

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



Transcript of Episode 7 – Tree regeneration following wildfires in the western US: a review

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

Guest: Camille Stevens-Rumann (Forest and Rangeland Stewardship, Colorado State University)

Link to Full Article in *Fire Ecology*: <https://fireecology.springeropen.com/articles/10.1186/s42408-019-0032-1>

Bob Keane: Good morning everybody. My name is Bob Keane. I'm the editor of the journal *Fire Ecology*, which is sponsored by the Association for Fire Ecology (AFE). This is the *Fire Ecology* podcast, Fire Ecology Chats. Today, we are honored to have the author of a very, very interesting paper. Both Camille Stevens-Rumann and Penny Morgan have written this paper in *Fire Ecology* called "Tree regeneration following wildfires in the western US." This is a huge subject today because a lot of people are looking at tree regeneration as a possible indicator of climate change and so on. And Camille and Penny have perused the literature, and they're going to tell us what they found. Good morning, Camille.

Camille Stevens-Rumann: Good morning, thanks for having me.

Bob Keane: Camille, you want to tell something about yourself?

Camille Stevens-Rumann: Yeah, I have done many a study on tree regeneration myself and in doing that research and in looking at, you know, this growing body of literature, Penny and I thought it would be really important for us to kind of get a sense of what many people are finding across the western US and really across western North America, to get a sense of what are the general trends and what are we finding across these fairly large landscapes.

Bob Keane: Oh, very interesting. So you got me. Can you let us know what did you find was this literature search?

Camille Stevens-Rumann: I think that the big take home that we found is that there are a lot of people who are finding places where few or no tree seedlings are establishing, especially in those areas that are kind of at lower elevation, or hotter and drier sites. And, you know, the reason for this is a number of factors and those include things like how far a particular site is from a living tree, you know, distance to seed source, that is one of those things that is really coming out in a lot of the literature. Another really common factor that's definitely been growing in the last couple of years—I think as we're writing this, you know, every week there's a new paper on this it seemed like—is the effect that climate change is having on the ability of these ecosystems to regenerate. And that seems to be particularly true in, again, those dry forests that are maybe already on the edge of where forests might be. And then there are other things that are concerning that are growing in this area where places might not be regenerating. And those are things like repeated disturbances, some cases that might be bark beetles and fire, though the literature was a little bit mixed on the effect of bark beetle disturbance before a fire. And certainly areas that are having repeated high severity fires in short intervals was another really key

driving factor of areas having no tree regeneration. And then I think, you know, you get into a lot of site variables also that become really, really important—that are really variable, how people measure them, and what measure they are measured, even though we all know they're important, like soils and aspects, elevation, and things like that. But those were kind of the big driving factors that we found.

Bob Keane: Yeah, I was amazed of the diverse factors that would govern tree regeneration from the high subalpine or upper subalpine, almost in the timberline. It looked to be snow and the absence of snow that is facilitating tree regeneration. And then of course, lower it could be the solar radiation and so on. So what role do you think tree species have in this?

Camille Stevens-Rumann: You know, all tree species are adapted to different fire regimes and different climate conditions that might influence how they regenerate. But I think one of the common species that a lot of us think about as being a good regenerator is something like lodgepole pine. And we're not seeing climate change or distance to seed source driving tree regeneration in lodgepole pine since its serotinous and really likes those high severity fires. In other species like ponderosa pine, there is more of, and Douglas fir even, there is more of an impact on that distance to seed source and climate because they tend to occupy those drier and hotter sites in general. So species can have a big impact on that.

Bob Keane: Yeah, right. So what about the time that you used to evaluate this? What was the time limit at which you decided that regeneration was a failure or a success? How long, how many years?

Camille Stevens-Rumann: Yeah. I mean, in this review, we kind of just looked at all of the literature and how they presented their results and so it was somewhat variable. I mean, in some cases, some of those studies were as short as one or a couple years, you know, two to three years. In other cases, you know, they were looking at 20 plus years post fire, or even, I think we had a couple of papers in there that were 40 to 50 years post fire. And so it was really trying to get it, you know, what are people saying about what they're finding? And how, how does that match with other data? We didn't exclude studies that were at shorter time intervals, though, certainly there is a big impact on whether or not we can say, we're truly seeing a lack of regeneration, you know, long term on those sites, if you're looking at those shorter time periods.

Bob Keane: Yeah, right. I work with the species like whitebark pine that you can't evaluate it over a decade or two. You really have to evaluate regeneration over a long time because it's both bird dispersed and in a really snowy environment. So I know that that time component is very important. Anything else you'd like to say about your study? How are managers going to use this information? Or scientists, this valuable literature review?

Camille Stevens-Rumann: Yeah, so you know, this project was, this review was a part of a Joint Fire Science Program grant that was used to, that we did a lot of manager outreach and had workshops with different stakeholders in the areas that we had the most research in. And we kind of developed a way to include more climate considerations in planting guidelines. Because I think one of the ways that we can think about this is, there's all these places that are naturally regenerating, and we have this growing body of work that looks at natural regeneration. And I think the next step for managers is thinking about what we do with those places that are not regenerating. Do we choose to plant trees if they're not coming back naturally? You know, one of the decisions that we should be making in deciding to plant trees. And so we tried to really make it a collaborative effort with these different groups, you know, people with vegetation specialists, re-vegetation specialists, silviculturists, and things like that within different national forests to talk about how to include climate better, as well as these other factors that we found as being really important. And so we created a bit of a decision tree that's much more broad scale, you know, thinking about if you're going to be thinking about these factors that

we looked at, here's a way to kind of prioritize your landscape a bit more, versus just trying to go out and plant in places that you might not have as much true regeneration success, even in planted seedlings.

Bob Keane: Very nice, huh. Thanks for doing this. Do you want to acknowledge any people or institutions in particular?

Camille Stevens-Rumann: As I mentioned, this was a project funded by the Joint Fire Science Program. And, you know, Penny Morgan and I worked on this as a part of that grant. And the workshops were really led by Jared Blades and with the help of Kerry Kemp as well. So it was kind of a multi university and institution process. It was really wonderful getting to work with all the National Forests we did, primarily in Montana, Wyoming, and Idaho. And, you know, the institutions that we all work for including the University of Idaho, Colorado State University, and The Nature Conservancy.

Bob Keane: Okay, well, I want to thank you very much, Camille. It was a wonderful learning about this wonderful paper. I hope people pick it up and read. It has very valuable information, and I thank you.

Camille Stevens-Rumann: Thank you for having me.