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

Transcript of Episode 2 - Changing wildfire, changing forests

Host:
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Guests:
Jessica Halofsky (Director, USDA Climate Hub and Western Wildland Environmental Threat Assessment Center, Forest Service) and David Peterson (Professor, School of Environmental and Forest Sciences, University of Washington)

Bob Keane: Hello, everyone. My name is Bob Keane. I am the host here at Fire Ecology Chats and I'm also the editor for Fire Ecology. Today I'm honored to have two guests, who recently published a very important paper in climate change and fire in the journal Fire Ecology, Jessica Halofsky and David Peterson. I could say without a shadow of a doubt that there are very few people who have done more for synthesizing climate change research for US Forest Service and other federal agencies than these two people. They have really done a wonderful job getting useful knowledge out to the managers. Jessica, could you tell us about this paper and the background behind the paper that you wrote for Fire Ecology?

> **Jessica Halofsky:** Sure. So this work was funded by the Northwest Climate Adaptation Science Center, and so they conducted a needs assessment with a number of different stakeholders, and a synthesis of information on fire and climate in the Pacific Northwest was identified as a high priority need. So, Dave Peterson and I teamed up with Brian Harvey at the University of Washington to conduct a synthesis. Brian is a Professor with the School of Environmental and Forest Sciences. But we have also done, as Bob mentioned, a lot of work in climate and fire around the western US as a part of our work with the National Forest System and conducting climate change vulnerability assessments. So we've had vulnerability assessments over quite a number of forests around the western US and so we're able to take a lot of the information that we pulled together from those assessments and feed it into this synthesis paper. But this is more specifically focused on the Pacific Northwest.

Bob Keane: Okay, yeah. So Dave, maybe you can tell us, this paper is specifically on the Pacific Northwest, but you've done other syntheses for other areas for other venues or publishing venues correct?

> **Dave Peterson**: Yes, we have done similar types of climate change vulnerability assessments throughout most of the western United States now. And so over the past 10 years or so, hearing about climate change and wildfire over and over again, has reinforced the need for these types of syntheses. Whenever you talk about climate change, you end up talking very quickly about wildfire. And whenever you talk about the future of wildfire, you end up talking very quickly about climate change. So we thought it was about time that we addressed both of these topics concurrently. And given our experience with doing these assessments over such a broad landscape in the West, we felt like we had a good perspective in terms of pulling together a variety of different topics in one place.

Bob Keane: That's wonderful, most managers really need this type of stuff in order to do their job. So, Jessica for the Pacific Northwest, what's the take home points? What can we expect as climate will change over the next century?

> **Jessica Halofsky:** Yeah, we looked at a lot of different kinds of information for this synthesis. So we looked at paleoecological studies, using pollen records that go back hundreds of thousands of years. We looked at fire history studies and then recent trends, studies showing recent trends in fire, and then also model projections for the future. And we saw that both historically and in the recent past that large and severe fires in the Pacific Northwest have been associated with warm and dry conditions, and we expect those conditions to occur more frequently in the future. So all these models agree that there will be more fire in the future. And we expect that warmer and drier conditions are going to lead to lower fuel moisture, longer fire seasons, and that's going to lead to more fire and larger fires compared to those in the 20th century. We also address interactions with other disturbances including drought and insects. We really think those are going to be the drivers of ecosystem changes—the interacting disturbances in a warming climate. And you know, where are these disturbances are interacting, they're likely to affect tree regeneration which affects future forest structure and also composition. And we also address reburns, and reburns are likely to occur more frequently with warming and drought and they're also likely to affect tree regeneration and species composition. We found that the hotter drier sites, maybe particularly at risk for regeneration failures. And overall, we found that the dry forests are likely to be at highest risk in a changing climate because of drought and increasing fire frequency, and those two factors together potentially leading to regeneration failures.

Bob Keane: That is really interesting. One of the questions that a lot of people ask about climate change is they understand why fire intensity would go up and why fires would get bigger in the future and why they would be more of them, but a lot of people don't understand, in the literature there's often that fire severity or the affect of fires will actually be more severe in the future. Dave, do you have any insight into that?

> **Dave Peterson**: That's a very interesting topic. I think it's a source of debate at the moment in literature, and I think it's a source of debate because different phenomena seem to occur in different areas. For example, we know that in the American Southwest, fire regimes tend often to be more fuel driven than they are in other places, so any particular inference you might have for a Southwest ponderosa pine forest may not apply to other parts of the country. So we tried to look at different forest types within the Northwest, different regions, different locations, and try to break that down a little bit in terms of what would be relevant where. I think for fire severity, it's a mixed bag depending on where you are and what the fuel conditions are.

Bob Keane: So Jessica, any suggestions on what we should do in the future as a fire manager?

> **Jessica Halofsky:** Yeah, and we do have a section that about that in the paper. One of the key messages we try to get across is there are these changes, it can be a little bit overwhelming, but there are actions we can take now to help our forests be more resilient to future stresses and to continue to provide ecosystem services. Starting the process of adaptation now is important before we really start seeing major changes in wildfire regimes around the middle of the century. And another key point is that a lot of what forest managers do now can actually be considered climate smart because they're helping to reduce stresses and increase resilience of forests to changes. So we have we have a number of examples in the paper. One of them is that managers can think about managing forest density to help decrease fire hazard and effects of drought. We can rethink, when, where, and what was planted after fire. There

might be some places where that is not effective in the future. And another is that managers can work with partners across boundaries to try to implement adaptation actions at large spatial scales.

Bob Keane: Okay, I see, very good. One just like closing point is, Dave, a lot of fire ecologists understand that we had a much more frequent fires regime prior to European settlement, prior to the 1400s. How will that past historical fire regime compare with what we're predicting in the future? Is there an analog to this or not?

Dave Peterson: That's a great question. And although I don't think there's a direct analog, certainly what we know about historical fire regimes can inform what we expect to see in the future. The factor that really has changed of course is that we now have tens of millions of people scattered out across the landscape, so there are a lot more ignitions. There are implications of fire ignitions for going about fire suppression in certain ways and for going about fuel treatment programs that would increase the resilience of these forests. So I certainly think those historical examples can provide insight into kinds of forests that would be resilient to a future with higher fire. But I think, more importantly, in terms of how this applies to managers, we've tried to provide a structural framework here for how they can go about pulling historical information, other things together. We call that simply a fire risk assessment, where they can look at things like wildfire frequency, extent severity, reburns, stress interactions, and regeneration, in a structured way. Because there's a lot of information out there and it's unreasonable to expect any given manager to have all that in their head but by providing a sequential way of looking at these different topics over time, in different places, we hope we can give them a leg up on the information they need for decision making.

Bob Keane: Well, I surely would like to thank you both for a wonderful Fire Ecology Chat. Is there anybody who would like to acknowledge or recognize, or any funding agency Jessica that you feel deserves mention?

Jessica Halofsky: Yeah, absolutely. This work was funded by the Northwest Climate Adaptation Science Center. And our other coauthor I mentioned before is Brian Harvey with the University of Washington.

Bob Keane: Wonderful and any from you, Dave?

Dave Peterson: We're grateful to the journal Fire Ecology for being interested in this topic and for providing some excellent peer reviews that helped to improve the nature of this manuscript and how it ended up being presented.

Bob Keane: Great, I really want to thank you both for a wonderful time and very interesting topic, and hope to see more papers in Fire Ecology in the future from both of you. Thank you again.