	0.32	0.03
		Basal Area	-0.36	-0.33	0.87	0.18
	1	Density	-0.03	-0.02	0.60	0.02
		Basal Area	-0.30	-0.17	0.11	0.08
	2	Density	-0.02	-0.02	0.83	0.02
		Basal Area	-0.04	-0.20	0.42	0.19
	3	Density	-0.003	-0.01	0.40	0.01
		Basal Area	-0.08	-0.17	0.21	0.07

Table S4. Current species-specific composition of regeneration. Average relative proportion (stems of a species divided by total stems present) of trees and seedlings of all species between upland and lowland sites and across reburn sequence. Species not present at a given site not included.

Fires	Site		Species	Regeneration %	Standard Error (%)
0	Upland	Conifer	*Picea mariana*	87.9	2.5
		Deciduous	*Betula neoalaskana*	1.9	0.8
			Salix	10.2	2.0
	Lowland	Conifer	*Picea mariana*	97	1.5
		Deciduous	*Salix*	1.5	1
1	Upland	Conifer	*Picea mariana*	57.8	10.6
		Deciduous	*Alnus crispa*	2.6	1.7
			Betula neoalaskana	11.5	6.1
			Populus tremuloides	0.1	0.1
			Salix	28	7.9
	Lowland	Conifer	*Picea mariana*	61.7	8.3
		Deciduous	*Alnus crispa*	0.5	0.5
			Betula neoalaskana	5.5	1.9
			Populus ttremuloides	3.1	1.7
			Salix	29.3	6.7
2	Upland	Conifer	*Picea glauca*	3.9	3.9
			Picea mariana	22.3	6.8
		Deciduous	*Alnus crispa*	6.7	4.2
			Betula neoalaskana	22.7	5.6
			Populus tremuloides	4.5	3.5
			Salix	39.9	8.1
	Lowland	Conifer	*Picea mariana*	33.3	4.9
		Deciduous	*Alnus crispa*	0.3	0.2
			Betula glandulosa	0.9	0.6
			Betula neoalaskana	4.2	0.6
			Populus tremuloides	6.3	1.2
			Salix	55	4.9
3	Upland	Conifer	*Picea mariana*	1.7	1.2
		Deciduous	*Alnus crispa*	6.8	3
			Betula neoalaskana	62.9	8.7
			Populus tremuloides	0.4	0.3

		Salix	28.1	6.4
Lowland	Conifer	*Picea mariana*	4.4	4.9
	Deciduous	*Alnus crispa*	0.3	0.2
		Betula glandulosa	2.7	1.3
		Betula neoalaskana	11	3.9
		Populus balsamifera	0.1	0.1
		Populus tremuloides	23.5	6.8
		Salix	58	7.7

Table S5. Model parameters of competing model structure.

Model	Model Structure	Null Dev.	Resid. Dev.	df	RSME	AIC
Conif. Density	Fire + Site + (Fire * Site)	124.6	50.5	36	0.94	**924.4**
	Fire + Site + Slope + (Fire * Site)			35	0.94	926.4
Decid. Density	Fire + Site + (Fire * Site)	59.6	49.6	36	1.27	**1087.6**
	Fire + Site + Slope + (Fire * Site)			35	1.27	1089.6
Decid. BA	Fire + Site + (Fire * Site)	77.4	25.8	36	0.80	55.2
	Fire + Site + Slope + (Fire * Site)		24.1	35	0.73	**54.1**

Figure S1. Histograms of topographic variables of Upland and Lowland Plots. Dotted vertical lines represent mean of site. A) Distribution of slope (degrees) of plots. Upland plots were more steeply sloped on average than lowland plots. B) Histogram of plot elevation (meters above sea level). Lowland plots were generally lower in elevation than upland plots. C) Annual average solar radiation (watts per square meter). Upland plots received greater annual solar radiation on average than lowland plots.

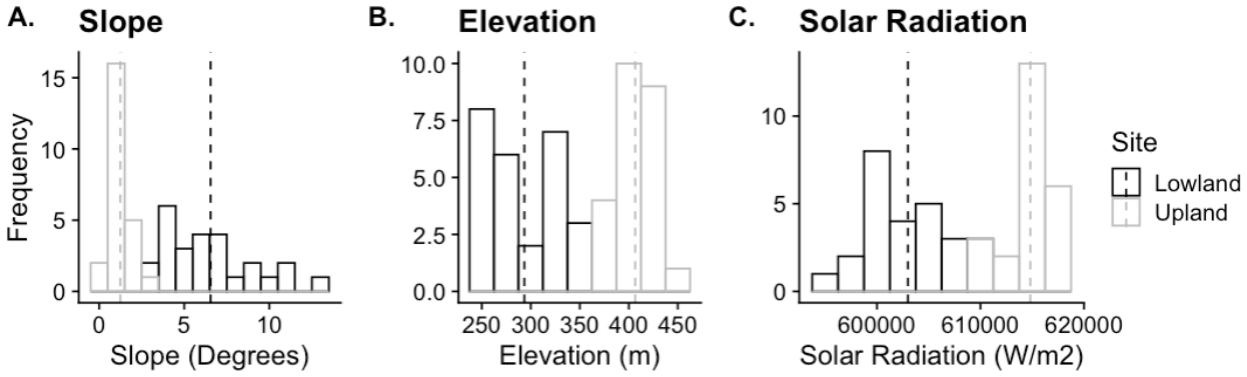
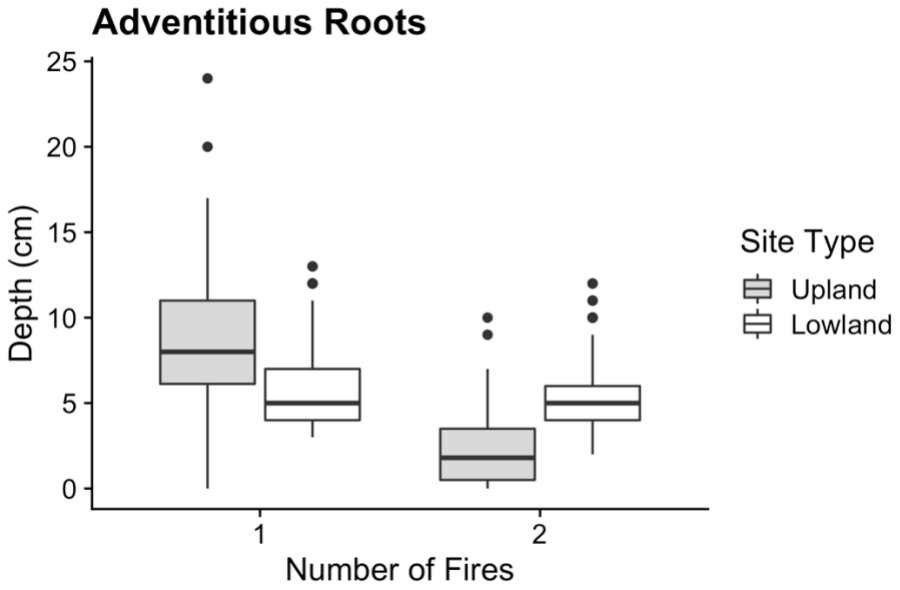


Figure S2. Adventitious root depth (cm). Distance in centimeters between highest adventitious black spruce roots to soil surface according to number of fires.



Adventitious roots were only available to sample in once- and twice-burned plots, as thrice-burned plots had no black spruce snags left to assess. Depth of adventitious roots implied greater fire intensity (soil consumption) in upland plots, particularly after one fire.