**Appendix 1**

For:

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

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Table S1: Plot details including fire name and fire size.

Table S2: Site level climate data

Table S3: Spatial correlation analysis results

Table S4: Canopy and understory composition by plot and site

Table S5: Dunn’s pairwise comparison; detailed results

Table S6: Mixed modeling parameter results and confidence intervals

Figure S1: Comparison of topographic indices between upland and lowland sites

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

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| 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 |

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| 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 includes averages from October through March, while summer temperature extends from June through August. | | | | | |
| Metric | Site | Mean | SD | Max | Min |
| Annual Precipitation (in) | Upland | 7.4 | 3.4 | 14.6 | 3.4 |
| Lowland | 10.6 | 4.6 | 24.4 | 5.9 |
| Winter Temp | Upland | 7.1 | 18.9 | 46.8 | -28.4 |
| Lowland | 8.8 | 19.6 | 48.7 | -24.7 |
| Summer Temp | Upland | 50.4 | 13.6 | 68.6 | 18.3 |
| Lowland | 51.9 | 12.8 | 67.7 | 18 |

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| 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. Significant p-values marked in bold. | | | | | | |
| Site | Burn History | Variable | Observed | Expected | P-value | sd |
| Upland | 0 | Density | -0.02 | -0.02 | 0.88 | 0.02 |
| Basal Area | -0.01 | -0.07 | 0.26 | 0.05 |
| 1 | Density | -0.02 | -0.01 | 0.30 | 0.01 |
| Basal Area | -0.05 | -0.03 | 0.35 | 0.02 |
| 2 | Density | -0.02 | -0.01 | 0.37 | 0.01 |
| Basal Area | -0.01 | -0.03 | 0.51 | 0.03 |
| 3 | Density | -0.03 | -0.01 | **0.03** | 0.01 |
| Basal Area | -0.01 | -0.04 | 0.41 | 0.03 |
| Lowland | 0 | Density | -0.01 | -0.02 | 0.51 | 0.02 |
| Basal Area | -0.01 | -0.07 | 0.35 | 0.06 |
| 1 | Density | -0.01 | -0.01 | 0.61 | 0.01 |
| Basal Area | -0.01 | -0.04 | 0.42 | 0.04 |
| 2 | Density | -0.04 | -0.01 | **0.01** | 0.01 |
| Basal Area | -0.03 | -0.04 | 0.80 | 0.04 |
| 3 | Density | -0.003 | -0.01 | 0.40 | 0.01 |
| Basal Area | -0.01 | -0.03 | 0.40 | 0.02 |

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| Table S4.Current composition of canopy and understory. Average relative proportion 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. Bolded numbers represent species most present on average within site and number of fires. | | | | | | |
| Fires | Site | Species | Tree % | Tree SD (%) | Seedling % | Seed SD (%) |
| 0 | Upland | *B. neoalaskana* | 2.8 | 2.1 | 0.7 | 1.4 |
| ***P. mariana*** | **91.7** | **2.7** | **86.8** | **11.5** |
| *Salix* | 5.4 | 3.3 | 12.5 | 10.2 |
| Lowland | ***P. mariana*** | **99** | **0.7** | **98.1** | **3.8** |
| *Salix* | 0.9 | 0.7 | 1.9 | 3.8 |
| 1 | Upland | *A. crispa* | 14.4 | 11.5 | 7.6 | 16 |
| ***B. neoalaskana*** | **22.6** | **30.8** | 13.7 | 16.6 |
| *P. mariana* | 6.5 | 10.6 | **51.8** | **37.6** |
| *Salix* | 13.1 | 21.4 |  |  |
| Lowland | *A. crispa* | 14 | 21.9 | 0.4 | 1 |
| *B. glandulosa* | 5 | 11.2 |  |  |
| *B. neoalaskana* | 25 | 43.3 | 3.9 | 4.3 |
| *P. mariana* | 16 | 35.8 | **62.4** | **18.9** |
| *P. tremuloides* |  |  | 2.7 | 4.04 |
| ***Salix*** | **40** | **54.8** | 30.6 | 15.8 |
| 2 | Upland | *A. crispa* | 15 | 26.4 | 6.7 | 13.8 |
| ***B. neoalaskana*** | **62.2** | **24.7** | 8 | 10.8 |
| *P. glauca* |  |  | 7.3 | 20.5 |
| *P. mariana* |  |  | 29 | 23.3 |
| *P. tremuloides* | 0.8 | 2.5 | 12 | 31.5 |
| *Salix* | 21.9 | 17.8 | **36.9** | **30** |
| Lowland | *A. crispa* | 25 | 50 | 0.3 | 0.5 |
| *B. glandulosa* |  |  | 0.8 | 1.4 |
| ***B. neoalaskana*** | **50** | **40.8** | 3.7 | 1.4 |
| *P. mariana* |  |  | 33.8 | 12.3 |
| *P. tremuloides* |  |  | 6.3 | 3.1 |
| *Salix* | 25 | 28.9 | **55** | **12.5** |
| 3 | Upland | *A. crispa* | 21 | 26.5 | 4.8 | 6.19 |
| ***B. neoalaskana*** | **50** | **35.7** | **57.9** | **30.8** |
| *P. mariana* |  |  | 2.3 | 3.2 |
| *P. tremuloides* |  |  | 0.2 | 0.4 |
| *Salix* | 29 | 17.5 | 34.7 | 29 |
| Lowland | *A. crispa* |  |  | 0.3 | 0.5 |
| *B. glandulosa* | 3.4 | 8.9 | 2.8 | 3.5 |
| *B. neoalaskana* | 6.4 | 6.4 | 11.6 | 11 |
| *P. balsamifera* | 0.8 | 2.2 |  |  |
| *P. mariana* |  |  | 4.9 | 5.6 |
| ***P. tremuloides*** | **49** | **31.4** | 21.1 | 18 |
| *Salix* | 40.3 | 24.1 | **59.3** | **21.9** |

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| Table S5. Results from comparison of conifer and deciduous tree basal area (m2/Ha) and densities of conifer and deciduous trees (stem/ha) across reburn sequence and between topographic position using Dunn’s multiple pairwise comparison test. P-values adjusted with Holm-Bonferonni correction. Only sequential comparison results presented. Significance of effect indicated as follows\*\*\* p ≤ 1e-04, \*\* p ≤ 0.01, \* p ≤ 0.05. | | | | | | | | | |
| Metric | Division | Site | Comparison | n1 | n2 | statistic | p | Adjust. p | Sig |
| Density | Conifer | Upland | 1 vs 2 | 80 | 80 | -3.78 | 1.5e-4 | 3.1e-4 | \*\*\* |
| 2 vs 3 | 90 | 60 | -1.12 | 0.26 | 0.26 |  |
| Lowland | 1 vs 2 | 98 | 84 | -1.46 | 0.14 | 0.29 |  |
| 2 vs 3 | 84 | 98 | 2.33 | 0.02 | 0.06 |  |
| Deciduous | Upland | 1 vs 2 | 80 | 80 | 6.59 | 4.4e-11 | 1.3e-10 | \*\*\* |
| 2 vs 3 | 80 | 60 | 0.17 | 0.87 | 0.87 |  |
| Lowland | 1 vs 2 | 98 | 84 | 0.55 | 0.58 | 0.58 |  |
| 2 vs 3 | 84 | 98 | 8.25 | 1.64e-16 | 3.29e-16 | \*\*\* |
| Basal Area | Conifer | Upland | 1 vs 2 | 8 | 8 | -1.73 | 0.08 | 0.17 | \* |
| 2 vs 3 | 8 | 6 | -0.53 | 0.59 | 0.59 |  |
| Lowland | 1 vs 2 | 6 | 6 | 0.17 | 0.86 | 0.86 |  |
| 2 vs 3 | 6 | 8 | 0.90 | 0.37 | 0.83 |  |
| Deciduous | Upland | 1 vs 2 | 8 | 8 | 2.69 | <0.01 | 0.02 | \* |
| 2 vs 3 | 8 | 6 | -0.33 | 0.74 | 0.74 |  |
| Lowland | 1 vs 2 | 6 | 6 | -0.63 | 0.53 | 0.53 |  |
| 2 vs 3 | 6 | 8 | 2.75 | <0.01 | 0.02 | \* |

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| Table S6.Parameters of site attribute regen models including bootstrapped CI, t, df and p-values based on Wald approximation. Significant p-values are in bold. | | | | | | | | |
| Metric | Division | Effect | Coeff. | SE | 95% CI | t | df | p |
| Density | Conifer | Intercept | 9.27 | 12.36 | (-14.96, 33.5) | 0.75 | 495 | 0.45 |
| Av. OL | - 11.82 | 5.32 | (-22.25, -1.39) | - 2.22 | 495 | **0.03** |
| Exp. Min | - 5.09 | 2.77 | (-10.52, 0.34) | - 1.84 | 495 | **0.01** |
| Decid. | Intercept | 888.67 | 850.1 | (202.49, 1574.86) | 2.54 | 494 | **0.01** |
| Slope | 484.77 | 87.76 | (312.76, 656.78) | 5.52 | 494 | **<.01** |
| Av. OL | - 349.84 | 144.92 | (-633.88, -65.80) | -2.41 | 494 | **0.02** |
| Exp. Min | -340.08 | 86.91 | (-510.43, -169.73) | -3.91 | 494 | **<.01** |
| Basal Area | Conifer | Intercept | 0.04 | 0.05 | (-0.05, 0.13) | 0.85 | 35 | 0.39 |
| Slope | 0.01 | 0.06 | (-0.10, 0.12) | 0.19 | 35 | 0.85 |
| Solar | 0.03 | 0.05 | (-0.08, 0.14) | 0.54 | 35 | 0.59 |
| Av. OL | 0.00 | 0.04 | (-0.08, -0.07) | -0.13 | 35 | 0.89 |
| Exp. Min | -0.01 | 0.04 | (-0.09, 0.07) | -0.22 | 35 | 0.82 |
| Decid. | Intercept | 0.79 | 0.3 | (0.2, 1.38) | 2.62 | 120 | **<.01** |
| Slope | -0.44 | 0.22 | (-0.87, 0.00) | -1.96 | 120 | **0.05** |
| Av. OL | -0.46 | 0.16 | (-0.68. -0.04) | -2.23 | 120 | **0.03** |
| Exp. Min | 0.5 | 0.18 | (0.15, 0.85) | 2.82 | 120 | **<.01** |

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.

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