Additional file 2 Statistical methods used in our study in the Illilouette Creek basin in Yosemite National Park and Sugarloaf Valley in Kings Canyon National Park, California, USA. Field data were collected from 2002 to 2013 to observe naturally occurring patterns of forest and understory structure and composition in relationship to fire regime. Public data collection began in the early 1900s.

Equation 2.1 We tested the effect of plot-based fire experience and environmental factors on plant cover and evenness using the following equation:

$$
\begin{aligned}
&\gamma \sim \\
&\underbrace{\textbf{Time since fire} + \textbf{Most recent fire severity} + \textbf{Time since fire * Most recent fire severity}}_{\text{Plot-based fire experience}} + \\
&\underbrace{\text{Climatic water deficit} + \text{Slope} + \text{Solar radiation index} + \text{Elevation} + \text{Canopy cover} + \text{Litter depth} + \text{Soil texture}}_{\text{Environmental variables}} + \\
&\underbrace{\text{Park} + \text{Plot} + \text{Survey year}}_{\text{Random effects}}
\end{aligned}
$$

where γ is the response variable, fixed effects are **bolded,** and random effects are plain text. The interaction between time since fire and most recent fire severity enabled us to compare the trajectories of the plant communities as they matured after different fire severities.

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Additional file 2, continued Statistical methods used in our study in the Illilouette Creek basin in Yosemite National Park and Sugarloaf Valley in Kings Canyon National Park, California, USA. Field data were collected from 2002 to 2013 to observe naturally occurring patterns of forest and understory structure and composition in relationship to fire regime. Public data collection began in the early 1900s.

Equation 2.2 We tested the main effect of pyrodiversity metrics at buffers around the plot (including 25, 50, 75, 100, and 250 m), times since fire, and most recent burn severity on plant cover and evenness using the following equation:

$$
\begin{aligned}
&\gamma \sim \\
&\textbf{Time since fire} \\
&+ \\
&\textbf{Most recent fire severity} \\
&+ \\
&\textbf{Simpson diversity} \\
&+ \\
&\textbf{Functional richness} \\
&+ \\
&\textbf{Functional dispersion} \\
&+ \\
&\textbf{Functional divergence} \\
&+ \\
&\text{Park} \\
&+ \\
&\text{Plot} \\
&+ \\
&\text{Survey year}
\end{aligned}
$$

Plot-based fire experience and plot-neighborhood pyrodiversity

Random effects

where γ is the response variable, fixed effects are **bolded,** and random effects are plain text. The interaction between time since fire and most recent fire severity enabled us to compare the trajectories of the plant communities as they matured after different fire severities.

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Additional file 2, continued Statistical methods used in our study in the Illilouette Creek basin in Yosemite National Park and Sugarloaf Valley in Kings Canyon National Park, California, USA. Field data were collected from 2002 to 2013 to observe naturally occurring patterns of forest and understory structure and composition in relationship to fire regime. Public data collection began in the early 1900s.

Equation 2.3 We ultimately tested the effect of plot-based fire experience, plot-neighborhood pyrodiversity, and environmental factors on plant Simpson's diversity and richness. We tested the main effect of the best pyrodiversity metric and buffer size (Tables 3, 4), its interaction with time since fire and most recent burn severity, and environmental variables, using the following equation:

$$
\begin{aligned}
\gamma \sim\ & \mathbf{Time\ since\ fire} \\
& + \mathbf{Most\ recent\ fire\ severity} \\
& + \mathbf{Pyrodiversity} \\
& + \mathbf{Time\ since\ fire * Pyrodiversity} \\
& + \mathbf{Most\ recent\ fire\ severity * Pyrodiversity} \quad \text{(Plot-based fire experience and plot-neighborhood pyrodiversity)} \\
& + \\
& \text{Climatic water deficit} \\
& + \text{Slope} \\
& + \text{Solar radiation index} \\
& + \text{Elevation} \\
& + \text{Canopy cover} \\
& + \text{Litter depth} \\
& + \text{Soil texture} \quad \text{(Environmental variables)} \\
& + \\
& \text{Park} \\
& + \text{Plot} \\
& + \text{Survey year} \quad \text{(Random effects)}
\end{aligned}
$$

where γ is the response variable, fixed effects are **bolded,** and random effects are plain text. The interaction between time since fire and most recent fire severity enabled us to compare the trajectories of the plant communities as they matured after different fire severities.

Table 2.1 Model family and transformation for each understory plant community response variable.

Response variable	Model family	Transformation
Cover (%)	Poisson	None
Richness	Poisson	None
Simpson's diversity	Gaussian	Square root
Evenness	Gaussian	None