

## Fire Ecology Chats: A Podcast Series by the Association for Fire Ecology



### Transcript of Episode 16 - Drivers of understory plant communities in Sierra Nevada mixed conifer forests with pyrodiversity

Host: Robert Keane (Editor of Fire Ecology and Retired Research Ecologist, USDA Forest Service, USA)

Guest: Kate Wilkin (Department of Biological Sciences, San Jose State University, USA)

Link to Full Article in Fire Ecology: <https://fireecology.springeropen.com/articles/10.1186/s42408-021-00111-6>

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**Bob Keane:** Hello everybody. My name is Bob Keane. I'm the editor in charge of the journal of Fire Ecology. Fire Ecology, of course has a unique situation in that it provides podcasts for many of its articles that come out each month. And today I'm very excited about our guest. Kate Wilkin is going to talk about "Drivers of understory plant communities in Sierra Nevada, mixed conifer forests with pyrodiversity. Good morning, Kate. How are you?

**Kate Wilkin:** I'm doing well. How are you doing, Bob?

**Bob Keane:** Great. Can you tell us your affiliation?

**Kate Wilkin:** My name is Kate Wilkin and I'm an assistant professor of fire ecology at San Jose State University and their new Wildfire Interdisciplinary Research Center.

**Bob Keane:** So Kate where did this study take place?

**Kate Wilkin:** This study took place in California, Sierra Nevada, dry frequent fire mixed conifer forests.

**Bob Keane:** So tell us about very exciting results.

**Kate Wilkin:** Absolutely. For this paper, we found that pyrodiversity really fosters biodiversity. We found that pyrodiversity begets biodiversity, which is really exciting. I think a lot of us knew that intuitively for this system, but it was great to really be able to show it with concrete results.

**Bob Keane:** Yeah, and what I thought was really exciting is that it appeared that this was true at multiple scales. So can you tell us a little more about that?

**Kate Wilkin:** So in Yosemite National Park and Kings Canyon National Park, we were in the mixed conifer area, and we looked at the plant communities, and how those related to different types of environmental and pyrodiversity metrics. And so on the ground, we looked at what is the understory plant cover? What is the plant richness and what is the plant diversity? And ultimately, when we were trying to explain the patterns that we saw, the best way to explain that a plant diversity included the type of climatic water deficit, the most recent fire

history, but ultimately, the thing that had the most impact on plant richness was this pyrodiversity within about 50 meters of the plot.

**Bob Keane:** Yeah, that's incredible. And you know, what else is incredible is number one, the number of plots you put in. But I could not believe the number of times this area that you sample burned. Can you tell us about what you mean by pyrodiversity?

**Kate Wilkin:** Absolutely, we were really fortunate to be able to work in wilderness areas that have had use fires since the 1970s. I know they're called had been called many different things since. I think most recently they are called prescribed natural fires or prescribed wildfires. They've been more than 50 fires which exceeded 100 acres with mixed severity in these areas since the 1970s. Managers took a leap of faith and were able to persuade some people that they should be allowing fire to return to these systems. And so we were so lucky to be able to observe this natural experiment that some of our early fire ecologists really set up for us.

**Bob Keane:** And not only did some of the areas burn six times, but you also used dNBR to get at the fire severity, so you combined severity with frequency. That was quite exciting.

**Kate Wilkin:** Right and it was interesting because when we were thinking about what is pyrodiversity, pyrodiversity is the season that the fire occurred, it's the severity or how many trees it killed, it's how big the fire was or the extent, the frequency—the number of times it burned, and then any of those kind of compounded disturbances. And rather than trying to create a pyrodiversity index for all five of those aspects, we created a synthetic index that combined all of those into one for our pyrodiversity metric. So it included you know, the season, the severity, the extent, the frequency, and compounded disturbances.

**Bob Keane:** Tell us again, what you measured for our species to get diversity?

**Kate Wilkin:** Right, so for species, we looked at plants, and we looked at plant cover, which is how much area are these individual plants covering? We also examined plant richness, which is the number of individual species we found within our plot, and then also Simpson's diversity. Ultimately, we found the strongest relationship between plant richness and pyrodiversity. For the range of pyrodiversity we saw in our study site that could influence the number of species on a plot by up to 21 additional species.

**Bob Keane:** Wow, that's amazing. So what would you tell the manager, how can they use these results?

**Kate Wilkin:** So for frequent fire, mixed conifer forests, things that you can do to foster pyrodiversity will also likely foster biodiversity. So allowing fires to burn from, you know, spring into winter, for example. Planning for some mixed severity in these wilderness areas where we have some high severity patches adjacent to moderate or low severity patches. Things that you can do to foster all of that are just incredibly important.

**Bob Keane:** Yeah, it is and I was really excited about the fact that the number of fires increase the diversity because a lot of managers feel that having too much fire in the landscape is a bad thing. But I think you've shown that it is indeed a natural part of the community.

**Kate Wilkin:** Absolutely. I don't think we could say, based on this paper that fire doesn't foster diversity. I think fires obviously showing that it's increasing the diversity here in our study sites.

**Bob Keane:** Thank you for getting on and telling us about your exciting paper. Kate, would you like to recognize any funding sources?

**Kate Wilkin:** Yes, the Joint Fire Science funded the first round of sampling in the early 2000s.

**Bob Keane:** Okay, thanks Kate for a wonderful paper, and everyone we look forward to the next Fire Ecology Chat.