

Fire Ecology with Dr. Gavin Jones

Ologies Podcast

August 10, 2021

Oh heey, it's the pair of sunglasses that you leave in the car that's scratched – it's not your favorite, but it's better than nothing in a pinch – Alie Ward, back with a piping hot episode of *Ologies*. It's top of mind for a lot of us up here in the Northern Hemisphere, especially toward the west of the continent. Wildfires. Fire ecology, blazing infernos, apocalyptic nightmares.

This ologist, so spesh, got his Bachelor's in Zoology, a Master's in Wildlife Ecology, and a PhD in Wildlife Ecology Statistics, all from the University of Wisconsin in Madison. He is currently a Wildlife and Terrestrial Ecosystems Research Ecologist. Such a mouthful! He's a research scientist at the US Department of Agriculture's Forest Service, also an Adjunct Professor at the University of New Mexico. He has been published in papers about fire refuges for wildlife, where they hide out, megafires, habitat loss. He's also just casually the editor at the Association of Fire Ecology.

I have been following him online for a while. I reached out to casually ask him about pyrology versus fire ecology, and before I knew it, I was begging him to talk to me. So we hopped on to chat while fires were raging in the West this week and I was in a muggy Florida hotel room for work and it smelled like a turtle tank.

But before we dive into the conversation, I want to thank everyone at [Patreon.com/Ologies](https://www.patreon.com/Ologies). It costs \$1 a month to join and then you can submit questions to the ologists. Thank you to everyone listening and making us the #1 podcast in the Science category on Spotify. And thank you for leaving reviews on Apple Podcasts to get us seen by other people. I truly read them all because I desperately want to make a show that does not suck. And to prove it, I'm going to read you a still-glowing coal of assessment from Burd Lancaster, who wrote:

Ologies is your cynicism antidote. I simultaneously feel beautifully tiny and so expansive that I could burst after listening. Sometimes I just have to stand there and laugh to myself for a while. Sometimes I cry! Emotions are weird. Love you, Dad Ward.

Burd Lancaster, get a hanky because your internet dad right here loves you right back. Everyone who left a review, I read it and I love you also.

Let's *fire off* some questions, yeah? Okay. Open your ears for info on what fire is, how hot it burns, fire trends, tinderboxes, lots and lots of forest fire flimflam, tolerant wombats, Angelina Jolie movies, cunning pinecones, thick bark, tragic koalas, Indigenous fire stewardship, and more with researcher, scientist of the woods, desert dweller, owl cuddler, Forest Service employee, optimist, and Fire Ecologist, Dr. Gavin Jones.

Dr. Gavin Jones: Yes. Gavin Jones, and my pronouns are he/him.

Alie Ward: Got it. And you are currently in New Mexico?

Gavin: That's right. In the great city of Albuquerque.

Alie: Do you guys have trees there?

Gavin: You know, we do. Yes. It's pretty much desert out here, so when the trees grow, they don't grow very tall.

Alie: And now, tell me how a fire ecologist from Wisconsin, and Florida, and now New Mexico... How did your life path lead to fire ecology?

Gavin: Oh my goodness... It was really an accident. I do consider myself a fire ecologist, but I was really trained, and I did my graduate work and all my studies in wildlife ecology. When I was in grad school I was doing some research out in the Sierra Nevada in California on the cutest, cuddliest creature there is; the California spotted owl. [*clip of owl hoots and ambient night sounds*]

And, like pretty much anybody who spends enough time doing science out in fire-prone lands like the Sierra Nevada, you eventually become a fire ecologist because a fire happens and then you have to try to figure out what to do with it. So that's exactly what happened. I was doing my master's degree. I was at the University of Wisconsin with my supervisor Zach Peery, and we were doing a study out in California on spotted owls, trying to figure out what kind of forests they used, how they would respond to climate change. And just as I was finishing my master's degree, like just a month or two before I defended my degree, a big fire burned through our study area.

Alie: Oh!

Gavin: Yeah, and at the time, to be honest with you, I was pretty devastated. I was like, "Man, what does this mean for the work that I've been doing? Does this even mean anything anymore?" It changed the game a little bit, but it provided an incredible opportunity to learn about how these animals, this owl that I was studying, responded to fire. It was basically a natural experiment. This fire burned through our study area in 2014 and it burned through about half of it.

So, you know, in ecology when we're doing these field studies, we rarely get the chance to do experiments. Like, almost everything we do is observational. We go out and we see what we see, and we record it, and we try to make sense of it. We rarely get to do experiments like other folks get to do in the lab who are doing chemistry or other molecular things. But this was really a natural experiment to see how this species of owl responded to fire, and that's what launched me into, I guess, being a real sucker for fire and for learning about how it works in some of these systems, why it happens, how it happens, what its consequences are, and I'm totally hooked now.

Alie: Augh! How many of your owls were "latered"? How many of the owls survived that? What percentage of the impacted area, half of your study area...?

Gavin: So, some of them didn't make it. Some of them dispersed. Some of them left the fire; they were able to get out of the way. And then there's large parts of the fire that didn't burn so severely, that burned at lower severity where, basically, a lot of the big trees in the canopy, they survived and some of the understory burned a little bit more of what we call "good fire" in some of these areas, which I'd love to talk more about. But you know, a lot of those birds did great and are still persisting in some of those areas that experienced lower severity fire, those lower severity effects to the forest.

Aside: But, predictably, many bit the proverbial dust and returned to the earth as ash.

Gavin told me that one of his colleagues was surveying the charred land and found a little aluminum owl leg band that they use for tagging and it encased a little crispy owl leg. Did not go well for that one.

Alie: And how did that wildfire start?

Gavin: That particular wildfire, that was a human-started fire and it's actually kind of a sad story. Some guy... I'm trying to remember the details. You should look this up, Alie, but some guy was, I think, taking a video for his ex-girlfriend or something, and lit some house on fire, and that started this gigantic... It was, at the time, one of the largest fires that had burned in the state of California.

Aside: Okay, buckle up. Here's the story. This was 2014's King Fire and it started in Pollock Pines in the Sierra Nevadas. And I already knew of this fire because my parents lived in Pollock Pines in 2014 and my sisters and I had to plead with them to heed the emergency evacuation orders as pyrocumulus clouds billowed over their hill. We're like, "Please get to safety! I'm sweating a lot. Don't make me come up there. I can't. The roads are closed."

So I booked my mom and dad a hotel in Reno out of harm's way, and the hotel turned out to have a mirrored ceiling and a very thrifty-but-sensual vibe, they tell me. I get the feeling that there were also hourly rates available at this hotel I got them. I didn't read the reviews, okay? It was an emergency!

Anyway, the King Fire that reduced homes to ashes and dashed people's dreams, it flambéed Gavin's owls; it was all started by a guy named Wayne Huntsman, who is not a huntsman but an arsonist. A formerly incarcerated firefighter, actually, who, that sweltering September day, had set several fires to impress a paramour. He took video for her, standing between two small, smoldering blazes that were just starting to take off.

[clip from Huntsman's selfie video: "I'm stuck in the middle there... Hmm."]

I'm not sure how their relationship turned out, but as proof that we're living in a simulation, the burn area, the burn scar, is absolutely shaped like a perfect, 97,000-acre dick-n-balls. All ablaze in one of the state's most infamous, literal thirst traps.

Okay, so how much is our horny, greedy species to blame?

Alie: Oh man...

Gavin: And that's another thing, a lot of the ignitions are human ignitions. People accidentally starting fires, machinery getting too hot, people driving over dry grass, and things like that.

Aside: So Gavin says that 80-90% of all wildfires are human-caused ignitions. Half of California's largest fires in the last century happened in the past five years!

By the way, a complex fire means a cluster of related fires in one area, but what's the difference between a wildfire and a forest fire?

Gavin: We talk about wildfires... Typically when we're talking about wildfires, those are unplanned; fires that we as people don't plan. So, you can kind of juxtapose that with a prescribed fire or a cultural fire. Prescribed fire is often fire that is purposely set and then managed by teams to achieve some type of objective. Maybe they're trying to restore some area, restorative fire. You probably hear a lot about people burning prairies and things like that. It's the same thing in forests. They go in and do prescribed burns.

And then there's also a really important component of cultural burning. Indigenous communities using wildfire for their purposes, which, until about 100, 200 years ago, made up the overwhelming majority of the fire activity that was happening in a lot of these areas. For the last 10,000 years or so, Indigenous peoples have been using fire in a really important cultural way. And that has really changed in the past couple of centuries with

colonization, but that is an increasingly important part of the solution to this modern wildfire problem.

Alie: And obviously, Indigenous cultures and just the planet at large, saw the benefit of prescribed burns. So, what good do fires do, either in prescribed burns or just in nature?

Gavin: That's such a good question. I mean, fires are a critical piece of ecosystems around the world. Every square inch of land that has vegetation has some type of fire regime. It has some sort of natural fire cycle. And fire is kind of a restorative process. There's many benefits of fire from... We can think about it from a human perspective, we can think about it from sort of an ecosystem perspective.

From the human perspective, fires create more resilient forests when they burn the right way. When we have, sort of, a natural, lower-intensity fire in some systems, like in the Sierra Nevada where I've spent a lot of my time, that reinforces healthy water supplies, it reduces erosion.

Aside: Sidenote, a fire regime sounds like Satan's cabinet members farting flames in a Hades boardroom. But it's actually just a gentle term. A fire regime describes a pattern of fire; how frequent, how intense, what kind of fuel it gobbles. And maybe me just calling it Satan's cabinet members farting in Hades... maybe that's part of the root of European's fear of fire and thus this historical fire suppression by colonists.

I wondered this and I begged myself not to google it because this aside would be like 45 minutes long. But snap: I found a 2015 paper from the journal *Philosophical Transactions of the Royal Society B*. Title? "Fire in the mind: changing understandings of fire in Western civilization" – [gasp!] What?! – in which, author Stephen J. Pyne writes – you ready for this?:

The Old Testament is in fact a cauldron of stories, rites, and beliefs simmering over a mix of religious fires.

The heartland of (European) forestry knew fire only as a human artefact, not a natural process. Most new lands (and colonized lands) were burned lands. (Naturally) The agencies found themselves in a continuous firefight. Fire became a political as well as practical challenge. The upshot has generally been disastrous.

Okay, so what does the land miss out on when natural fire is suppressed and Indigenous populations are fined, imprisoned, or even, up until the 1930s in the US, shot for fire stewardship? Welp, from an ecology standpoint, those fires can help the water supply by eliminating excess vegetation and thus increasing runoff into streams and by preventing huge fires with more frequent smaller ones. Also, erosion doesn't get out of control when there are regular fires like you see with post-megafire mudslides.

Also, the charcoal after a burn could trap carbon for millennia and the recovery of vegetation takes more excess carbon from that atmosphere, according to the 2019 paper "How wildfires trap carbon for centuries to millennia."

Okay, but wildfires burn at 800°C, that's 1472°F, America. So the animals hate natural and cultural burns too, right? No animal wants to be trapped in a blaze, but... I'm just going to stop myself from singing about the circle of life in your ears.

Gavin: And then from an ecosystem perspective, and from... What I like to think about a lot is the biodiversity perspective; what kinds of animals there are, and the richness of animal life and plant life. Fires create this template for wildfire and plants to thrive. And also it creates this natural dynamic where you have places that burn in one year, and then don't burn for a

while, and then places that burn frequently, and places that burn at high severity and low severity. You can kind of think about it as this patchwork, this mosaic, of different ages of forests that burned at different times. And that creates a really diverse landscape that generates the habitat for lots of critters.

It can be a really regenerative and restorative process to the land, both from an ecosystem perspective. Fire is a necessary part of these systems, so when we can put the right kind of fire on the landscape, it really benefits us too, as people and as a society.

Aside: So, fire mosaic paints a beautiful picture of land in different states of recovery. And if you're looking to learn more about it, don't google 'fire mosaic' unless you want to see a lot of tiling crafts that seem to be an homage to Burning Man. But look up the official term, it's 'patch mosaic burning'.

So, let's talk different flavors of fire, because it does matter.

Gavin: So, you can think... This is a really overly simplistic way to think about fire, because fire is a really complicated process. But the way that we often describe it and think about it within the fire ecology world, we think about natural, low-severity fire regimes. In a given area, you might expect fires to burn at lower severity. Not too hot, not too all-consuming. They burn along in the understory, nice and happy, crawl along, burn some logs here, burn some trees there, but generally don't destroy or consume the big trees in the overstory of the canopy. So that first end of the system, that's kind of frequent, low-severity fires.

And then on the other end of the whole spectrum, you can think about infrequent, high-severity fire regimes. These are places... and that area is for fires, when they do burn, to burn pretty big and pretty hot. And those are both natural, but they're natural in those different places. So, why is it that you have some places that naturally burn low severity – and generally I'm talking about forest fires here – and then other places, other forests, that naturally burn at really high severity and really large?

We can think about those two ends of the spectrum also in terms of what's limiting the system. In these low-severity fire systems, those are generally systems that are limited by fuel. So what I mean by that is, the climate is such that on any given year, the conditions are right for fire. Like if there's a lightning strike or another ignition, fire is going to burn. And the fuel is dry, and the only thing that's keeping that fire... one of the primary things that's controlling that fire and where it burns is where the fuel is; where the trees are, the kindling is, so to speak.

And because those fires, those places, they ignite every year, there's ignitions all the time, and the conditions are right for fire, they burn really frequently. So, you can think about places where the fires burn every couple of years, and when they do burn they, kind of, clean out, or burn in that understory, below the forest canopy. It's burning the smaller trees, it's burning some of the medium trees, and it's burning some of the big trees but mostly it just... every time a fire burns it burns all the fine fuel, or a lot of it. So, that's the primary control on how fire burns in some of these dry, fuel-limited systems.

Aside: So in these areas, the way it's supposed to be is that fires don't get mega because blazes are more frequent, so burning all of the fallen wood and the understory so an excess of fuel doesn't build up. That's one way that these giant, devastating fires can be avoided.

Gavin: And then on the other end of the spectrum, you have these climate limited systems. So, rather than the system being limited by fuel, it's limited by climate. And so this is a place like the Pacific Northwest, where it's really wet, right? It's generally wet most of the time, it's

cool. There may be quite a few ignitions, but when those ignitions occur, the fuel is not really ready to burn; it's too wet. Maybe it burns a small fire or something like that, but it just kind of extinguishes itself. And you think about that system, those kinds of areas, and when you end up getting those really big, infrequent, severe fires that occur there, it's because there's been some sort of climate activity, like a drought, that's caused all that fuel that hasn't burned in a really long time to dry out. And then it burns, and when it does burn, it burns really big because there's tons of fuel available. So that's kind of the two ends of the spectrum.

I was trying to think about this today, "How do I describe that spectrum in a way that's not so dry and academic?" *[laughs]* I was thinking about, like... Okay, the haircut that I get is like a frequent fire system. I go to Great Clips, or Sport Clips, or whatever just down the street from me. And I get my hair cut every few weeks, maybe every month. It kind of maintains the general structure, it never goes super long, I never buzz it super short either. I just kind of keep it tamed, so to speak. I go in there frequently, I clean out, sort of, the growth that's happened in between each cut.

On the other end of the spectrum, you could have somebody... And I did this once when I was in college I think, maybe right after college. Grow out your hair super duper long. I didn't cut it for... I don't remember exactly how long it was. But say you grow your hair for a year, or five years, or something, you know? You get some pretty floppy, pretty crazy hair; at least if you've got hair like me. And then you say, "I'm going to buzz it," and then you buzz it right off. That's kind of the... you can kind of think about that as the two ends of the spectrum. You've got your frequent haircut system and you've got your infrequent, high-severity haircut system where you just let it grow and you cut it all off.

Aside: So in this analogy, the regular maintenance cuts are the low-intensity fires; the ones that burn the undergrowth, don't spread too far, or that extinguish themselves because there's enough moisture to keep things from being straight bone-dry powder keg kindling.

But if those small fires don't happen, or if the fire-resistant older trees are logged out, or if the climate is just super hot, then you get a situation that's much more dramatic. [*"Nice haircut."*]

Alie: And is that, like... long mane to buzzcut, is that what a megafire is, then?

Gavin: Yeah, so that term... I would say that's a good way to think about it, from the long mane to the buzzcut. The term megafire is a really interesting term and it really doesn't have a great definition. A lot of people, when they talk about megafires, they're thinking about these, basically, really big fires; fires that are giant in size. But you can have a really, really large fire that doesn't necessarily create that forest buzzcut, right? It doesn't necessarily kill all the trees within its path. It may kill some trees in some parts, but not throughout the whole fire.

Aside: So a forest mullet, maybe. But not the cool kind that Gen Z has, the "Warning: My cousin will probably hit on your wife" kind of mullet. Not ideal.

Gavin: You can have really large fires that are not necessarily super damaging. You can have smaller fires that are pretty severe and intense and destroy a lot of what's there in terms of the forests. There isn't really a single definition of megafires. A lot of people like to think about them in terms of their impact to society, too. So, it's not just how big or severe they are in terms of how many trees they kill, but it's, you know, how much that fire influences people and how much of the infrastructure it destroys.

There's a growing problem within the US and particularly the Western US, which right now, as you know, is experiencing quite a bit of fire activity, is that there's a lot more people living in that interface; what we call the Wildland Urban Interface, or the WUI [*woo-ee*].

Aside: Yes, the US Forest Service defines the Wildland Urban Interface as "A group of homes and other structures with basic infrastructure and service within or adjacent to federal land that is an at-risk community." Aka: All the cute cabins that you save on Pinterest when you should be working on a spreadsheet for your boss because you just want to get away for the weekend but go someplace that still has coffee shops.

So, more and more folks ditched the cities in the pandemic for these types of living situations and might be getting their very first tastes of PSPS, which are Public Safety Power Shutoffs, when utility companies straight-up cut power for a day, maybe a few weeks, when winds are high in case otherwise-live, downed wires ignite the forest. Realtors might not tell you about that until after you're done with escrow, so, *Wow-ee* indeed.

Gavin: The Wildland Urban Interface is kind of this intermingling of people and the forest, where they kind of overlap a little bit, and there's a lot more people living there now than there was 10-20 years ago. So, you can think about fires as generally having more of a mega-impact on people now because we're just more vulnerable in some ways to those fire effects when those fires do burn through.

Alie: Now, as we're speaking, the Dixie Fire is one of the largest fires California has ever seen. There's the... Is it the Bootleg Fire, up in Oregon?

Gavin: Yep, in southern Oregon. That's right.

Alie: So, I'm surprised you were able to even talk to me right now. Can you tell me a little bit about what your job entails? Is the busy season all year round because you're analyzing data that comes in? Do you have to go to the field a lot? Are you getting reports from people who are closer to each of the fires? Do you have to count all the fires? All of that.

Gavin: Yeah, so I am not one of the incredible people who are out on the front lines doing this work on the fires. My work is really more focused on, "After a fire burns, what can we learn from it?" And there are also a ton of people, of course, who are out there responding to these fires like the Dixie Fire, and the Bootleg Fire, and many others when those are burning. Those are the people who really deserve the applause and the praise, who are out there doing this really dangerous work. And relatively speaking, I'm a desk jockey compared to those people. I spend a lot of my time here at the computer trying to take that data and learn from the fires and trying to understand how wildlife respond to those fires.

That's what I do most of the time. This last year, covid year, has definitely made things even more so away from the field. But boy, I love fieldwork, I've done quite a bit of it. I love getting out into those burned landscapes and trying to figure out what's going on.

Alie: What is it like when you are doing fieldwork? What kind of samples do you have to collect and what kinds of observations are you making?

Gavin: So, a lot of the work that I've done has focused on how this one little critter, that spotted owl, responds to these burned areas, these fires that have come through. So, myself and some of my really outstanding colleagues, both from when I was in grad school that I established during my PhD program, some of those collaborators back at University of Wisconsin, as well as some of my fantastic teammates here at the Rocky Mountain Research

Station with the US Forest Service, we've done quite a bit of work trying to understand how this bird, this spotted owl, responds to fires.

We've gone out and spent quite a bit of time in these burned areas capturing owls and putting GPS tags on them to see where they move in these burned areas, to see if they like them or if they're using them. We literally go out into the woods and hoot at them, Alie.

Alie: *[laughs]* Do you really?!

Gavin: We really do. You walk into the woods where you think there's going to be an owl and you just start hooting with your mouth.

Alie: *[laughs delightedly]*

Gavin: You just do. And they hoot back! Because they're like, "Hey who the heck is that?"

Alie: Oh my gosh!! And then are you able to count them based on who hoots?

Gavin: *[laughs]* Pretty much, yeah. So, we call them callback surveys, so we're calling and they call back. That's how we locate them, and oftentimes we're just interested in detecting them so, "Okay, there's an owl here; there's an owl there," sort of establishing where they are across the landscape.

Aside: Did I look this up? Of course! And please enjoy the absolute maestro of this art, Sierra Pacific Industries Wildlife Biologist, Kevin Roberts.

[clip of Sierra Pacific Industries YouTube video:]

Kevin Roberts: What I like to do when I'm surveying for spotted owls and using my voice, is to kind of mix them all up and do something to the effect of [high-pitched, almost-closed-mouthed grunts that imitate a hoot; then a more intense, higher-pitched squawk/scream; then down to a more mellow vwoop-vwoop call]. Thank you.

Kevin, we beg you to make a ringtone. Is it too much to ask? You can only answer that in owl hoots.

Anyway, that is how you do a Jim Carrey-level impersonation of spotted owls.

Gavin: But a lot of the work I've done is focused on capturing those owls once we find them, and putting little GPS tags on them, and seeing where they go. And we get that data, and we see where they went, and we try to figure out, "Okay, how are they interacting with some of those burned areas? What can we learn from that about what type of fire they like, what kind of forest they like, and how we might be able to manage the forests in a way that supports them?"

Alie: And how is fire ecology changing, with the climate, with droughts? Why do droughts even happen? Is the water that would normally rain here raining somewhere else? Where is the water?

Gavin: Okay, so again, this is something that much smarter people would have a much better answer for, but I will say that something that is for certain is that we are entering into uncharted territory with fire, and fire ecology, and fire behavior.

One of my good colleagues at University of California Merced, LeRoy Westerling, has said many, many times to me, and I've seen him write about this too, you know, there is no more normal in terms of fire. There's not even a new normal. It's a new abnormal because it's becoming really difficult to predict what's going to happen in the future because we don't have a reference point anymore. We're going into uncharted territory.

So, when it comes to drought, and climate change, and things like that, those are definitely a part of the equation in terms of what's going on with wildfire and what's going to happen, particularly climate change and how that interacts with forests, and dries out fuel, and things like that. Sometimes it's hard to just talk about drought and climate change, for many reasons, because it's part... as a scientist who's interested in conservation, like, what can I do about that? I don't mean to sound, like, nihilistic, like, "We can't do anything about it," because we can. We absolutely can and it's never too late to take action on those big problems like climate change.

But you know, I have the honor to work for this agency, the US Forest Service, that is in charge of managing a ton of land. So, what can we do on the ground to make a difference in terms of how these fires burn, right? You know, considering climate change... That plays a role. It plays a really important role, and so does drought in terms of driving some of these wildfire patterns that we've seen. But there's also something to be said for how forests are managed, and how flammable forests are, and how we can potentially manage them in a way that tries to mitigate those worst effects of fire when they do come through.

So, it's really like... You are going to hear people say, "These fires are just because of climate change. There's nothing we can do about it." And then you're going to hear people say, "Climate change has nothing to do with it. We just need to manage forests differently." And the reality is, it's neither of those. It's kind of both, right? It's both climate change and, you know, the forests and the patterns of fuel across the landscape are affecting how fires burn. As a research scientist with the Forest Service, I'm thinking about, "How can I do science that informs how we manage forests?"

And that's one of the coolest parts about my job, is that I work for an agency that has a really strong management component. A huge part of the agency is people out there doing this work, managing forests, coming up with forest plans, and management plans, and fire plans. And I get to do science that helps them figure out how to do that, and we work together in a collaborative way to figure that out. And that is where... I like focusing on those solutions, right? "How can we press the levers and make a difference from the ground?"

Alie: Is the leading theory on that just more and better prescribed burns? Or is it, "Humans, stop living in the woods for a while"? What is the best tool you have?

Gavin: That is a great question. And I think this is a misconception, that if humans just got out of the picture, it would all be better. I think it's easy to think that way. "We're just the problem, and humans suck, and we just need to get out of the picture and nature will do its own thing," and blah, blah, blah. And look, I understand that perspective. I'm sensitive to it. But we have to remember, Indigenous peoples have been burning for 10,000 years. And you know, we need more fire on the landscape. Not less. It's just what *kind* of fire burns.

This is kind of crazy to think about, especially given... Looking at these maps, I've got the *New York Times* Wildfire Tracker open here; I've got another tracker on my desktop open as well. With all these big fires burning, you're thinking, "Man, there's just got to be so much more fire now than there ever was."

Alie: Yeah, that's what I would think. Yeah.

Gavin: Yeah! That's totally what you would think. But it's actually not the case.

Alie: WHAT!

Gavin: There's still less fire in Western North America than there was 100, 200, 300, 500, 1,000 years ago.

Alie: But they were smaller back then? Is that the thing?

Gavin: They just burn differently. I'll bring you through a little bit of a time warp. We, often, in Western Science, delineate this pre-colonial era, and in the pre-European, pre-colonial era, there was a lot of fire in the West. I mean, these are flammable landscapes, and they never really got put out, right? All these ignitions would just burn. And vast areas of the landscape would burn all the time, depending, again, on what kind of system you're in, right? So, these frequent fire systems would burn very frequently. You know, every couple of years you'd have fires returning to the same areas.

Then when white settlers colonized, and pretty much disrupted Indigenous burning, and began actively suppressing wildfires, the amount of fire in the landscape just dropped to almost nothing. We were very effective at suppressing fires for a long time in the Western US. And basically, what's happened is, only recently have we, sort of, lost our handle on our ability to put out fires.

The level of activity that we're seeing now is still far less than the level of fire activity that used to burn. But the difference is that, because in many of these forests and particularly in these frequent-fire forests or these dry forest systems that used to burn really frequently, they haven't burned in a century or more. So when they do burn, they burn really hot and really big, and that's not a natural kind of fire for this system.

Also, along with that, we have a lot more people, again, living in those fire-prone areas. So, we feel the effects a lot more as the population has increased. So we still have way less fire activity on the landscape; it's just that these fires are typically burning in a way that is, for those forests, unnatural, and for society, really, not acceptable.

The other crazy thing is that we actually have, in some areas, particularly again in these historically frequent-fire systems, we have a lot more trees too than we used to have.

Alie: Oh! How is that?

Gavin: Yeah, it goes right along with that fire suppression. So, we put out fires for 100 years or more, and all those little shrubs and saplings that would have burned in those regular fires grew up to be big, medium-sized trees.

Aside: More trees?! Isn't that good? Meeeh... Well, it's kind of like a garage that we have failed to Marie Kondo for a long time, which, I'll be honest, is my garage. Gotta clear some stuff out! (I'm talking to myself.)

Gavin: So, we have actually a lot more trees on the landscape now in a place like the Sierra Nevada, where I've spent a lot of my career doing this research, than we used to. It's just like how the kinds of fires are different. The kinds of trees are different. We have a lot more smaller trees and medium-sized trees, and a lot fewer of those really giant, old trees which are really, kind of, an endangered species, sort of, in and of themselves. Because over the past 100 years or so, particularly pre-1980s, there was quite a bit of large tree logging, going all the way back to the early 1900s and late 1800s. So, a lot of those big old trees were removed. A lot of those smaller trees grew up with that fire suppression. And now we just have a ton of smaller trees on the landscape.

And that, again, is kind of feeding back into why we have fires that are burning differently. Because these fires are burning through, you know, these pretty thick, well-connected forests that, historically, just didn't look like that at all.

Aside: So, forests look and behave much differently now than they were for tens of thousands of years because of colonial human tinkering. Don't you want to know all about Indigenous fire stewardship now and cultural burns? So do I! And did I, hours before this podcast episode went up, decide to feverishly book an Indigenous fire scientist to talk to me for next week? I did! So stay tuned. I just thought I'd *plant* that expectation for you.

Alie: And what about the effect of fire on seeds opening and certain plants saying, like, "Sweet. There was just a fire? Now's my time to shine."? Are ashes good for certain types of botany?

Gavin: So... Okay, one of my colleagues, Jens Stevens, he's with the Forest Service as well now. He's done some really awesome work looking at tree adaptations to fire and fire regimes. But one of the most common examples of how trees are adapted to fire, particularly when thinking about seeds, is serotiny.

So, serotiny is this trait that some trees have. Not all trees but some trees have this, basically, waxy kind of resin that encompasses their cones and their seeds. And they only open when fires burn because the fire melts that wax off of their seeds, and the seeds drop, and the tree is able to regenerate. And typically, or at least in many cases, in some cases that I know of, those trees require a really severe fire to release its seed.

Aside: Okay, so serotinous means 'later' or 'following', and it is not to be confused with Sertraline, which is the generic form of Zoloft, which I googled wrong.

According to NationalForest.org, serotinous cones with full, mature seeds can just chill out, closed up, on a pine tree like a Jack pine or a Table Mountain pine for years until a fire sweeps through, and the resin melts, and then the seed confetti party time happens.

This is also – sidenote – how indoor fire sprinklers work! They're not reliant on smoke, but on heat of over 150°F. So there's a little glass capsule in fire sprinklers and it's filled with glycerin, and that heats up and bursts and opens the sprinkler valve. And apparently, they open individually wherever it's hottest, not all at once like in the movies. I'm lookin' at you, *Lethal Weapon 4*, *The Incredibles*, and *Charlie's Angels*, and *Mean Girls*, and *Casino Royale*, and *Kindergarten Cop*, and the *Peanuts* movie, and all the other ones that I'm going to link on my website because I found someone with a YouTube channel who is very pissed about this sprinkler myth.

Anyway, heat? Seeds disperse. It's natural.

Gavin: So, some trees have adapted for that trait. And in other cases, trees have really thick bark, and this is the case for many of the trees in these frequent-fire systems that experience fires all the time on a, you know, five to ten-year cycle, or in that range. Trees have really thick bark because they need to survive that frequent heat and disturbance from fire. So there's really remarkable adaptations that plants have to fire. And also, increasingly, we're trying to learn about animal adaptations to fire.

Typically, we think about these in terms of behavioral adaptations, so like how do animals interact with either fire itself or the post-fire landscape in a way that tells us a little bit about... opens the book on their evolution, how they evolved.

Aside: So what do the spotty owls like? It turns out, small patches of high-intensity fires, which were more common in pre-colonial times. Spotty owls are like me at a cocktail party. Just waitin' for a tray of eggrolls to roll past.

Now, in scientific terms, this is called a 'sit and wait predator'.

Gavin: And the owls like to sit on the edge, on that green edge, and hunt into that smaller patch of open forest where it can see little critters run across, and has a better flight path, and that sort of thing, while also concealing itself from its predator like the great horned owl. So, that's just one example that I've been involved in, but we generally expect not only plants to have these adaptations, but also animals to potentially have these behavioral adaptations too.

Alie: That's so interesting. Also, I didn't realize that owls had drama between them. You would think they'd be like, "I'm an owl. You're an owl. Let's make this happen." You know?

Gavin: I know. It's so true; there is totally drama. One of my mentors and colleagues... His name is Rocky Gutiérrez, he's done some work looking at owl communities and trying to figure out, like, how owls can co-exist in a space. There's a lot of drama out there in the owl world.

Alie: So much. Speaking of drama, have you seen the acclaimed dramatic film *Those Who Wish Me Dead* starring Angelina Jolie, who is a person who lives in a fire tower?

Gavin: No, I have not. [laughs]

Alie: Well, well, well... If you like fires and people being miscast, you will love *Those Who Wish Me Dead*.

Gavin: [laughs] Good! That's my main genre of movie that I like. Miscasting, yeah. That's great.

Alie: If you like to watch a movie and the entire time picture someone else playing the lead role, you will love *Those Who Wish Me Dead*. She is absolutely gorgeous, she's a stunner, I love her acting. I don't know why they cast her in this movie. It seemed so weird. [clip from movie trailer: "Why'd they put you in a fire tower?" "Well, I'm just lucky, I guess."]

Anyway, *Those Who Wish Me Dead*, so much forest fire and a lot of, just, breathing through smoke that seems like it should be thicker. You can smell this movie.

Aside: Listen, there are a lot of actors that are suited for certain types of cinematic environments, okay? Oh, but if you watch it, Medina Senghore is so good in it that I just looked up her name and then I followed her Instagram. So, some beautiful creatures are more well-suited to some roles and environments. That's all.

Alie: What about the term 'pyro-diversity'? Is that a real word?

Gavin: Oh! Oh, Alie! I'm so glad you asked that question.

Alie: [laughs] [Michael Scott: "I am street smart AND book smart."]

Gavin: Yes, so pyrodiversity is something that I've been spending a lot of time thinking about in recent years. It's kind of a fun buzzword, you know? "Pyrodiversity? What does that even mean? Sounds like someone made that up," and it's probably because, well, somebody *did* make it up.

It's basically another way to think about this fire mosaic that we were talking about earlier. The term 'pyrodiversity' emerged alongside this idea that pyrodiversity gives rise to biodiversity. Basically, the more different kinds of fire that we have on the landscape, the more different kinds of severities, the different fire ages... basically, the greater mixture of

different types of fire characteristics that are in a landscape is going to lead to greater biodiversity, which means more species, basically. So you have more kinds of wildlife, more kinds of plants, etc., more kinds of bees, more kinds of bats, more kinds of birds, etc., because you have all sorts of different kinds of habitat for them that's been produced by fire.

Alie: Ah! Okay, that makes sense.

Gavin: Yeah, so it's an important idea because it really kind of underlies this important role of fire. In these cases with the Dixie Fire and the Bootleg Fire, these fires that are really destructive to human infrastructure, and also, you know, to people's lives... I mean, this is really serious stuff that is sad and it's hard to watch. But on the other side of the coin, we do need fire on the landscape, right? We need a different kind of fire. We don't want to see more of the destructive fires that are out there. We want to see good fire.

What I mean by good fire is really, kind of, like this pyrodiversity idea, where we have a really nice mixture of fire that restores, cleans out the understory in some places, kills some trees, disrupts the system a little bit. Some disruption is good. And you create that really, sort of, wide-ranging variety of habitats for different critters to live. And that also supports all sorts of other great things like water quantity and quality. It reduces runoff, it reinforces the resilience of ecosystems and forests.

So, fire is so good. It's like... We want that good kind of fire. It's really such a restorative thing. And pyro-diversity encompasses this idea of, like, that beautiful mosaic on the landscape that is always changing. It's not just static. It's always changing, always being renewed. That's the idea of pyro-diversity.

Alie: Ah-ha! Can I *blaze* through a lightning round?

Gavin: Yes.

Alie: Pardon the pun! Even though I'm not sorry!

Aside: Before your questions, we donate to a cause each episode, and as a Forest Service employee, Gavin can't directly endorse anything in particular, so it was my pick this week and a donation will be going to the Common Good Community Foundation. They have established a matching fund to assist all local communities impacted by the Dixie Fire. All donations will be distributed to Plumas County agencies involved in directly assisting communities and individuals most affected by the fire. More info is up CommonGoodPlumas.org. That donation was made possible by sponsors of the show.

[Ad Break]

Okay, let's tend to your smoldering curiosities.

Alie: Great question from Nicole D-G, Marie, Charlotte Fjelkegård, Meghan McLean, Daniel Kim, Liz Gross, Eden Sunshine, Talia Duniyak, and Nicole Kleinman. In Nicole's words: What happens to wildlife when there's a fire? Daniel Kim wants to know: Are there any animals that have adapted to survive forest fires? And Nicole asks: Do they all leave or are some able to hide or survive in a sneaky way?

Gavin: [laughs] Oh, that's so great. This is a great question, so I don't know if I can do a super quick answer to this because I'm going to be too excited about it.

But yeah, so how do wildlife respond to wildfires? Here's the thing: it really depends. And that's the greatest, you know, scientific smoke in mirrors. "It depends." But it really does. Some species like fire. Some don't. And it also depends on what kind of fire it is. If it's really

severe or mild. For example, there's one species that some of my awesome colleagues have worked on; it's called the black-backed woodpecker. Many people think of it as a poster child of severely burned forest because it really needs these patches of totally killed trees. It depends on the insects that live in those recently killed trees.

It needs those severely burned forests. Several years after those fires burn and those trees are killed, it's no longer good habitat. It's really kind of a short-term thing. They flock to these really severely burned places, they totally thrive, and then they are out of there and onto the next fire. [*"I'm outtie"*]

Some critters love that. Others, not so much. The spotted owl, the species that I spent a lot of time studying, is really more of an old forest obligate. It doesn't love that severely burned stuff quite as much. So basically, there are winners and losers. That's the answer. It's never as simple as you make it. It's not just, "All animals are going to die or leave when a fire burns." No, some of them are going to do great and some of them are not.

That's part of the beauty of studying this stuff, is trying to figure out why. Why do some animals love it and some don't? The world is so complex and amazing. It's really fun to try to figure that out.

And then in terms of where animals go, some animals can escape fires; fly out of the way, run out of the way. I always think of the movie *Bambi* when, like, all the animals are parading out of the forest. [*clip from Bambi in the background: foreboding orchestral music and birds cawing in alarm*] I don't want to ruin *Bambi* for anybody, but some animals can evade fire. Even flying critters cannot always fly away from fast-moving fires. Some animals will burrow under the ground and wait for the fire to pass and then come back out, which is totally crazy. It's nuts.

Aside: Ooh! Okay, burrowing critters hiding from fires. My heart burst into flames.

Which animals burrow? Some Australian possums hide out in tree hollows. Snakes hightail it down a burrow. But wombats also hit the basement during bush fires. And there were a bunch of internet rumors going around last year that they invite and usher other critters in. These rumors spread like wildfire, but they are flimflam. They actually just tolerate animals hiding out in their wombat doomsday bunkers. But, same with gopher tortoises in the US. And to hear all about that, you can amble slowly over to the Testudinology episode with wonderful tortoise scientist Amanda Hipps.

Now, what about rebel birds?

Gavin: There are other creatures... There's firehawks down in Australia, and they will actually, like, pick up burning branches and drop them to burn other parts of their habitat so that they can catch their prey.

Alie: I have heard of these and it sounds so devious. They even will get together and wait for rodents to run out.

Gavin: That's just wild. There's winners and losers. There's such a variety of animals that respond in different ways to fire, and that's just the coolest thing. And that's one of the reasons why pyrodiversity, going back to pyrodiversity, is thought to promote biodiversity, because the more variety of fire you have, the more different kinds of animals are going to benefit from that variety, right? So if you have your forest that was killed by fire next to a forest that is totally green, and old, and decaying almost, we have this big mosaic of different kinds of

forest that burn at different times, that's going to support all kinds of different critters. So, it's a cool thing. [Martha Stewart: "Now that's a good thing."]

Alie: And several people, Rebekah Weinzetl, India Lind, Nicole Kleinman, and Jesse Hurlburt want to know: Can I really prevent forest fires? Or is this just another example of a giant corporation trying to foist responsibility onto individuals? Nicole wants to know: Was Smokey the Bear more helpful or harmful to forests? What do you think about Smokey the Bear? Are you at liberty to say??

Gavin: [laughs] I think Smokey the Bear is super cute. I will say that we absolutely can prevent forest fires. Not all of them, and not necessarily that we should prevent all of them. Think about prescribed fires, right? We do want to put some fire on the landscape. But as I mentioned before, a giant majority, like between 80-90%... Humans cause 87% of all wildfire occurrences annually within the western US. That's crazy! That's a big number.

And a lot of those... You can go look this up. There's a couple studies out there that have shown these gigantic spikes of fire activity on the Fourth of July every year.

Alie: [pained] Ooh.

Gavin: We absolutely play a role in ignitions. A very small percentage of all of the ignitions result in those really big, big fires. Of course, many of the fires that ignite don't burn everything up. But we absolutely, as people, can be careful about how we burn. I think that Smokey the Bear is just misunderstood. [laughs] You know, because it's true, we as people... We absolutely do start fires. We start unintended, unplanned fires that sometimes result in really devastating circumstances.

There's sort of this perception that all fire is bad, among some people. And I don't know if Smokey the Bear is associated with that or not, but you know, all fire is not bad. Fire is so important, and the reason why some fire is really bad right now in particular is because we haven't had the kind of fire on the landscape that is natural in a lot of these systems.

Aside: A lot of patrons – looking at you, Michael Davis, Peter, Ashley Herbel, Sébastien Papineau, first-time question-askers Karla Jerez and Ada Smith, Shandra Mason, Bennett Gerber – they all essentially asked: What do we do?!

Alie: Should firefighting teams approach it more strategically? Like, let it burn 25 miles over here but let's stop it here? Or at this point, like... What do we even do?

Gavin: Yeah, so that is such a difficult and vexing question that much smarter people than me are thinking really, really hard about. So, I don't want to make any really poorly informed statements about how firefighters should be doing their job because they're doing an incredible job. But I'll say that, generally, there's many times when fires are burning and there's a decision made to let the fire burn on its own for a little while when it's deemed to be safe. Especially in areas where there's not as many people, like more wilderness-type areas, because fires can do some of that work for us to restore the natural structure of a system.

So, fires can be really restorative, especially in those cases when we think it's going to burn in a "healthy" way or a natural way and there aren't people who are in danger. That's kind of the idea of those managed wildfires. You know, when wildfires burn we're trying to manage them as opposed to just put them out or suppress them.

Alie: And from Smokey the Bear, let's move on to goats. Ashley Mitton and Leanna Shuster literally both started their questions: [drumroll] Goats! (Both of them.) Please tell us about

how goats are used to help reduce fire risk in areas with excess vegetation. And Ashley says: I mean, a few hours and they chewed down most of the pasture. Can goats save us?

Gavin: *[laughs]* Man, I wish goats could just save us! That would be so great. Just hand it all over to them. Yeah. I'm sure they've got it figured out.

No, but I actually don't know about goats being used in wildfire management. That could just be my naivety, so I'll punt that one.

Alie: Okay.

Aside: All right, goats. I tried to rent some for my hillside about two years ago, and it was a minimum, sadly, of five acres. And I had just moved in and it was too soon to ask my neighbors if they wanted to go in on a goat herd with me. I didn't want to come on so strong. But there are businesses like GoatsRUs.com that'll rent them out. I thought this was a pretty common practice, hiring goats to eat your overgrown grass, because when I was in high school in Northern California, a lot of neighbors did that. And then I read the FAQ on GoatsRUs.com, and *WHAT?!* This business started in the tiny town I went to high school in, around the time I was in high school! Holy Literal Smokes! As far as coincidences go, it's the *Greatest Of All Time*.

So this next smoky query was asked by plenty of folks, including patrons Hanna, Aussie Alannah Wood, firefighter supporter Lizzy Martinez, Charlie Caccamo, first-time question-asker Ashly Martinez, Nina Eve Zeininger, asthmatic Ada Smith, Joseph, and Kaydee Coast.

Alie: Let's see... Dylan McGuire says: I live in eastern Washington where smoke has become the fifth season. When will we have the giant forest rakes mentioned by Donald Trump? *[clip of Trump: "They spend a lot of time on raking, and cleaning, and doing things..."]*

Do we need to rake the forest??

Gavin: So, this is... *[sigh]* I think, again, this is just a misunderstanding. So, going back to smoke. This is a real problem, right? We don't like being exposed to smoke. You remember... I don't know, Alie, if this happened where you were. I think this was up in the Bay Area. Last year, you probably remember seeing all over social media, those pictures of San Francisco being just, like, orange; like some scene from *Blade Runner* or something.

Alie: Yeah. Mm-hmm.

Gavin: The problem with smoke is that, you know, it's going to be there. It's going to happen. If we're living in a system that has fire where we need to have fire, we're going to also have smoke. That's just a part of it, right? Where there's fire, there's smoke.

The real important question is: How do we want our smoke? *[both laugh]* You know? And that's how some people are trying to think about this problem of smoke because it is a real, serious, public health problem, right? With these unplanned "megafires" that happen, we all of a sudden get a ton of smoke, we didn't know it was coming, it disrupts our lives and puts us at risk, and there's a lot of smoke that happens, right? Just this past week or two I saw people on Twitter, you know, out on the East Coast saying that they were getting some smoke from some of the wildfires in the West.

That kind of unpredictable nature is, I think, for many people, not desirable. *["Oy vey!"]* So, the idea is, if we can use more prescribed and planned fires, and more cultural and Indigenous fires, where we know when the smoke is coming, it's a lower amount, less smoke in general is coming our way at any given time but maybe a little more often... Those

are kind of the two options, right? We can either, sort of, have our smoke in big pulses when we don't know it's coming, or we can try to make it a little more predictable.

Alie: It seems like the 'wheres' and the 'whys' are important here.

Gavin: That's exactly right. Yes.

Alie: For sure. What about... Maria Jouravleva wants to know: Underground wildfires. I understand how they start, but how do they keep going? How is there enough oxygen for some to last for years? How deep do they go? Jeremiah Miller says: What's the strangest place there's been a wildfire?

They're underground??

Gavin: Yes, some fires do burn underground. It's kind of crazy.

Alie: WHAT! How??

Gavin: So, one of the interesting, kind of, related phenomena that I have witnessed is, sometimes in these areas that have recently burned, you come across a gigantic hole in the ground. Like, just a giant hole. There's trees around, and then there's just a gigantic hole in the ground. When I started doing this work in these post-fire landscapes, I was like, "What in the heck is going on here?" And I started asking around, and these are basically trees that have burned, and kept burning, and smoldering, and smoldering, and the smoldering fire continued down through their root system, underground, throughout the whole root system, and maybe they'll even pop up somewhere else a little ways away where the root kind of pops back up onto the ground.

And basically, these are like gigantic casts for trees, right? Like, where the tree and its roots used to be. So, fires can absolutely burn in a subterranean way. I've seen some of these, sort of, root holes following fire, which is kind of wild to see.

Aside: It is wild to see, and I know because I just watched a ton of videos of smoldering, flickering root systems. They can burn for weeks. Months! Maybe even through a whole season. And the fire will just pop up somewhere else.

Also, somewhere in Pennsylvania, there is an abandoned Centralia coal mine that's been on fire since 1962. Experts say there is enough fuel to just keep it burning for 250 years. No one knows what to do; they just all left town except for five people who live there. They're like, "We're not going anywhere." And we're like, "That's cool."

But yes, fires. Underground. Flames... breathing... heaving...

Alie: Oh man. I didn't even know that was possible. I would not have thought that. That is bananas.

Aside: Some of y'all, patrons Lizzie Marr, bushfire asker Brandi Harbaugh, and first-time question-asker, long-time lurker Adriana Alfaro want to know: What can we expect the normal amount of wildfires to be? Is there a normal? They all want to know, numerically, how much worse are big wildfires going to get? Give us numbers! We need numbers.

Gavin: So, if you look at how fires have changed in the last 30, 40 years, we have seen a lot more fire activity now than we did 10, 15, or 20 years ago. One of my colleagues, who I just mentioned a moment ago, his name is Sean Parks with the US Forest Service, and one of his colleagues, they put out a study recently showing that between 1985 and 2017 there was an eightfold increase in area that burned at high severity on an annual basis in the Western US.

Aside: *Eightfold!*

Gavin: So, there is certainly a lot more large fires now, and also those fires are burning more severely now than they did 35 or 40 years ago. But that's, like, the small-scale context. If you zoom back out and look at the whole context of the last several thousand years, we are seeing less fire now than we did way back when. It's a different kind of fire that's burning, that's not necessarily natural in some of these systems.

And also, we are experiencing more of the effects of fire than we ever have as humans, the negative effect, because we're living in these fire-prone areas where, for a long time, it was somewhat safe to live because fires weren't burning that much for the last hundred years in a lot of these areas because we were pretty good at putting them out. But now that those fires are burning more severely and more intensely, and we're living there, and we have the news to cover it all the time, yeah, we certainly are hearing about it more.

And it is having a serious impact on people, as you know. There's all sorts of really tragic stories of these fires spreading through towns, and one of those towns just... the Dixie Fire, I believe, burned through Greenville, California in the last day or two. And that's an incredibly tragic thing to have happen. We are living in a world that's really different now.

Alie: Right. I know it's, kind of like, top of mind for everyone. I feel like when you say, "I live in California," people ask you, like, "Is your city on fire?" And you're like, "I don't know. Let me check Twitter."

Gavin: [*laughs*] I just texted one of my friends who lives in California, like, "Are you guys... Where are you? Are you okay? Are you burning?"

Aside: Literally, [*newsbreak beeping*] this just in: According to an NPR report that dropped about an hour ago, the US Forest Service just announced that wildfires will be aggressively extinguished this summer and all the preventative, controlled burns are suspended.

Apparently, fire season is predicted to be so bad they can't spare any of the thousands of firefighters on the ground to go do prescribed burns. Kind of like not being able to go to bed because you have a paper due, but then you can't finish the paper because you're too tired. Something's got to change. Tune in next week for more on that.

Now, on the topic of heavy hearts amid blazing wildfires.

Alie: Is there anything that is the most difficult thing about being a fire ecologist? I mean, already the idea of, like, a charred owl leg is going to hurt my heart until the day I die, but anything that is just really frustrating or really difficult for you?

Gavin: I would say that one of the frustrating things is just how difficult this problem is. It's just such a big problem, and sometimes it's hard to, sort of, feel like we can get out of it. I like to call myself a reckless optimist. [*laughs*] For me, the glass is not half full. It's like, "Oh my god, it's almost overflowing." It's like, "We can do this, you guys. We can totally do this."

This is such a difficult problem. It seems like we're facing the same problems every year, but I think there is a light at the end of the tunnel and that light has to do with getting more of that good fire on the landscape. And that's something that I know is a priority for the agency I work for, the US Forest Service, and trying to restore the resiliency of these forests.

And the, sort of, nugget of goodness that I try to take is that we, at least on my side, the science side of this agency, we have this incredible opportunity to, like, learn about fires, why they burn, how they burn, what their consequences are, and what we can do about it. And we get to work with the managers and the people who are, again, out doing that stuff

on the ground. We've got our hands on some of the leverage. We can make a positive impact and we can make a change in, you know, how these fires are burning, even as we're thinking about bigger problems like climate change. We can put our fingers on the lever a little bit. So, there's a huge opportunity in the coming decades to make a big difference in, sort of, the next century of fire.

Alie: Yeah, how do you think an average Joe like myself, sitting around biting my nails at the news, what *can* we do?

Gavin: [*laughs*] You know, I would say, follow Smokey the Bear's advice. So, we'll put him on a pedestal for a minute and say, just watch out for yourself and make sure that you are not contributing to any of the problems with these unplanned ignitions and fires. That's one thing you can do. So, maybe try to avoid explosive gender reveal parties. That's good. You should probably not do that. Don't be throwing your cigarettes out and don't drive your car or anything on dry grass and things like that.

You know, there's little things like that you can do. But this is a big problem and it takes both individuals to make sure they're not starting these unplanned fires, but also these big, institutional actions and management to fight this problem. So, I would say don't bite your nails down to the bone. Just make sure you're not the one who's starting that fire.

Alie: Okay, good to know. "Don't start any fires. Don't try to impress any ex-girlfriends by starting a fire."

Gavin: [*laughs*] Yes. Don't do that. They're not going to be impressed.

Alie: Not going to be impressed!

Aside: The gender reveal party couple who started a fire last year in November were charged with manslaughter for a firefighter's death. And that lovelorn arsonist of the 2014 King Fire? Sentenced 20 years in prison and ordered to, somehow, pay \$60 million to victims of the crime.

Imagine what you could do with \$60 million and 20 years of your life. Yeah, think twice before doing any hornt up fire tomfoolery.

Gavin: Just get 'em a cupcake or something with one candle.

Alie: Get 'em a cupcake! Do that. Don't be on the news.

Gavin: Yes.

Alie: What about your favorite thing about fire ecology? Is it putting puzzles together? Is it being out in the field?

Gavin: I would say my favorite part about being a fire ecologist is similar to my favorite part about being a scientist, which is just that we... The world is infinitely more complex than we think it is, and I learn new things every day about what's going on with these fires and how animals are responding. My preconceptions are always, kind of, just blown out of the water whenever I start digging into this stuff. So, it's just such a wonderfully rich world out there, and fire is such a critical part of that whole system. So, being able to step into that complexity and try and just use my little pick to chip away at one corner of that, you know, vast unknown. The world of fire ecology is just the greatest honor and pleasure.

I've got three little kids, and you know, when I sit down at my computer and start clacking away every day, I'm partly thinking, like, "What can I do to make this world better than when I came into it?" And you know, sometimes it may seem that my little corner of the

world is insignificant, but I like to think that me and all my wonderful colleagues within my agency, and outside of it as well, working in this area, we're all pulling in the same direction and we're trying to, you know, make this world a better place as well and get that good fire back on the landscape, and try and... yeah, change the game a little bit.

Alie: I love it. I appreciate it so much. I'm glad that you are not currently in the middle of a fire.

Gavin: Me too!

Alie: Thank you for talking to me during, obviously, a very, very busy time for fire folks.

Gavin: It's been my pleasure. Absolutely.

So yes, fire off your burning questions to the coolest nerds out there. That is what we do. And stay tuned for a special follow-up episode next week. Cross your fingers I can make it happen!

Learn more about Dr. Gavin Jones by following him on Twitter [@EcologyofGavin](#). We are on there also [@Ologies](#), and I'm on there as [@AlieWard](#). Same [handles](#) on [Instagram](#). Come be our friends. Feel free to support the show for a dollar a month, if you like it, at [Patreon.com/Ologies](#).

Merch is available at [OlogiesMerch.com](#). Thank you, Shannon Feltus and Boni Dutch, of the podcast *You Are That* for managing merch. Thank you, Erin Talbert, for adminning the *Ologies* podcast [Facebook group](#). Thank you to Emily White of The Wordary for making the transcripts. Caleb Patton bleeps them, and those are all available for free at the link in the show notes.

Every other Thursday, we also release new *Smologies*. They are edited down, short, clean, classroom-friendly versions of your favorite episodes. Thank you to Zeke Rodriguez Thomas of Mindjam Media for editing those. Big thanks to Kelly Dwyer for website design. If you need a website, she's your gal. Link in the show notes to her. Thanks, Noel Dilworth and Susan Hale, for keeping the schedules running, and for social media quizzes, and for #MerchMonday posts.

Thank you to main squeeze and hot-as-hell editor Jarrett Sleeper of Mindjam Media for putting it all together. And of course, long-time editing help, Steven Ray Morris of the podcasts *The Purrrcast* and *See Jurassic Right*. Nick Thorburn wrote and performed the theme music. He's in a band called Islands. They have a new album out; Islomania.

And if you listen to the end, you know I tell you a secret. And this week's secret is: Sometimes if I need a brain break, I'll go on Craigslist and I'll just click the "Free" section to see what people are giving away, so you can see things that people just put up that are free. And I sometimes like to look and see what people are getting rid of, and then I try to figure out what a life story is for that. Like, "Why is this person giving away a ballerina statue? What's up with this wheelbarrow?"

Let's look at a couple right now. You want to? Okay. Let's see what's up there.

Ah! There's two guinea pigs and it just says, "Need Gone." Damn, that is the meanest way to give away a guinea pig. Now I just want to get these guinea pigs.

"I have ten guinea pigs needed for pickup. I can no longer take care of them and will have to release them if I cannot find anyone to pick them up." Yikes! If anyone needs guinea pigs in LA... I didn't mean to make that so sad.

A vintage artist portfolio case... Did they quit being an artist? I don't know. I hope not. Ooh, here's a six-foot pine ladder. I don't need one, but it's fun to look. A lot of free pianos on here. Again, I don't want or need these things, but sometimes it's just nice to wonder, "How'd that person get the piano

in the first place? And why don't they play it anymore?" Anyway, I love when people spare things from landfills and other people can get things for free. What can I say?

Ooh! Tap shoes!

Okay, berbye.

Transcribed by Emily White at TheWordary.com

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