Supporting Information for

Modern pyromes: Biogeographical patterns of fire characteristics across the contiguous United States

Megan E. Cattau, Adam Mahood, Jennifer K. Balch, and Carol Wessman

Megan E. Cattau
Email: megancattau@boisestate.edu

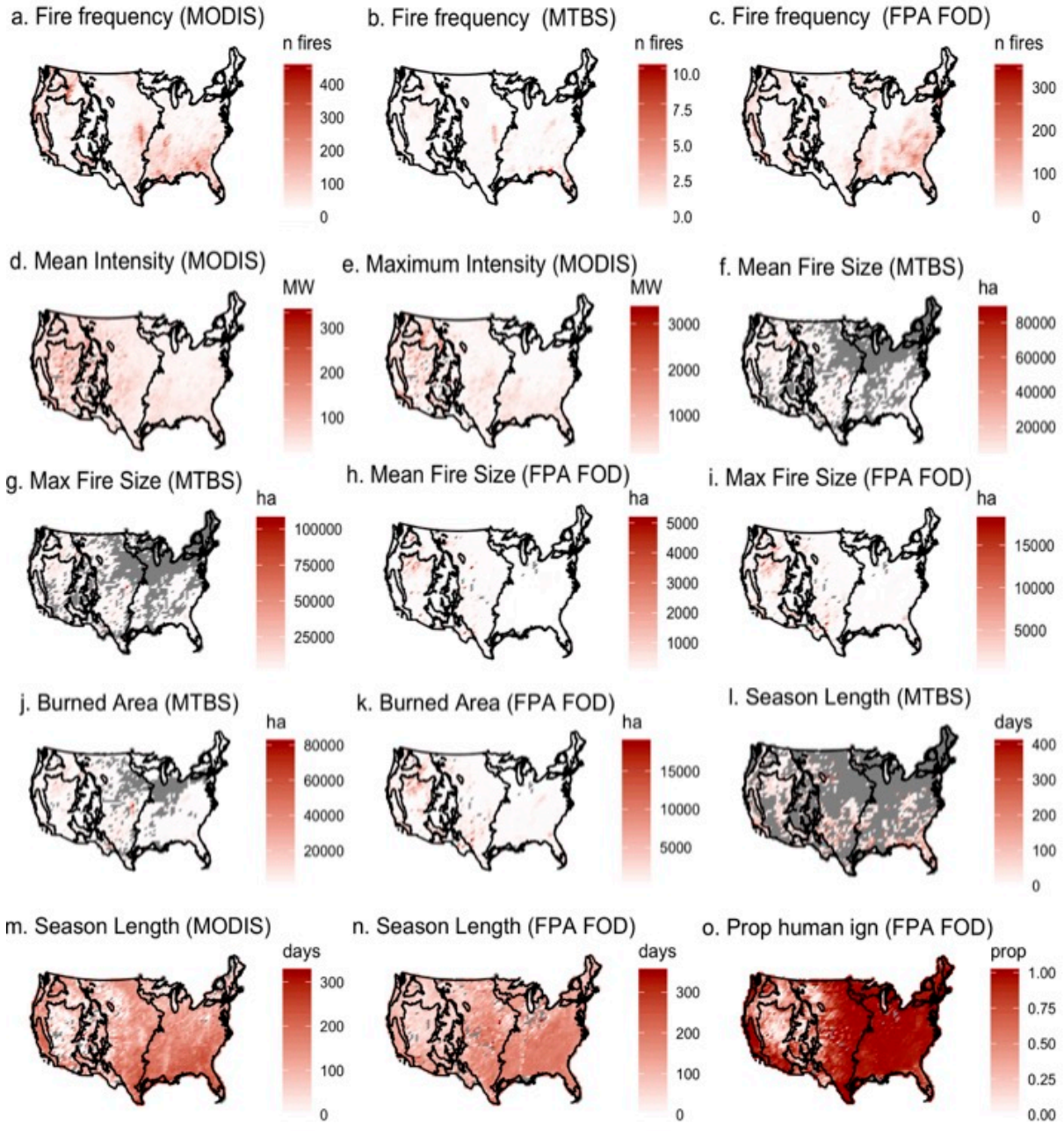


Figure S1. Derived fire characteristics across the contiguous United States. Mean values per pixel over the time period of the relevant dataset for a) Fire frequency in number of fires (n) (Moderate Resolution Imaging Spectroradiometer (MODIS)), b) Fire frequency in n (Monitoring Trends in Burn Severity (MTBS)), c) Fire frequency in n (Fire Program Analysis fire-occurrence database (FPA-FOD)), d) Mean fire radiative power (FRP) in Megawatts (MW) (MODIS), e) Maximum FRP in MW (MODIS), f) Mean area in hectares (ha) (MTBS), g) Maximum area in ha (MTBS), h) Mean area in ha (FPA-FOD), i) Maximum area in ha (FPA-FOD), j) Sum area in ha (MTBS), k) Sum area in ha (FPA-FOD), l) Season length, standard deviation Julian Day (JD)*2, in days (MODIS), m) Season length, standard deviation JD*2, in days (MTBS), n) Season length, standard deviation JD*2, in days (FPA-FOD), and o) Proportion of fires human ignited (FPA-FOD).

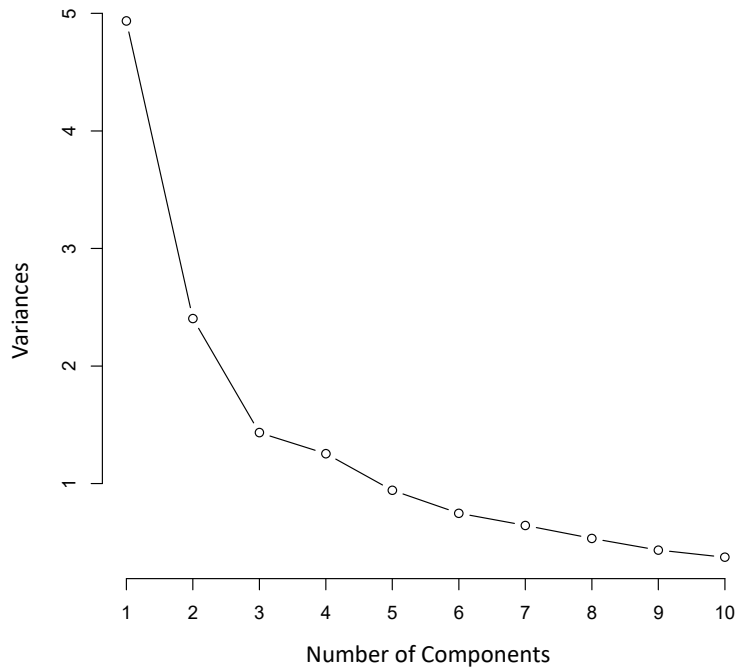


Figure S2. Scree plot. The variances, or amount of the total variation in the dataset (i.e., fire characteristics derived for the contiguous United States), captured as a function of the number of components from a Principal Components Analysis (PCA). The PCA was conducted to determine which fire variables accounted for most of the variance in the data and thus which variables to use to define the pyromes. We determined how many PCA components to keep for further analysis using the Kaiser criterion (Table S1) and by evaluating this scree plot. Because the amount of variance explained by retaining additional components after four components is small, we retained the first four components for further analysis. The first four PCA components explained ~72% of the cumulative variance.

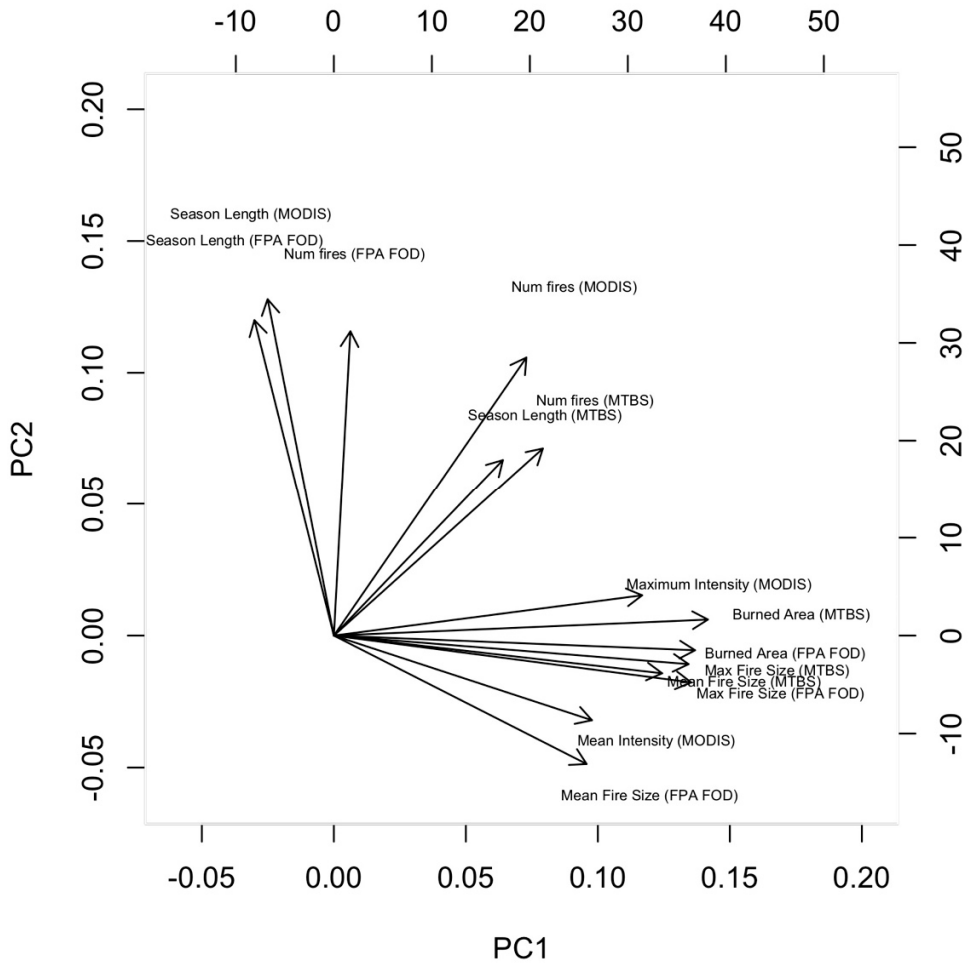


Figure S3. Biplot of Principal Components Analysis (PCA). The biplot used all derived fire characteristics across the contiguous United States and was conducted to determine which fire variables accounted for most of the variance in the data and thus which variables to use to define the pyromes. After determining to keep the first four PCA components based on the Kaiser criterion (Table S1) and by evaluating a scree plot (Figure S2), we determined which of the fire characteristics were associated with these four components using statistical analysis (Table S2) and by evaluating this biplot and dotplots (Figure S4). The x and y axes on this biplot show PCA scores of the samples on components 1 and 2, and the top and right axes show the loadings (i.e., correlation) of the samples on components 1 and 2, which can be used to interpret how strongly each of the original fire characteristics variables (displayed with arrows) influenced the principal components. Every variable in this suite loads significantly onto at least one of the components, so we retain all fire variables for the clustering analysis. These variables included all of those listed in Table 1 except ignition type: the mean pixel values for the number of fires (Moderate Resolution Imaging Spectroradiometer (MODIS), Monitoring Trends in Burn Severity (MTBS), and Fire Program Analysis fire-occurrence database (FPA-FOD)); mean and maximum fire radiative power (FRP) (MODIS); mean, maximum, and sum area (MTBS and FPA-FOD); Standard deviation Julian Day (JD)*2 (MODIS, MTBS, and FPA-FOD); and proportion of fires human ignited (FPA-FOD).

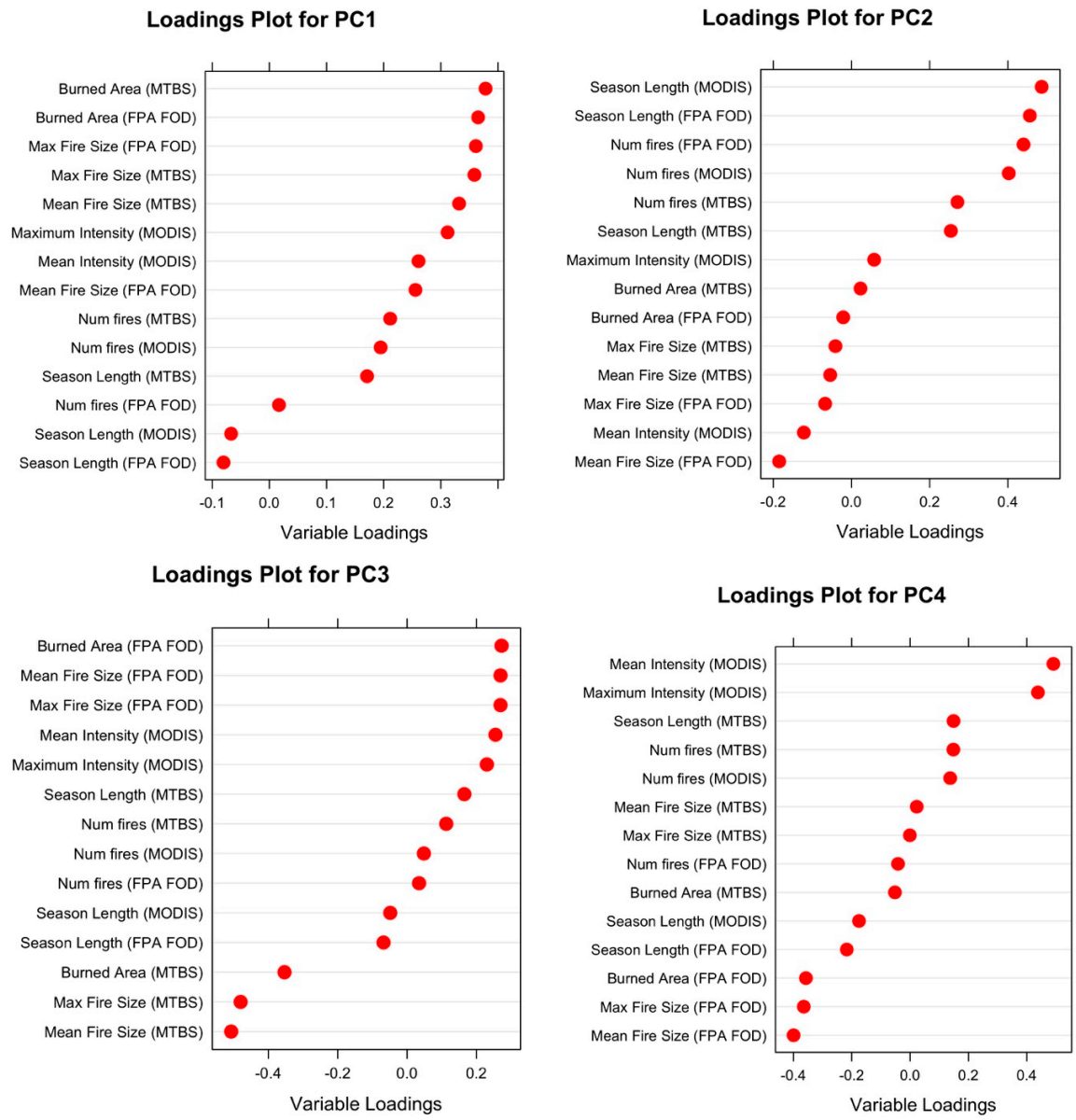


Figure S4. Dotplots for the Principal Components Analysis (PCA). The dotplots show the loadings (i.e., correlation) of the fire characteristics variables on each of Principal Components Analysis (PCA) components 1-4. The PCA analysis used all derived fire characteristics across the contiguous United States and was conducted to determine which fire variables accounted for most of the variance in the data and thus which variables to use to define the pyromes. After determining to keep the first four PCA components based on the Kaiser criterion (Table S1) and by evaluating a scree plot (Figure S2), we determined which of the fire characteristics were associated with these four components using statistical analysis (Table S2) and by evaluating a biplot (Figure S3) and these dotplots. Every variable in this suite loads significantly onto at least one of the components 1-4, so we retain all fire variables for the clustering analysis. These variables included all of those listed in Table 1 except ignition type: the mean pixel values for the number of fires (Moderate Resolution Imaging Spectroradiometer (MODIS), Monitoring Trends in Burn Severity (MTBS), and Fire Program Analysis fire-occurrence database (FPA-FOD)); mean and maximum fire radiative power (FRP) (MODIS); mean, maximum, and sum area (MTBS and FPA-FOD); Standard

deviation Julian Day (JD)*2 (MODIS, MTBS, and FPA-FOD); and proportion of fires human ignited (FPA-FOD).

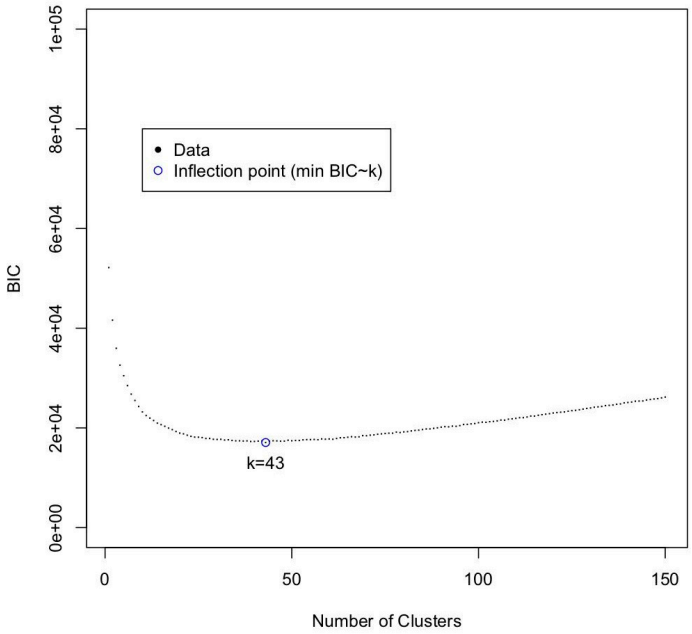


Figure S5. Bayesian Information Criterion (BIC) scores. The BIC scores as a function of number of clusters (*k*) for k=2-150 from a k-means unsupervised clustering analysis on all derived fire characteristics across the contiguous United States. The clustering analysis aimed to identify unique groups of pixels that share similar fire characteristics (i.e., pyromes). Because the number of clusters (*k*) must be specified but the ideal number of clusters was not known *a priori*, we ran the algorithm specifying 2-150 *k*. The maximum number of pyromes occured at *k* at which adding additional clusters increased the BIC (i.e., the threshold of *k* at which adding additional clusters no longer improved model fit). We identified this threshold at *k*=43, so the most finely partitioned level in the final pyrome classification scheme includes 43 pyromes.

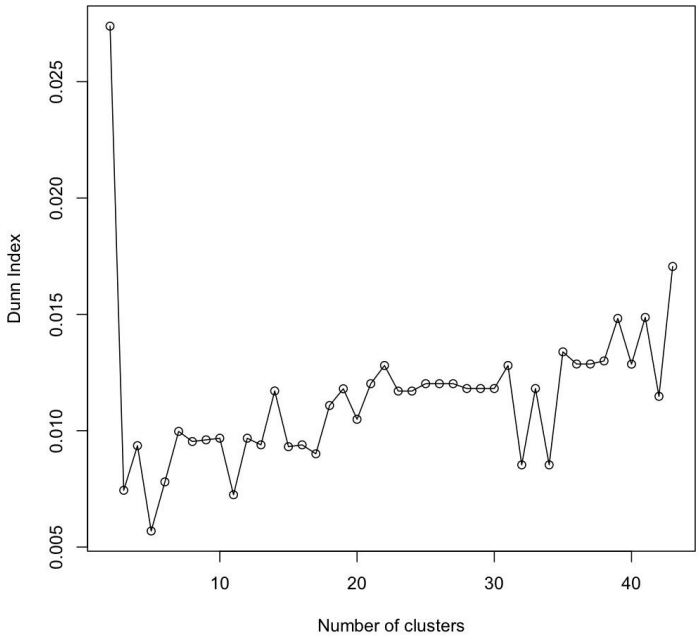


Figure S6. Dunn Index. The Dunn Index as a function of number of clusters (*k*) for k=2-43 from a k-means unsupervised clustering analysis on all derived fire characteristics across the contiguous United States. The clustering analysis aimed to identify unique groups of pixels that share similar fire characteristics (i.e., pyromes). The maximum number of possible pyromes occurs at k=43, as identified by examining the Bayesian Information Criterion (BIC) (Figure S5). We then determined how many clusters to retain for each level of the pyromes classification by examining $k = 2{:}43$ and identifying all *k* which had the highest corresponding Dunn Indices (i.e., a local maxima across the set). A local maxima Dunn Index indicated clusters that maximized separation between clusters and compactness within clusters, relative to their neighbors. These local maxima occur at k = 2, 4, 7, 10, 12, 14, 16, 19, 22, 31, 33, 35, 39, 41, and 43, which indicated the number of pyromes in each level in the final pyrome classification scheme.

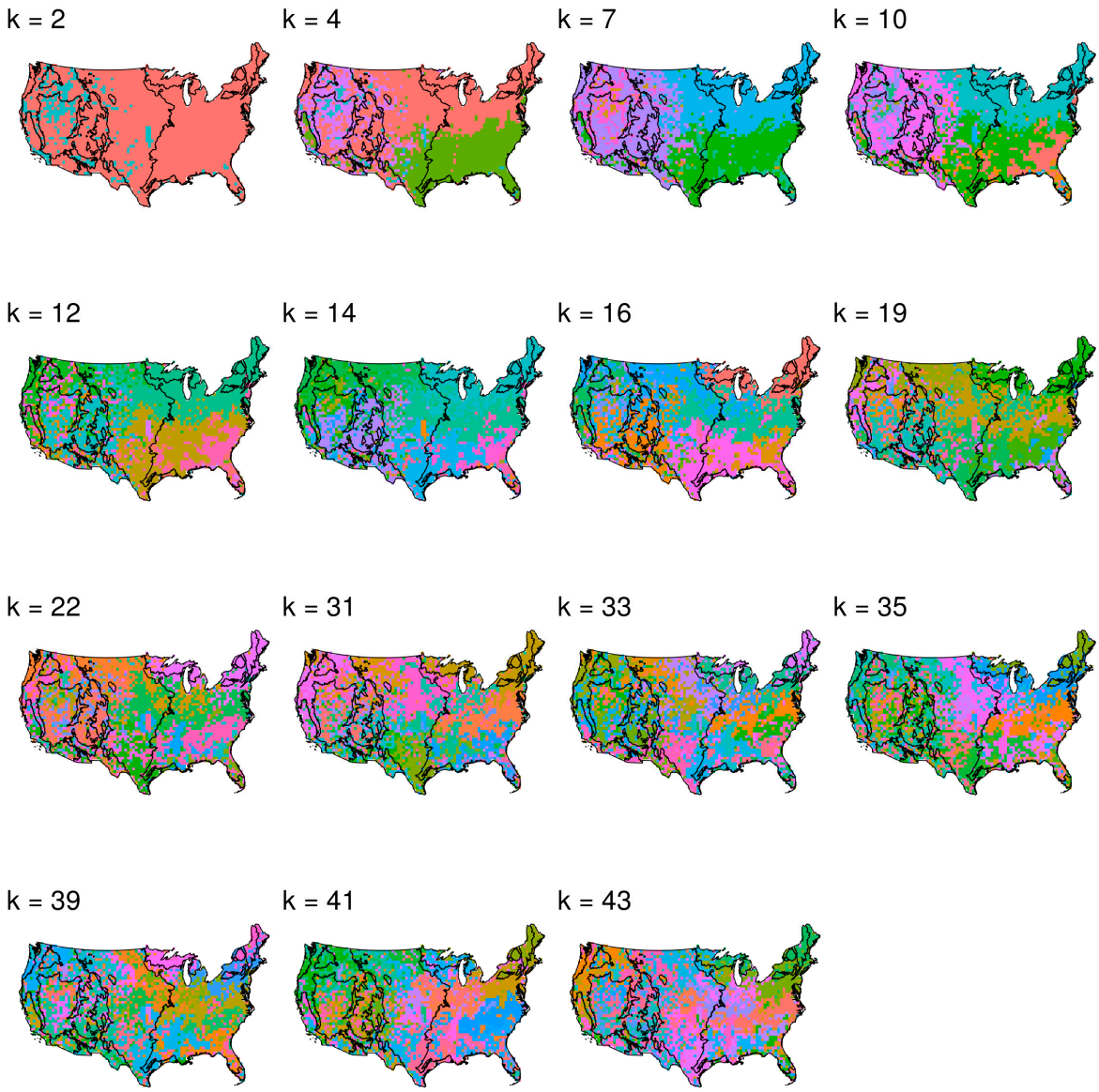


Figure S7. The number of final clusters, or pyromes. These clusters were derived at *k* = 2, 4, 7, 10, 12, 14, 16, 19, 22, 31, 33, 35, 39, 41, and 43 from a k-means unsupervised clustering analysis on all derived fire characteristics across the contiguous United States. The maximum number of clusters (k) was determined by examining the Bayesian Information Criteria (BIC) for all possible k = 2-150 (Figure S5), and the number of clusters (k) in each level was determined by examining the Dunn Index for all possible k = 2-43 (Figure S6). Each map represents a level in the final pyrome classification scheme.

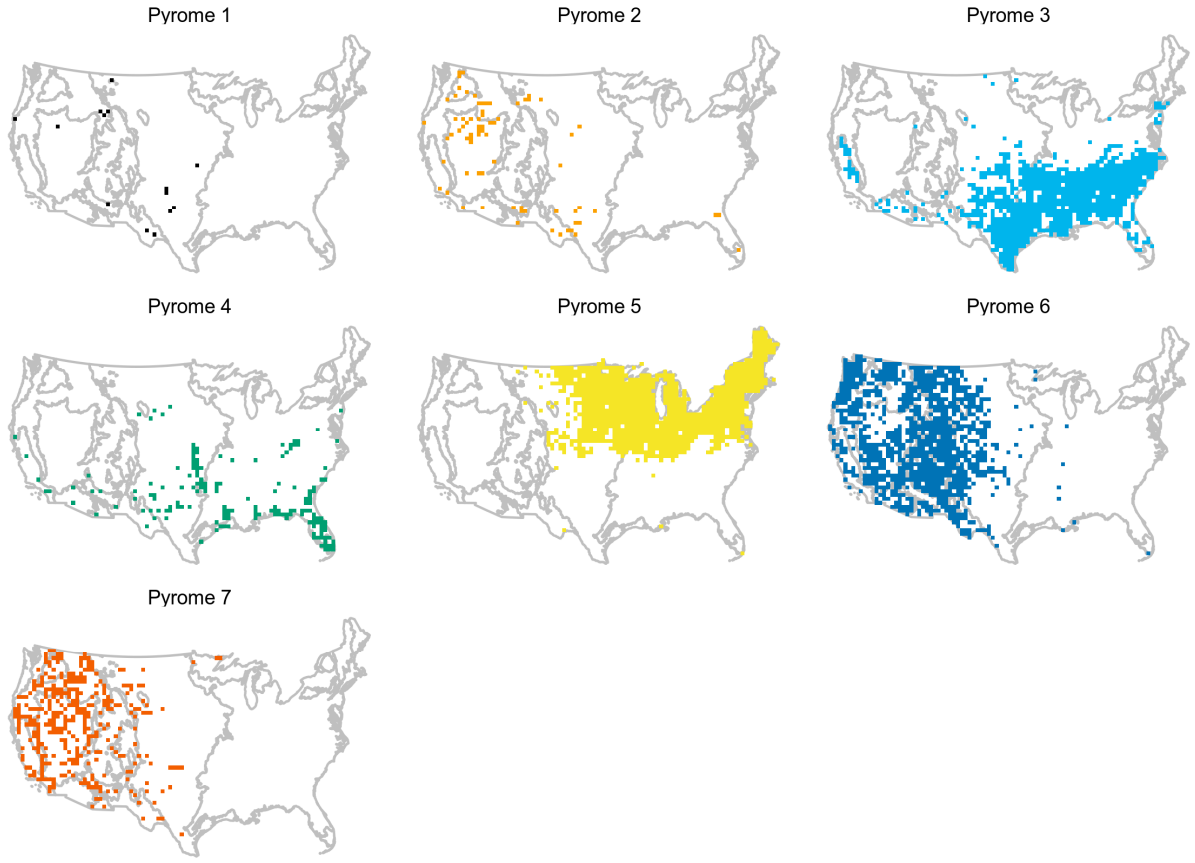


Figure S8. Disaggregated pyromes 1-7. These pyromes were derived at pyrome classification level k = 7 from a k-means unsupervised clustering analysis on all derived fire characteristics across the contiguous United States. This represents the third-level classification from a classification scheme with levels at *k* = 2, 4, 7, 10, 12, 14, 16, 19, 22, 31, 33, 35, 39, 41, and 43. The number of clusters (k) in each level was determined by examining the Dunn Index for all possible k = 2-43 (Figure S6).

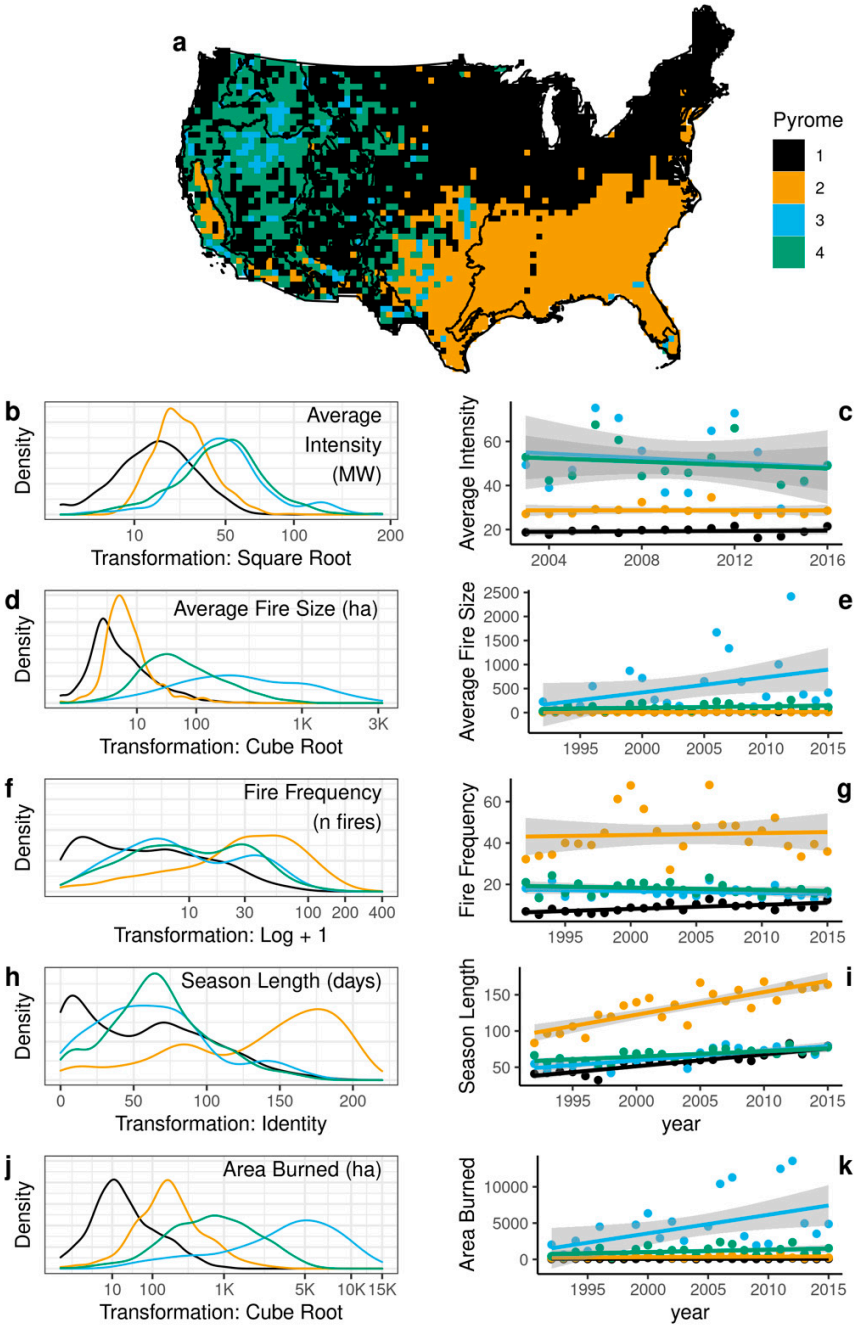


Figure S9. Pyrome classification scheme for k=4 in the contiguous U.S. (**a**) The pyrome map with Environmental Protection Agency (EPA) level 1 ecoregions displayed as black outlines. For each pyrome, the distributions and temporal trends are shown for the following characteristics: (**b**) and (**c**) fire intensity (mean Fire Radiative Power (FRP) from the Moderate Resolution Imaging Spectroradiometer (MODIS) in Megawatts (MW)); (**d**) and (**e**) fire event size (mean area from the Fire Program Analysis fire-occurrence database (FPA-FOD) in hectares (ha); (**f**) and (**g**) frequency (number of fires from the FPA-FOD); (**h**) and (**i**) season length (2*sd Julian day from the FPA-FOD in days); and (**j**) and (**k**) burned area (sum area from the FPA-FOD in ha). All values are annual pixel means for each pyrome. For change over time, dots represent the average value for each year for each pyrome, the trend lines (with error) were determined with linear regression. Black lines on the maps represent EPA Level I Ecoregions.

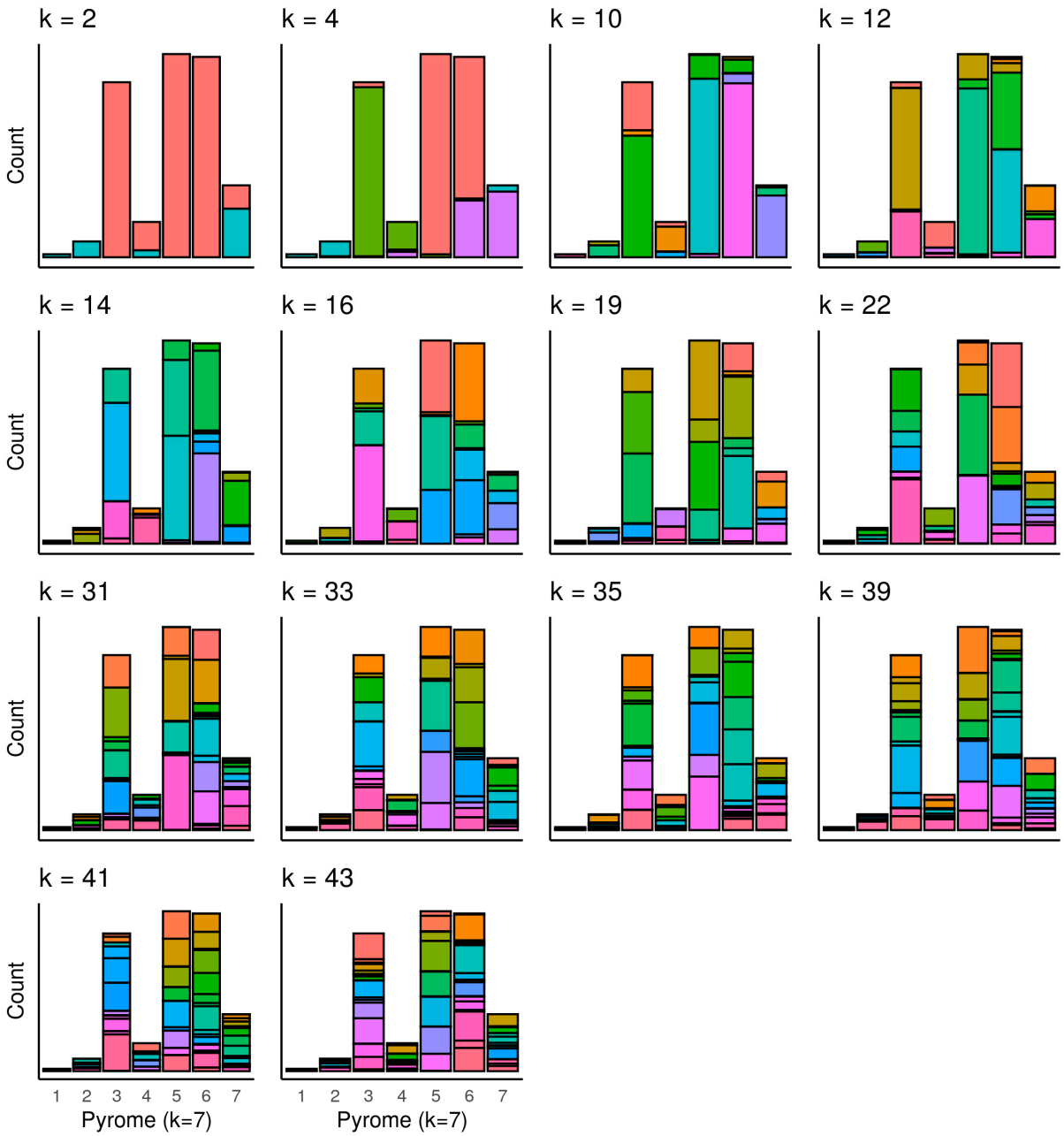


Figure S10. The nestedness of pyromes 1-7 at pyrome classification level $k = 7$. Comparisons with pyromes at levels at $k = 2, 4, 10, 12, 14, 16, 19, 22, 31, 33, 35, 39, 41$, and 43. These panels display each pixel colored by the membership at the values of k noted above and grouped by the membership at $k = 7$. These pyromes were derived from a k-means unsupervised clustering analysis on all derived fire characteristics across the contiguous United States. The number of clusters (k) in each level was determined by examining the Dunn Index for all possible $k = 2$-43 (Figure S6).

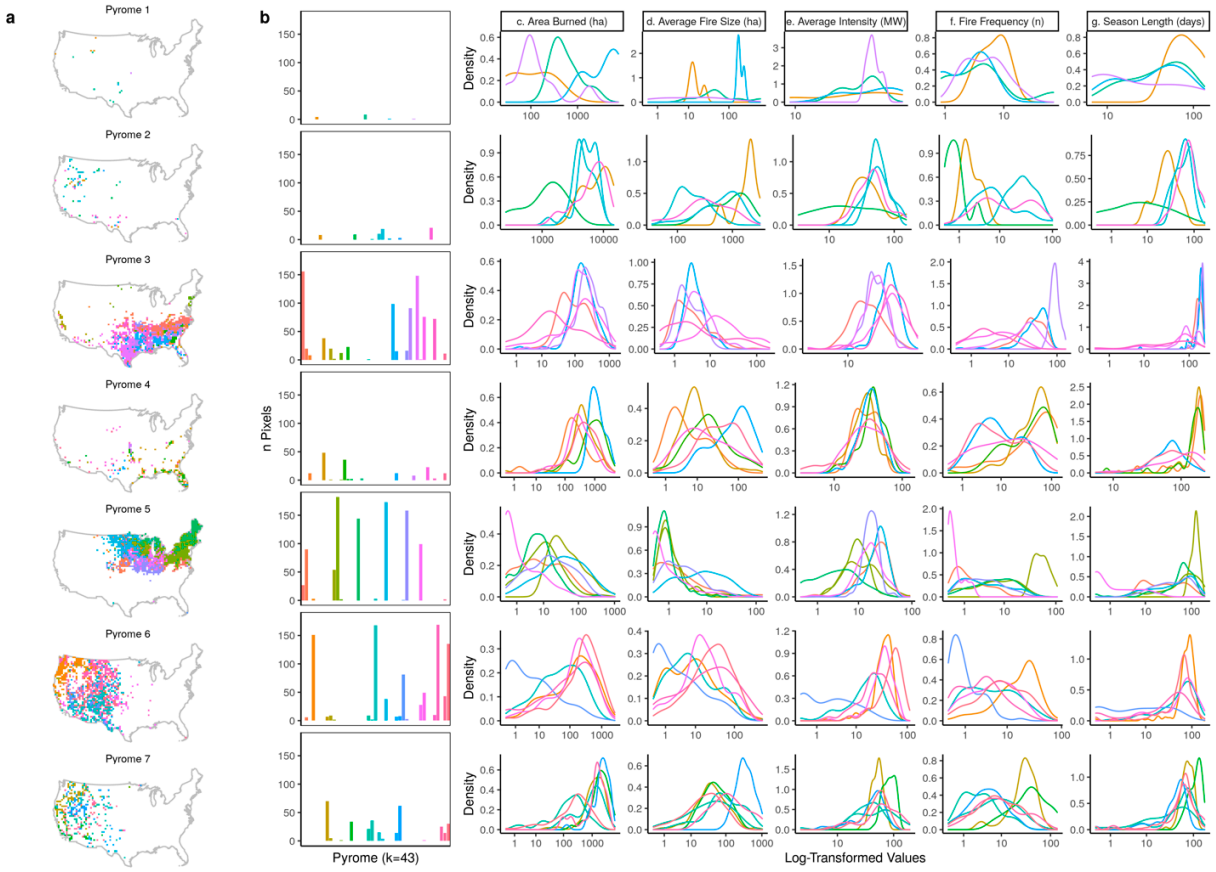
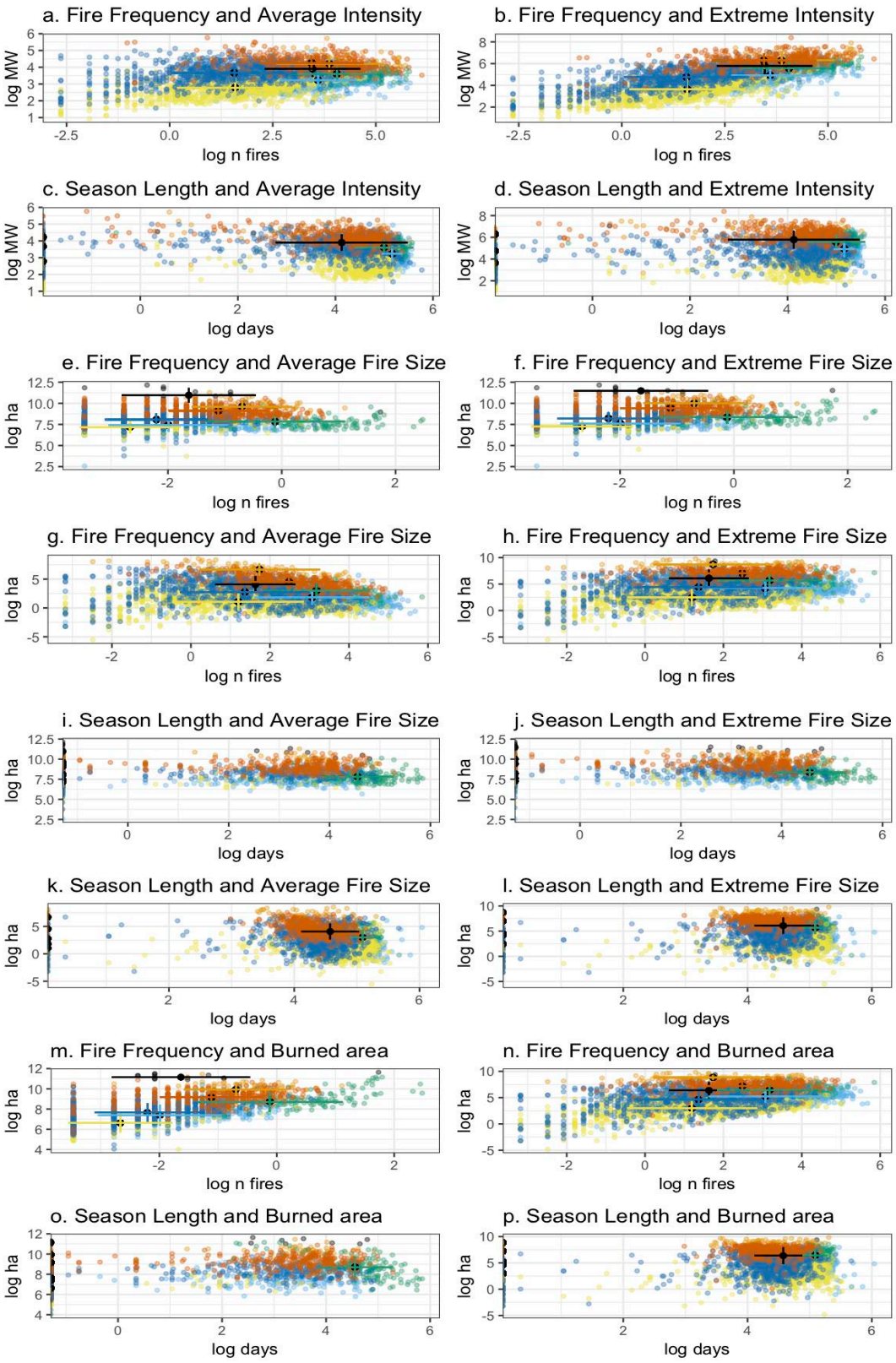


Figure S11. Heterogenity of pyromes 1-7 at pyrome classification level $k = 7$ described by pyromes at level $k = 43$. These panels display each pixel colored by membership at $k = 43$ and grouped by membership at level $k = 7$ a) in geographic space and b) as frequency distributions, as well as the distribution of the values of fire characteristics, including c) burned area (sum area from the Fire Program Analysis fire-occurrence database (FPA-FOD)), d) size (mean area (FPA-FOD)), e) intensity (mean Fire Radiative Power (FRP) from the Moderate Resolution Imaging Spectroradiometer (MODIS)), f) frequency (number of fires (FPA-FOD)), and g) season length (2*sd Julian day (FPA-FOD)). These pyromes were derived from a k-means unsupervised clustering analysis on all derived fire characteristics across the contiguous United States. The number of clusters (k) in each level was determined by examining the Dunn Index for all possible k = 2-43 (Figure S6).


a. Fire Frequency and Average Intensity
log MW
log n fires
b. Fire Frequency and Extreme Intensity
log MW
log n fires
c. Season Length and Average Intensity
log MW
log days
d. Season Length and Extreme Intensity
log MW
log days
e. Fire Frequency and Average Fire Size
log ha
log n fires
f. Fire Frequency and Extreme Fire Size
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g. Fire Frequency and Average Fire Size
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log n fires
h. Fire Frequency and Extreme Fire Size
log ha
log n fires
i. Season Length and Average Fire Size
log ha
log days
j. Season Length and Extreme Fire Size
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k. Season Length and Average Fire Size
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l. Season Length and Extreme Fire Size
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m. Fire Frequency and Burned area
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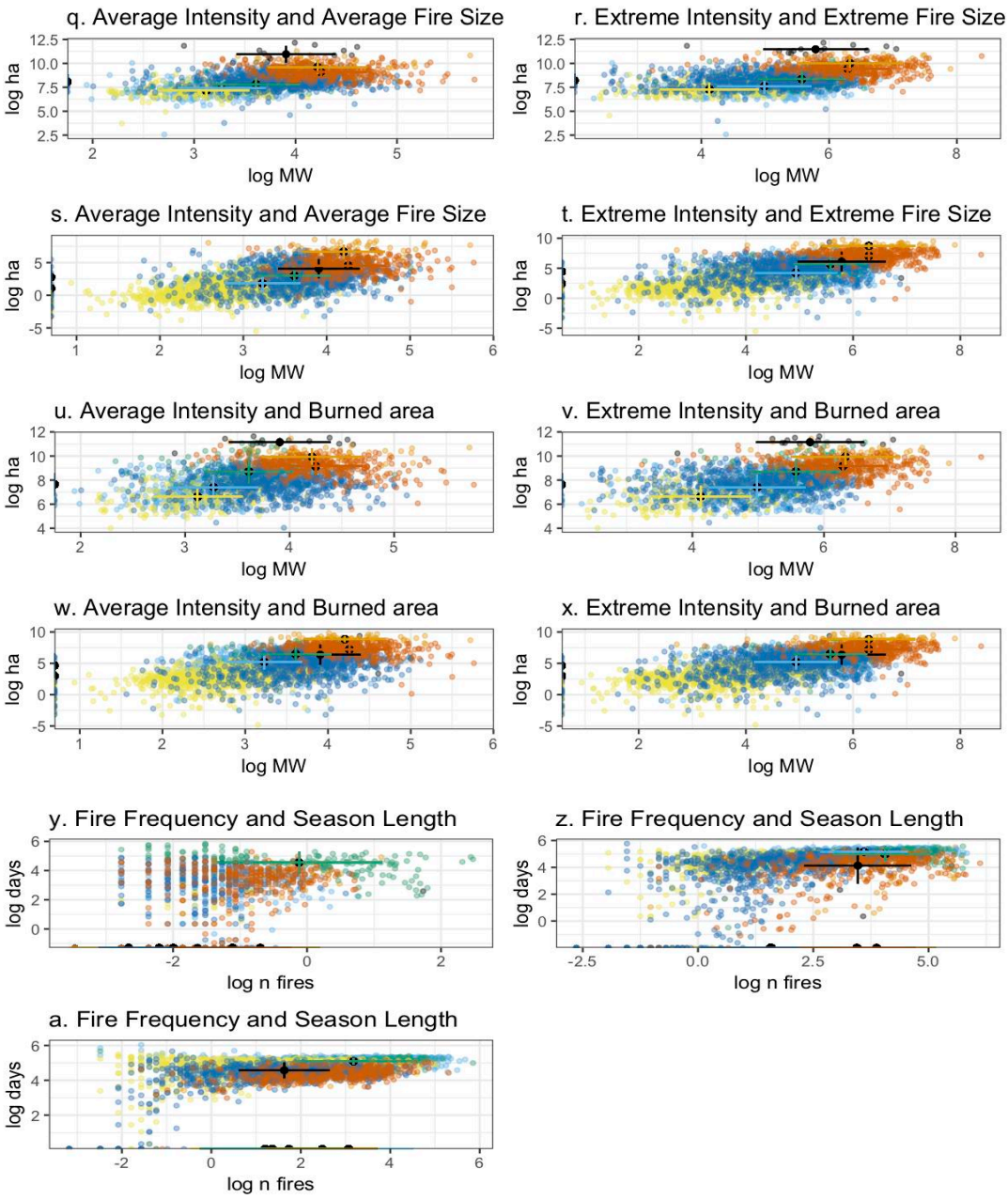

Figure S12. The multidimensional space that U.S. pyromes occupy, or trade-offs in fire characteristic by pyrome, at pyrome classification level k = 7, including **fire frequency and intensity** - a) number of fires MODIS and mean FRP MODIS and b) number of fires MODIS and maximum FRP MODIS - , **season length and intensity** - c) 2 * Std JD MODIS and mean FRP MODIS and d) 2 * Std JD MODIS and maximum FRP MODIS - , **fire frequency and fire event size** - e) number of fires MTBS and mean fire event size MTBS, f) number of fires MTBS and maximum fire event size MTBS, g) number of fires FPA-FOD and mean fire event size FPA-FOD, and h) number of fires FPA-FOD and maximum fire event size FPA-FOD - , **season length and fire event size** - i) 2 * Std JD MTBS and mean fire event size MTBS, j) 2 * Std JD MTBS and maximum fire event size MTBS, k) 2 * Std JD FPA-FOD and mean fire event size FPA-FOD, and l) 2 * Std JD FPA-FOD and maximum fire event size FPA-FOD - , **fire frequency and**

burned area - m) number of fires MTBS and sum area MTBS and n) number of fires FPA-FOD and sum area FPA-FOD - , **season length and burned area** - o) 2 * Std JD MTBS and sum area MTBS and p) 2 * Std JD FPA-FOD and sum area FPA-FOD - , **fire intensity and fire event size** - q) mean FRP MODIS and mean fire event size MTBS, r) maximum FRP MODIS and maximum fire event size MTBS, s) mean FRP MODIS and mean fire event size FPA-FOD, t) maximum FRP MODIS and maximum fire event size FPA-FOD - , **fire intensity and burned area** - u) mean FRP MODIS and sum area MTBS, v) maximum FRP MODIS and sum area MTBS, w) mean FRP MODIS and sum area FPA-FOD, x) maximum FRP MODIS and sum area FPA-FOD - , and **fire frequency and season length** - y) number of fires MTBS and 2 * Std JD MTBS, z) number of fires MODIS and 2 * Std JD MODIS, and aa) number of fires FPA-FOD and 2 * Std JD FPA-FOD.

Table S1. Principal Components Analysis (PCA) components, with the associated eigenvalues and variance from a PCA analysis using all derived fire characteristics across the contiguous United States. The PCA was conducted to determine which fire variables accounted for most of the variance in the data and thus which variables to use to define the pyromes. We determined how many PCA components to keep for further analysis using the Kaiser criterion and by evaluating a scree plot (Figure S2). Based on the Kaiser Criterion, on which components whose eigenvalues >1 are retained, we retain four components for further analysis. The first four PCA components explained ~72% of the cumulative variance.

Component	Eigenvalue	Prop. Variance Explained	Cumulative Prop. Variance
1	4.87	0.35	0.35
2	2.40	0.17	0.52
3	1.52	0.11	0.63
4	1.24	0.09	0.72
5	0.94	0.07	0.78

Table S2. PCA Correlations. Correlations between fire variables and the Principal Components Analysis (PCA) components and the contributions of the fire variables to the components. The PCA analysis used all derived fire characteristics across the contiguous United States and was conducted to determine which fire variables accounted for most of the variance in the data and thus which variables to use to define the pyromes. After determining to keep the first four PCA components based on the Kaiser criterion (Table S1) and by evaluating a scree plot (Figure S2), we determined which of the fire characteristics were associated with these four components using the statistical analysis summarized here and by evaluating a biplot (Figure S3) and dotplots (Figure S4). Every variable in this suite loads significantly onto at least one of the components, so we retain all fire variables for the clustering analysis.

Fire characteristic		PCA 1	PCA 2	PCA 3	PCA 4
Fire frequency					
Number fires (MODIS)	Correlation	0.43	0.62	0.06	0.15

	Contribution	3.79	16.17	0.23	1.89
Number fires (MTBS)	Correlation	0.47	0.42	0.14	0.16
	Contribution	4.47	7.34	1.27	2.2
Number fires (FPA FOD)	Correlation	0.04	0.68	0.04	-0.05
	Contribution	0.03	19.35	0.12	0.17
Fire intensity					
Mean Intensity (MODIS)	Correlation	0.58	-0.19	0.31	0.55
	Contribution	6.81	1.49	6.49	24.15
Maximum Intensity (MODIS)	Correlation	0.69	0.09	0.28	0.49
	Contribution	9.72	0.34	5.28	19.21
Fire event size					
Mean Fire Size (MTBS)	Correlation	0.73	-0.08	-0.62	0.03
	Contribution	11.03	0.3	25.74	0.05
Max Fire Size (MTBS)	Correlation	0.79	-0.06	-0.59	0
	Contribution	12.87	0.17	23.04	0
Mean Fire Size (FPA FOD)	Correlation	0.56	-0.29	0.33	-0.44
	Contribution	6.53	3.42	7.25	15.97
Max Fire Size (FPA FOD)	Correlation	0.8	-0.1	0.33	-0.41

	Contribution	13.06	0.45	7.25	13.3
Burned area					
Sum Area (MTBS)	Correlation	0.83	0.04	-0.44	-0.06
	Contribution	14.31	0.05	12.5	0.27
Sum Area (FPA FOD)	Correlation	0.81	-0.03	0.34	-0.4
	Contribution	13.35	0.04	7.41	12.77
Fire season length					
Std JD *2 (MTBS)	Correlation	0.38	0.39	0.2	0.17
	Contribution	2.92	6.46	2.72	2.22
Std JD *2 (MODIS)	Correlation	-0.15	0.75	-0.06	-0.19
	Contribution	0.45	23.64	0.24	3.07
Std JD *2 (FPA FOD)	Correlation	-0.18	0.71	-0.08	-0.24
	Contribution	0.65	20.79	0.46	4.72

Table S3. Fire characteristics of each pyrome. Mean and standard deviation values of each fire characteristic by pyrome and slope of the linear model of each fire characteristic as a function of time for each pyrome across the contiguous United States. The highest mean value for each characteristic is in **bold**. Mean values that are not statistically significantly different from the highest value are *italicized*. Codes for significant differences between the highest mean value and the next highest (Tukey's Post Hoc Test on One-way analysis of variance): ***≤0.01, **≤0.05, *≤0.1. The steepest slope for each characteristic is in **bold**. Slope values whose confidence intervals overlap with the steepest slope are *italicized*. Codes for significance of the slope: ***≤0.01, **≤0.05, *≤0.1.

Fire characteristic		**Pyrome 1**	**Pyrome 2**	**Pyrome 3**	**Pyrome 4**
Fire frequency (n)					
Number fires (MODIS)	Value	54 (+/-63.5)	*85.4 (+/-82.3)*	53.1 (+/-46.4)	**91.7 (+/-74.6)**
	Slope	**2.57 (+/-1.4)***	0.73 (+/-0.61)	-0.08 (+/-0.18)	-0.42 (+/-0.41)
Number fires (MTBS)	Value	0.3 (+/-0.6)	0.6 (+/-0.5)	0.1 (+/-0.2)	**1.3 (+/-1.4)**
	Slope	0.03 (+/-0)***	0.01 (+/-0)***	0.01 (+/-0)***	**0.09 (+/-0)*****
Number fires (FPA FOD)	Value	8.4 (+/-11.2)	14.1 (+/-17.8)	*42 (+/-42.4)*	**44.7 (+/-44.6)**
	Slope	*0.11 (+/-0.29)*	-0.12 (+/-0.13)	0.24 (+/-0.04)***	-0.53 (+/-0.08)***
Fire intensity (MW)					
Mean Intensity (MODIS)	Value	54.8 (+/-25.4)	*77 (+/-47)*	27.9 (+/-13.2)	39.9 (+/-16.6)
	Slope	*0.1 (+/-0.73)*	-1.32 (+/-0.32)***	*0.03 (+/-0.1)*	*0.05 (+/-0.21)*
Maximum Intensity (MODIS)	Value	424.2 (+/-316.8)	**727.2 (+/-503.5)**	180.3 (+/-125.4)	317.7 (+/-171.1)
	Slope	*5.09 (+/-8.43)*	*0.77 (+/-3.69)*	-0.48 (+/-1.11)	-1.49 (+/-2.48)
Fire event size (ha)					
Mean Fire Size (MTBS)	Value	**37662 (+/-26030.1)**	8348.3 (+/-5969.5)	1047.1 (+/-1228.9)	1812.7 (+/-3422.6)
	Slope	99.97 (+/-23.4)***	**127.76 (+/-10.32)*****	5.34 (+/-3.9)	28.46 (+/-6.88)***
Max Fire Size (MTBS)	Value	**44939.8 (+/-25747.4)**	11297.9 (+/-6890.1)	1232.7 (+/-1427.5)	2764.7 (+/-4153.5)
	Slope	*217.34 (+/-27.31)****	**176.08 (+/-12.04)*****	6.89 (+/-4.56)	51.3 (+/-8.03)***
Mean Fire Size (FPA FOD)	Value	113.3 (+/-139.1)	**1269 (+/-1157)**	15.9 (+/-38.1)	53.1 (+/-85.4)
	Slope	5.93 (+/-4.82)	**48.28 (+/-2.11)*****	0.41 (+/-0.64)	1.29 (+/-1.42)
Max Fire Size (FPA FOD)	Value	1511.9 (+/-3143.2)	**6635.3 (+/-2895)**	161.2 (+/-304.6)	585.9 (+/-716)
	Slope	68.85 (+/-27.16)**	**309.01 (+/-11.89)*****	5.21 (+/-3.58)	20.48 (+/-7.98)**
Burned area (ha)					
Sum Area (MTBS)	Value	**30994 (+/-18464.6)**	10779.3 (+/-6353.6)	1165.7 (+/-1211.5)	4390 (+/-6222.9)
	Slope	**286.84 (+/-30.09)*****	189.51 (+/-13.27)***	10.07 (+/-5.02)**	123.83 (+/-8.85)***
Sum Area (FPA FOD)	Value	1692.2 (+/-3190.1)	**7659.1 (+/-3280.2)**	339.4 (+/-429.8)	1073.3 (+/-1041.7)
	Slope	76.78 (+/-30.4)**	**344.1 (+/-13.31)*****	7.52 (+/-4.01)*	27.48 (+/-8.94)***
Fire season length (days)					
Std JD *2 (MTBS)	Value	29 (+/-40.7)	43.1 (+/-32.4)	22.8 (+/-34)	**123.8 (+/-73.9)**
	Slope	0.16 (+/-0.11)	0.19 (+/-0.05)***	0.13 (+/-0.02)***	**1.33 (+/-0.03)*****
Std JD *2 (MODIS)	Value	100.6 (+/-66.7)	74.6 (+/-57.1)	**178.3 (+/-33.8)**	163 (+/-49.8)
	Slope	**0.74 (+/-1.32)**	0.16 (+/-0.58)	0.11 (+/-0.17)	-0.73 (+/-0.39)*

Std JD *2 (FPA FOD)	Value	106.4 (+/-42.6)	82 (+/-43.5)	**175.8 (+/-30.7)**	166.3 (+/-30.2)
	Slope	*2.93 (+/-0.58)****	0.97 (+/-0.25)***	**3.38 (+/-0.08)*****	1.95 (+/-0.17)***
Ignition type (Proportion)					
Anthropogenic ignitions	Value	0.6 (+/-0.4)	0.4 (+/-0.3)	**0.9 (+/-0.1)**	0.8 (+/-0.2)
	Slope	**0.02 (+/-0)*****	0 (+/-0)***	0.01 (+/-0)***	0.01 (+/-0)***

Fire characteristic		**Pyrome 5**	**Pyrome 6**	**Pyrome 7**
Fire frequency (n)				
Number fires (MODIS)	Value	10.2 (+/-12.7)	11.8 (+/-18.7)	56.8 (+/-60.7)
	Slope	0.02 (+/-0.17)	-0.15 (+/-0.17)	0.12 (+/-0.29)
Number fires (MTBS)	Value	0 (+/-0.1)	0.1 (+/-0.1)	0.4 (+/-0.3)
	Slope	0 (+/-0)	0 (+/-0)***	0.01 (+/-0)***
Number fires (FPA FOD)	Value	9.7 (+/-15.7)	10 (+/-13.2)	22.3 (+/-25.3)
	Slope	**0.34 (+/-0.03)*****	0 (+/-0.04)	-0.25 (+/-0.06)***
Fire intensity (MW)				
Mean Intensity (MODIS)	Value	18.8 (+/-9.9)	45.2 (+/-24)	**78.2 (+/-40.2)**
	Slope	**0.09 (+/-0.09)**	-0.18 (+/-0.09)*	-0.17 (+/-0.15)
Maximum Intensity (MODIS)	Value	58.1 (+/-54.9)	170.3 (+/-141.1)	*655.8 (+/-423.2)*
	Slope	0.16 (+/-1.04)	-1.25 (+/-1.05)	**3.63 (+/-1.73)****
Fire event size (ha)				
Mean Fire Size (MTBS)	Value	718.1 (+/-523)	1830.6 (+/-1403.9)	5159 (+/-3915.4)
	Slope	1.71 (+/-6.49)	4.29 (+/-3.44)	51.4 (+/-4.83)***
Max Fire Size (MTBS)	Value	762.6 (+/-556.4)	1991 (+/-1561.9)	6403.3 (+/-4374.2)
	Slope	1.69 (+/-7.57)	4.65 (+/-4.02)	66.03 (+/-5.64)***
Mean Fire Size (FPA FOD)	Value	9.8 (+/-22.2)	65.1 (+/-130.6)	193.4 (+/-263.4)
	Slope	0.13 (+/-0.59)	0.32 (+/-0.6)	5.01 (+/-0.99)***
Max Fire Size (FPA FOD)	Value	34.2 (+/-58.3)	257.1 (+/-333.9)	1549.8 (+/-1052.7)
	Slope	0.82 (+/-3.34)	1.88 (+/-3.38)	49.08 (+/-5.58)***
Burned area (ha)				
Sum Area (MTBS)	Value	485.6 (+/-420.5)	1391.8 (+/-1264.4)	4944.7 (+/-2980.9)
	Slope	1.88 (+/-8.35)	5.06 (+/-4.43)	73.42 (+/-6.22)***
Sum Area (FPA FOD)	Value	54.3 (+/-90.7)	314.5 (+/-409.2)	1923.9 (+/-1322.5)
	Slope	1.14 (+/-3.74)	1.61 (+/-3.78)	59.08 (+/-6.24)***
Fire season length (days)				
Std JD *2 (MTBS)	Value	5.6 (+/-17.2)	13.4 (+/-26.9)	37.2 (+/-35.6)
	Slope	0.02 (+/-0.03)	0.02 (+/-0.02)	0.07 (+/-0.02)***
Std JD *2 (MODIS)	Value	103.4 (+/-45.5)	77 (+/-54)	76.4 (+/-46.6)
	Slope	0.13 (+/-0.16)	-0.46 (+/-0.16)***	-0.75 (+/-0.27)***
Std JD *2 (FPA FOD)	Value	118 (+/-46.6)	82.6 (+/-37.8)	81.8 (+/-30.6)

	Slope	2.54 (+/-0.07)***	0.56 (+/-0.07)***	0.43 (+/-0.12)***
Ignition type (Proportion)				
Anthropogenic ignitions	Value	*0.9 (+/-0.1)*	0.5 (+/-0.3)	0.4 (+/-0.3)
	Slope	0.02 (+/-0)***	0 (+/-0)***	0 (+/-0)***

Table S4. Controls of each pyrome. Percent of each of the seven pyromes across the contiguous United States occupied by each of the primary controls of fire: vegetation (2016 National Landcover Database (NLCD)), climate (temperature- and moisture-based climate zones (Koppen-Geiger Climate classification)), and ignitions (FPA-FOD). A grid cell is considered dominated by anthropogenic or lightning ignitions if over 75% of ignitions in that grid cell are human or lightning-caused, respectively.

Pyrome	Ignition type	Percent	Landcover	Percent	Climate	Percent
1	Anthro	50	Forest	14.3	BSk: Arid - Steppe Cold	57.1
	Lightning	21.4	Herbaceous	21.4	Csb: Temperate - Dry Summer Warm Summer	7.1
	Neither	28.6	Shrubland	64.3	Dfa: Cold - Without Dry Season Hot Summer	7.1
					Dfc: Cold - Without Dry Season Cold Summer	21.4
					Dsb: Cold - Dry Summer Warm Summer	7.1
2	Anthro	13.7	Cultivated	8.2	Aw: Tropical - Savannah	1.4
	Lightning	35.6	Forest	13.7	BSh: Arid - Steppe Hot	4.1
	Neither	50.7	Herbaceous	42.5	BSk: Arid - Steppe Cold	56.2
			Shrubland	32.9	BWh: Arid - Desert Hot	1.4
			Wetlands	2.7	BWk: Arid - Desert Cold	11
					Cfa: Temperate - Without Dry Season Hot Summer	4.1
					Csa: Temperate - Dry Summer Hot Summer	2.7
					Csb: Temperate - Dry Summer Warm Summer	4.1
					Dfa: Cold - Without Dry Season Hot Summer	1.4
					Dfb: Cold - Without Dry Season Warm Summer	1.4
					Dfc: Cold - Without Dry Season Cold Summer	1.4
					Dsb: Cold - Dry Summer Warm Summer	5.5
					Dsc: Cold - Dry Summer Cold Summer	4.1
					Dwa: Cold - Dry Winter Hot Summer	1.4
3	Anthro	96	Barren	0.6	Af: Tropical - Rainforest	0.1
	Lightning	0.4	Cultivated	27	Aw: Tropical - Savannah	0.2
	Neither	3.6	Developed	9.8	BSh: Arid - Steppe Hot	4.6
			Forest	29	BSk: Arid - Steppe Cold	7.7
			Herbaceous	9	BWh: Arid - Desert Hot	1.7
			Shrubland	12.4	BWk: Arid - Desert Cold	0.5
			Water	1.2	Cfa: Temperate - Without Dry Season Hot Summer	73.8
			Wetlands	11	Cfb: Temperate - Without Dry Season Warm Summer	0.4
					Csa: Temperate - Dry Summer Hot Summer	1.5

					Dfa: Cold - Without Dry Season Hot Summer	8
					Dfb: Cold - Without Dry Season Warm Summer	1.1
					Dsb: Cold - Dry Summer Warm Summer	0.1
					Dsc: Cold - Dry Summer Cold Summer	0.1
					Dwb: Cold - Dry Winter Warm Summer	0.1
4	Anthro	73	Barren	0.6	Am: Tropical - Monsoon	1.2
	Lightning	0.6	Cultivated	12.3	Aw: Tropical - Savannah	4.3
	Neither	26.4	Developed	8	BSh: Arid - Steppe Hot	0.6
			Forest	28.2	BSk: Arid - Steppe Cold	14.7
			Herbaceous	14.7	BWh: Arid - Desert Hot	1.8
			Shrubland	13.5	Cfa: Temperate - Without Dry Season Hot Summer	63.8
			Water	4.9	Cfb: Temperate - Without Dry Season Warm Summer	0.6
			Wetlands	17.8	Csa: Temperate - Dry Summer Hot Summer	1.8
					Dfa: Cold - Without Dry Season Hot Summer	10.4
5	Anthro	93.5	Barren	0.1	BSk: Arid - Steppe Cold	4.6
	Lightning	1.7	Cultivated	44.1	BWh: Arid - Desert Hot	0.1
	Neither	4.8	Developed	6.6	BWk: Arid - Desert Cold	0.1
			Forest	29.6	Cfa: Temperate - Without Dry Season Hot Summer	6.2
			Herbaceous	7.1	Dfa: Cold - Without Dry Season Hot Summer	51.6
			Shrubland	1.3	Dfb: Cold - Without Dry Season Warm Summer	34.8
			Water	3.4	Dwa: Cold - Dry Winter Hot Summer	1
			Wetlands	7.7	Dwb: Cold - Dry Winter Warm Summer	1.5
6	Anthro	29.2	Barren	2.3	Aw: Tropical - Savannah	0.1
	Lightning	21.9	Cultivated	9.6	BSh: Arid - Steppe Hot	1.4
	Neither	48.9	Developed	2.4	BSk: Arid - Steppe Cold	46.3
			Forest	18.9	BWh: Arid - Desert Hot	5.9
			Herbaceous	20.5	BWk: Arid - Desert Cold	15.5
			Shrubland	43.7	Cfa: Temperate - Without Dry Season Hot Summer	1.6
			Water	1.1	Cfb: Temperate - Without Dry Season Warm Summer	0.5
			Wetlands	1.5	Csa: Temperate - Dry Summer Hot Summer	1.2
					Csb: Temperate - Dry Summer Warm Summer	6.1
					Dfa: Cold - Without Dry Season Hot Summer	2.9
					Dfb: Cold - Without Dry Season Warm Summer	6.3
					Dfc: Cold - Without Dry Season Cold Summer	5.3
					Dsb: Cold - Dry Summer Warm Summer	5.1
					Dsc: Cold - Dry Summer Cold Summer	0.4
					Dwa: Cold - Dry Winter Hot Summer	0.5
					Dwb: Cold - Dry Winter Warm Summer	0.3
					Et: Polar Tundra	0.3
7	Anthro	15.7	Barren	1.8	BSh: Arid - Steppe Hot	2.1
	Lightning	29.2	Cultivated	5.1	BSk: Arid - Steppe Cold	41.6

Neither	55.1	Developed	2.1	BWh: Arid - Desert Hot	2.4
		Forest	25.6	BWk: Arid - Desert Cold	9
		Herbaceous	19.3	Cfa: Temperate - Without Dry Season Hot Summer	0.9
		Shrubland	43.4	Csa: Temperate - Dry Summer Hot Summer	6.3
		Water	0.9	Csb: Temperate - Dry Summer Warm Summer	6.6
		Wetlands	1.8	Dfb: Cold - Without Dry Season Warm Summer	6.9
				Dfc: Cold - Without Dry Season Cold Summer	7.8
				Dsa: Cold - Dry Summer Hot Summer	0.3
				Dsb: Cold - Dry Summer Warm Summer	11.4
				Dsc: Cold - Dry Summer Cold Summer	2.7
				Dwa: Cold - Dry Winter Hot Summer	0.3
				Et: Polar Tundra	1.5

Table S5. Ecosystem type and historical fire regime of each pyrome. Percent of each of the seven pyromes across the contiguous United States occupied by current ecosystem (EPA Level I Ecoregions) and historical fire regime (Landfire FRG). FRG Group I: ≤35 Year Fire Return Interval, Low and Mixed Severity; FRG Group II: ≤35 Year Fire Return Interval, Replacement Severity; FRG Group III: 35-200 Year Fire Return Interval, Low and Mixed Severity; FRG Group IV: 35-200 Year Fire Return Interval, Replacement Severity; FRG Group V: >200 Year Fire Return Interval, Any Severity.

Pyrome	Historical fire regime	Percent	Ecoregion	Percent
1	Fire Regime Group I	21.4	GREAT PLAINS	42.9
	Fire Regime Group II	42.9	NORTH AMERICAN DESERTS	21.4
	Fire Regime Group III	21.4	NORTHWESTERN FORESTED MOUNTAINS	28.6
	Fire Regime Group V	14.3	TEMPERATE SIERRAS	7.1
2	Fire Regime Group I	17.8	EASTERN TEMPERATE FORESTS	2.7
	Fire Regime Group II	19.2	GREAT PLAINS	20.5
	Fire Regime Group III	17.8	MEDITERRANEAN CALIFORNIA	4.1
	Fire Regime Group IV	35.6	NORTH AMERICAN DESERTS	49.3
	Fire Regime Group V	5.5	NORTHWESTERN FORESTED MOUNTAINS	15.1
	Barren or Sparsely Vegetated	4.1	SOUTHERN SEMIARID HIGHLANDS	1.4
			TEMPERATE SIERRAS	5.5
3	Fire Regime Group I	47.4	EASTERN TEMPERATE FORESTS	65.2
	Fire Regime Group II	24.5	GREAT PLAINS	28.2
	Fire Regime Group III	19.1	MEDITERRANEAN CALIFORNIA	2.1
	Fire Regime Group IV	1	NORTH AMERICAN DESERTS	2.7
	Fire Regime Group V	4.8	NORTHERN FORESTS	0.2

	Water, Snow, or Ice	1.9	NORTHWESTERN FORESTED MOUNTAINS	0.5
	Barren or Sparsely Vegetated	0.6	SOUTHERN SEMIARID HIGHLANDS	0.4
	Indeterminate Fire Regime Characteristics	0.7	TEMPERATE SIERRAS	0.4
			TROPICAL WET FORESTS	0.1
4	Fire Regime Group I	47.2	EASTERN TEMPERATE FORESTS	54.6
	Fire Regime Group II	29.4	GREAT PLAINS	28.8
	Fire Regime Group III	8.6	MEDITERRANEAN CALIFORNIA	2.5
	Fire Regime Group IV	3.7	NORTH AMERICAN DESERTS	3.7
	Fire Regime Group V	4.3	NORTHWESTERN FORESTED MOUNTAINS	0.6
	Water, Snow, or Ice	4.9	SOUTHERN SEMIARID HIGHLANDS	0.6
	Barren or Sparsely Vegetated	1.2	TEMPERATE SIERRAS	2.5
	Indeterminate Fire Regime Characteristics	0.6	TROPICAL WET FORESTS	5.5
5	Fire Regime Group I	20.8	EASTERN TEMPERATE FORESTS	50.1
	Fire Regime Group II	31	GREAT PLAINS	32
	Fire Regime Group III	17.3	NORTH AMERICAN DESERTS	0.2
	Fire Regime Group IV	1	NORTHERN FORESTS	17.2
	Fire Regime Group V	25.1	NORTHWESTERN FORESTED MOUNTAINS	0.2
	Water, Snow, or Ice	3.1	TROPICAL WET FORESTS	0.1
	Barren or Sparsely Vegetated	0.3	WATER	0.1
	Indeterminate Fire Regime Characteristics	1.5		
6	Fire Regime Group I	13.9	EASTERN TEMPERATE FORESTS	0.5
	Fire Regime Group II	25.2	GREAT PLAINS	28.5
	Fire Regime Group III	17	MARINE WEST COAST FOREST	3.8
	Fire Regime Group IV	17.4	MEDITERRANEAN CALIFORNIA	2.2
	Fire Regime Group V	19.8	NORTH AMERICAN DESERTS	40.4
	Water, Snow, or Ice	1	NORTHERN FORESTS	0.2
	Barren or Sparsely Vegetated	5.2	NORTHWESTERN FORESTED MOUNTAINS	21.2
	Indeterminate Fire Regime Characteristics	0.5	SOUTHERN SEMIARID HIGHLANDS	0.8
			TEMPERATE SIERRAS	1.9
7	Fire Regime Group I	19.6	GREAT PLAINS	9.9
	Fire Regime Group II	11.4	MEDITERRANEAN CALIFORNIA	6.3
	Fire Regime Group III	20.8	NORTH AMERICAN DESERTS	38
	Fire Regime Group IV	27.4	NORTHERN FORESTS	0.9
	Fire Regime Group V	14.8	NORTHWESTERN FORESTED MOUNTAINS	38.6
	Water, Snow, or Ice	1.2	SOUTHERN SEMIARID HIGHLANDS	1.5
	Barren or Sparsely Vegetated	4.8	TEMPERATE SIERRAS	4.8