Free to Grow: How Pesticides Help Trees Grow

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Seth Barnes: We live here, too. We want clean water. We want safe, recreating opportunities. We live and work and play in these forests as well. We drink the water. We have families. And so we care, and we want to be stewards. And what we've found everywhere we've looked, as far as I'm aware, in my tenure in this position, is that we find clean water coming off of private forest land.

Chris Edwards: Welcome to Forestry Smart Policy, a podcast produced by the Oregon Forest Industries Council for policymakers and other thought leaders influencing decisions in Oregon. I'm Chris Edwards, your host and president of OFIC. In this episode, I sit down with Katie Murray, executive director of Oregonians for Food and Shelter, and Seth Barnes, director of Forest Policy for OFIC. We take on arguably the most controversial and misunderstood topic in forestry, pesticides. We talk about how, when, and why pesticides are applied, how forest waters are protected, how state and federal agencies determine safety risks and regulate pesticide use, and whether Roundup causes cancer. Along the way, we discuss the difference between aerial and ground application, new regulations resulting from the private forest accord, and what water quality monitoring tells us about the safety of our drinking water. Without further delay, here's my discussion with Katie Murray and Seth Barnes.

All right, today we're here recording an episode on pesticides, which will surely be a spicy conversation. Here with Katie Murray from Oregonians for Food and Shelter, the Executive Director of Oregonians for Food and Shelter, and Seth Barnes, Director of Forest Policy for the Oregon Forest Industries Council. Thank you both for being here to talk a little bit about pesticides. I know that I am going to probably learn quite a bit in this episode, and hopefully this is an informative conversation for policymakers here in Oregon. But before we jump in to the discussion, let's talk a little bit about your background. Katie, we'll start with you. You're executive director at Oregonians for Food and Shelter. What's your professional background? What are your credentials? Why should we be listening to you when we talk about pesticides?

Katie Murray: Thank you, Chris, and thanks for having me on your podcast. This is the first time I've ever done a podcast, so I am moving up in the world as we speak. I've been at Oregonians for Food and Shelter for just about three years now. I came to OFS from Oregon State University, where I was in the Integrated Pest Management Center for almost 15 years. I worked largely in agriculture, not so much in forestry, but working on issues related to pest management for producers of food. As we all know, growing food is a difficult

venture, and pests are kind of the number one challenge. I just learned a lot through that experience about pests, pesticides, why we use pesticides, what happens when certain pesticides get phased out or their labels get changed, what those impacts are to producers, and how it impacts production overall.

Chris Edwards: Maybe you could tell us a little bit about what Oregonians for Food and Shelter is or does.

Katie Murray: Sure. Yeah, thank you. So Oregonians for Food and Shelter is a trade organization. You know, we have a lot of businesses within our membership across both agriculture and forestry. We have individual operators all the way up to companies and other trade organizations. And we primarily work on issues related to pesticides, fertilizers, and biotechnology. So anytime those issues come up either in the legislature or in the regulatory space, we engage in our, really our number one goal is to achieve science-based policies around those topics, which, as we're going to talk about today, tend to be very controversial. And there are a lot of emotions that get involved when we start talking about these issues. So we're really working to promote science-based policy and support for innovation in these sectors just as much as we supported in other sectors.

Chris Edwards: Before we move to Seth, and how did you end up at the Integrated Pest Management Center? Did I get the name right?

Katie Murray: Yes, you did. It's now called the Oregon IPM Center. So I came there from a grad program at Oregon State in Applied Anthropology. So my program was related to natural resources and communities. They have a really interesting program there. I don't know if they still have that focus area at OSU, but they really go into communities and look at the impacts of the natural resource sector, changes in regulations, how that ends up changing communities. And so that was my first introduction to Oregon. I was actually in the Peace Corps before coming to Oregon. I traveled around the state. It was an interdisciplinary program, and we just learned a lot about different sectors and different rural communities and the issues that they're facing now.

Chris Edwards: Okay, so we may end up cutting this, but I want to know a little bit more about what you do in the Peace Corps.

Katie Murray: In the Peace Corps, I was an English teacher. I was in Mongolia for two years. Yeah, it was a crazy… I mean, it was 20 years ago now, so it feels like another lifetime. But I actually worked a little bit with a Mercy Corps program there that was transitioning nomadic herders into more settled lifestyles. So things like planting alfalfa for their animals, and the deserts there are growing, and food is more scarce. So that nomadic

lifestyle isn't as viable for them anymore. So they're needing to settle and grow food and grow food for animals. So that was a big effort.

Chris Edwards: I have so many more questions about that, but we won't take time on this podcast to explore that. Okay, and then Seth, tell us a little bit about your professional background and why you're sitting in this room with us here today to talk about pesticides.

Seth Barnes: Well, I'm a multi-generational Oregonian and one who has a strong foundation in forestry, I guess you could say. My parents, my grandparents were in forestry of some degree, sort or another. My grandfather was a fishing guide on the Siusla River. So I went to school when I was considering careers. My forestry just seemed like a natural way to go. I had already worked in forestry for a lot of my life, doing work with my dad as a consulting forester. And so I have a degree in forest management from Oregon State University. Then I went to work for the Department of Natural Resources up in Washington State. So I left Oregon and went up to Washington and worked there for 12 years, everything from state forest to forest policy work out of Olympia, dealing with the Washington Forest Practices Act, implementing the Forest Practices Act in Washington. It was a great experience, but I always wanted to get back home and work on issues in my home state. Well, while I was up there in Washington State as well, I pursued a master's degree at Washington State University in public administration with an emphasis in natural resource policy. That was super interesting and really learned a lot and enjoyed that. I kind of rounded out my forestry science background with a little political science, which was fun for me, and kind of led me in a direction to go more policy work, frankly, and ended up here coming back to Oregon at the Oregon Forest Industries Council, really doing similar work that what I was doing for several of the years when I was in Washington, but just with a different... sitting on the other side of the table, so to speak, representing landowners now in this role, instead of working with the agency or working for the agency. So still work largely with a lot of counterparts and folks working for the agency. And I feel like that background gives me pretty good insight into the kind of work that they do and things that are facing them and helps me be more successful at trying to be a team player and help them and all of us be successful.

Chris Edwards: And you've been at OFIC since 2015, 16?

Seth Barnes: Yep, 15, 2015.

Chris Edwards: Okay. There's no question that there is a lot of emotion around these issues. And I think that emotion is usually grounded, I mean, primarily in fear. And it's all sciency stuff. And most of us lay folks are not scientists. And so it can be a little bit overwhelming, especially when there are folks with certain agendas that use tactics to

make us very afraid. So we're going to get into some of that in this discussion. We're going to start super high level and then we'll drill down as necessary. And I'm going to start, Seth, by just with the super basic question, why are pesticides, herbicides, why are they used in forestry? What's the purpose?

Seth Barnes: Yeah, that's a good question, good basic question. Reestablishing a new forest is one of the most important jobs the forester has.

Chris Edwards: Did you say reestablishing?

Seth Barnes: Reestablishing, so it's following harvest, right? Making sure that we get the forest reestablished and growing again is really the legacy of any forester. In fact, if you drive around long enough with, it won't take very long, if you drive around with the forester in the pickup truck, it won't take very long before he or she points out several stands along the way, several forests that they will tell you that they had a hand in establishing. It's a source of a lot of pride for foresters, and we really take that very seriously. Like I said, it's a lasting legacy. And I would say pesticides is just one of the tools that helps us establish a healthy, vigorous new forest.

Chris Edwards: So when you say it's one of the tools that helps you establish, so you're planting trees, and then you need pesticides for what purpose?

Seth Barnes: Anytime you're doing anything like farming, agriculture, forestry, you're doing a little bit of battle with natural elements as well. And so there's noxious weeds, there's invasive species, there's pests of all sorts and types. And in the forested setting, mostly what we deal with is the noxious weeds and the invasive species. And so it's stuff that most Oregonians are familiar with, Himalayan blackberry. I mean, as much as people love picking blackberries, nobody likes having a big giant bush of them in their backyard.

Chris Edwards: I call those lucifer berries. They are not Himalayan blackberries. They are sent by Satan himself, and they are sharp, and they are nasty, and they will rip you open and bleed out right there on the trail. But they make great tasting jam.

Seth Barnes: They do make great tasting jam. Lucifer berry jam. But we deal with those same things in forestry, and they are trouble. Especially if you have them, and they are all over the place, right? Anybody who has dealt with scotch broom much in their life feels the same way as they do about Himalayan blackberries. It's a noxious weed. It's really hard to get rid of, and all we are trying to do is knock those weeds and noxious plants back long enough, hold them at bay for a couple of years, get those trees established. Once those trees have a good root system, have a leader above where those weeds will impact them, they will outcompete. And so that's really all we're trying to do is knock back that

competing vegetation for those newly established seedlings so they can get a head start and then they take it from there.

Chris Edwards: All right. So that's a pretty good explanation of why pesticides are used. How often are they applied? Like how many years? Because a stand of trees may be harvested at 40 or 50 or 60. We have members that harvest their trees older than 100 years old. And across that entire lifespan, how many years, how many successive years are pesticides applied?

Seth Barnes: That's a good question. This is where we differ a little bit from our friends in agriculture because we are dealing with a crop, so to speak, that grows on a 40 to 60 to 80 year time scale, right? Depending on where you're at and what your goals are for your property and how well your trees grow. So we apply pesticides typically only in the first two to three years, maybe as far out as four, but that's it. From that point forward, there's no pesticides applied. And in forestry, we use the term pesticide, and Katie can get into this more, but pesticide is sort of a term that's used generally to describe a lot of different types of chemicals. What we use in forestry fairly exclusively in the forest setting, I'd say 99.999% of the time, it's herbicides that we use, which are meant to hold back plants. There are some insecticides that occasionally get used. Those are used, as far as I'm aware, exclusively by state agencies that are dealing with those really terrible outbreaks. But in the forested setting, private forest land, it's herbicides that we apply.

The other thing that I would point out is that we use them, like you said, and like I said, in the first couple of years, two, three, four years of the life of that young forest, in order to reach what's called in forestry quote unquote free to grow. That's a term you'll hear foresters use. It's in the Forest Practices Act as a requirement. We have to meet free to grow, meaning that we have to have at least, and this is the standard in the Forest Practices Act, at least 200 trees per acre growing free of vegetation. They have to be healthy, vigorous, acceptable species that are growing and not going to be impacted deleteriously by the competing vegetation. In other words, they are free to grow.

Chris Edwards: And then in order to accomplish that, what time of year are those herbicides typically applied?

Seth Barnes: There are two different windows of time to apply, one being in the spring and one in the other in the fall. And those accomplish two different things. So I'll start with the fall. Typically in the fall, we would do what's called a site prep application. So prior to the site being planted, we would apply some herbicide that would help hold back some of those weeds, as I described before. And allowing then, once we do plant the trees, allowing those trees to have a good head start before the rest of those weeds and plants start

competing with them. And then, so those are, that's one, and there are certain types of chemicals that would be applied during that window of time. And when I say fall, it's usually a window of anywhere between August through end of October sort of time period. And that's driven by the weather as well. And we'll get into that, I'm sure. But we can only apply during favorable weather conditions. These are small windows where the wind is light, where there's, precip is very low, fairly dry. Those are good conditions for applying. And then again, there's another window of opportunity in the spring. And that's a post emergent that we would typically do. And that's a spring release. So in the fall, we might do a site prep, right? And then we would plant those trees and then we would wait a full year. And 18 months later, we might come in after those trees are a year old, or maybe even two years past growth. So it depends on what's growing up. If they're seeing a bunch of stuff come up that is out competing and it's really hindering those trees and they're struggling, then there would be another window of opportunity where another application would be made. And that's why I say it's typical for many operations to only have two applications because one would be that site prep and the other would be the release. Sometimes, depending on how much competing vegetation you have and how poor the site is or even how well your seedlings are surviving given other conditions or how vigorous the seedlings are growing, you might come back again in a couple of years at year four, say, and do another application to help them with another leg up. But that's usually about it.

Chris Edwards: Okay. And when you're applying an herbicide, what type of volume are we talking about?

Seth Barnes: Yeah, that's a good question. And it depends on the product, right? Some products, there's a little bit more than others, but in all products, it's not very much. I think for the lay person, you'd be surprised at how little actual active ingredient goes into a mixture that covers an entire area. So for a little bit of a comparison, many of the chemicals that we apply take about what would be equivalent to a can of pop, like 12 to 16 ounces, diluted in water, and then spread across an entire acre, which is about the size of a football field. So think about a can of pop spread across an entire acre. It's not very much actual active.

Chris Edwards: That sounds, so I'm not a forester, and I've never done this professionally myself, but I have seen herbicides sprayed by homeowners on their lawns and their flower beds and whatnot. And I feel like it goes on a little bit thicker than that.

Seth Barnes: It probably does. No, homeowner. And that's where I think that it's important to note that in the industry, we're required to have licenses and to go through extensive training and constant re-certification in order to keep those licenses current. As you're alluding to with the homeowner, the products that we use are all available to, mostly

available to homeowners to deal with similar pest problems in their, in or around their house. They can get a lot of these products at Home Depot and other places. The difference is those people that are buying them at Home Depot don't have extensive training and are not, and are also not knowledgeable about how much to apply, when to apply, all of that sort of thing. So surely you get… I think the operating paradigm for the homeowner is often more is better.

Chris Edwards: And from previous conversations that you and I have had, Seth, you've shared just how much of an expense these herbicides just are really costly. It's costly to purchase and it's costly to apply. Whether it's helicopter or hand crews, it's not inexpensive.

Seth Barnes: You have to remember as well that a forester is not or a landowner doesn't receive any revenue from this activity, right? This is all about establishing a forest that you will then harvest in 40 to 60 years. And so you're trying to keep those costs, those initial input costs of reforestation and establishing a good forest at as low a level as possible because you're carrying that cost for decades. Foresters have a ton of incentive to apply as little, yet as effectively as possible. In other words, make the most out of what you're doing, so make sure that you're applying the right pesticide, make sure that it's applied to the right places so that you can get the best coverage and the most efficient and best use of the product while not spending more time or more effort or more chemical than is needed.

Chris Edwards: Okay, so you mentioned both aerial application of herbicides and I think you said ground application. So what are the pros of the two different approaches?

Seth Barnes: Yeah, we apply what we would call aerially via helicopter or ground and that's typically hand crews, right, with backpacks. Pros of aerially applying? There's a lot of pros. It's efficient. You get very even application. I was talking to somebody the other day and equated it to if you're mowing your lawn and you had a team of people out there with scissors cutting your grass, how even do you think that would be versus going across it with your lawnmower where you can see where you just went.

Chris Edwards: Oh, right. You can see those tracks.

Seth Barnes: It's very similar actually with helicopter application. We actually have GPS systems in these helicopters. In real time, the pilot can see where they just left off. They can produce that back for the landowner and ensure that they hit all of the spots that they were supposed to go over without over spraying into areas they weren't supposed to go over. Aerial application via helicopter is also very efficient across space as well and time. These areas that we're applying to are not right next door to each other typically and are also out in the woods, so to speak. They're out in the hinterlands and helicopters are able

to get from point A to point B very quickly and efficiently and get down into close to that unit and get the job done. As far as ground base or hand application, you can get pretty targeted. You can get a little bit closer because you're doing it very close to the ground. A con of ground application is it's labor intensive. The people doing the work, they're doing on a very steep ground, got weight on their back. So you can have turned over ankles, tripping hazards. There's all sorts of things that are exposed to that way. It's tough work.

Chris Edwards: So before I turn some questions to Katie, we can't leave the topic of application, particularly aerial application of herbicides without talking about drift. Because that's always a concern of folks that are worried. They say, well, look, what if that drifts off target? What if it drifts over and hits my property? I'm a neighbor. I'm concerned about that.

Seth Barnes: Yeah, off target application or drift, as you're putting it, is not allowed under the Forest Practices Act, and it's not allowed under most labels or all labels that I'm aware of. And ODA has rules that make that illegal as well.

Chris Edwards: Just so the listener knows, we're going to get into... I have a question that I'm going to ask Katie about labels here in a minute, because when you say labels, it's not allowed by the labels. I think, you know, as a lay person looking at my cereal box, so we're going to talk a little bit about what a label means in the pesticide world in a minute. But so continue. Sorry to take you off track.

Seth Barnes: No, no, that's great. Yeah, the labels on these chemicals are extensive. Each one of them are a book, basically.

Katie Murray: So I can add a little bit about Drift here, just because one of the things that we do at OFS is really engage when these issues bubble up wherever it is, whether it's in a county or at the state level, or even sometimes at the federal level. Many people are probably aware of controversies happening right now in Lincoln County related to aerial pesticide application. This is not a new controversy there. We've seen that play out over many years. And one of the things that we do when this does arise is look to the data. So what do we see out there? What's actually happening? And it's understandable that Drift would be a concern, especially if you live nearby some of these areas that are going to be sprayed by helicopter. That's an understandable fear. But the way it actually plays out, this is a very, very rare event for it to happen. So we have to always ground the concern with what we actually see playing out on the ground.

Seth Barnes: I would say a lot of that, Chris, is because of the new technologies that we have that are far and away better than previous older technologies. Raindrop nozzles, and I'm not an expert on all of these technologies, that we'd really have to get an actual

helicopter applicator. And they love to talk about this stuff, so maybe that's a follow-up podcast. But raindrop nozzles that make sure that what you're applying really goes straight down to the ground, so you get coverage just where you're applying. The width of the boom and how that boom is situated on the aircraft. It's fascinating, the actual technology that's gone into refining that tool to ensure that it is head and shoulders better today than it ever was in previous decades.

Chris Edwards: Okay, so we've talked a little bit about off-target application. What are the requirements where pesticides cannot be applied? You know, buffers and things like this.

Seth Barnes: I'm glad you brought that up, Chris. And this is, I think, a little bit of a source of... I think it's just unknown from people. Even people following the private forest accord don't immediately realize that spray concerns and issues were actually the first thing negotiated by the private forest accord authors when they were sitting down together. And it was in the original MOU that was written by the two parties where they hashed out new regulations largely to appease those who were concerned, not necessarily with an abundance of science. As Katie alluded to, there isn't a lot that would suggest that anything we have been doing should be of any concern. Notwithstanding that, there's concerns. And so knowing that, hearing that over the years and then getting in that room together, that bubbled up to the forefront is something that needed to be addressed right up front in order for the parties to find room to begin talks about other stuff. And so back in, I think it was 2020, the parties got together and hashed out an agreement that both parties agreed to and moved forward and were satisfied to the extent that they were able to agree to sort of lay down all weapons of pushing for anything more until, you know, 2028 on this topic, on this issue.

And what they agreed to was smaller windows of opportunity for application, so seasonal windows. And those coincide with the windows that I already explained in the spring and in the fall. And so landowners now, when they submit a notification for this activity, for helicopter application, you don't have all year, all 12 months for that notice to be active. You only have a 90-day window of time, and you have to specify which 90-day window of time it is. Probably even more of more interest to the listeners, there's new buffers on homes, schools, and water intakes. So new buffers, meaning 300-foot, no application areas surrounding homes, schools, and...

Chris Edwards: A no-spray zone.

Seth Barnes: No-spray zone, that's right, yeah. They also increased buffers on all waters, created real-time notice to neighbors, created after-the-fact notification of when that it was completed, and then are making the records available. That's one thing I think most people

don't realize is that along with your pesticide license, anyone licensed that applies pesticides has to keep rigorous records of what they applied, when they applied it, what were the conditions, atmospheric conditions and weather conditions on the day that they applied, and then the rate of application, how much was applied, how much area they applied it to, all of that that has to be kept for some time. So once they gather those records and they keep those records, in forestry now we have, under these new regulations, we have a response time. So when the agency requests those records in forestry now, we have, I believe it's 24 hours to produce those records.

Chris Edwards: Okay, and I heard you, you've talked a bunch about the application requirements, but you also mentioned notification. So what's the system for giving notification that's out there that we're using and how has that been updated?

Seth Barnes: Yeah, thanks. This is a good question. I think it's also a source of a lot of confusion that I hear. In forestry, the Forest Practices Act requires not only adherence to the Forest Practices Act itself, but also notification of any operation that's going to happen. And the purpose of that is so that the agency can go out there proactively or review your paperwork proactively, work with the landowner to ensure what you are planning to do will be in compliance with the Forest Practices Act. It is a notice so that the department can do the best they can to ensure compliance. Because in the end, you are required to comply with the Forest Practices Act. And the Department of Forestry does have very strong regulatory authority to cite people for not following the Forest Practices Act. And so it's a notification system, but it's not without teeth and without regulatory authority backing it.

So when it comes to applying herbicides, we have to notify the department that we're... what we're planning on doing, when we're planning on doing it, and what we're planning to apply. The challenge there is typically we'll do that in our sequence of preparing for the operation. We have to submit our paperwork to the department for our planned spray unit, often before we can see the weeds coming up. So we might not always know what we're dealing with in terms of what we're going to have to spray for, whether it's Himalayan blackberries or scotch broom or thistle or whatever, until we get closer to the time. And so to hedge their bets, most foresters will put down a series of chemicals that they might apply. Not that they will apply all of those, but they are putting several down there so they can notify the department and say, these are the ones we may apply. And then when it comes to the time of application, they choose out of that list because the requirement from the department is, you have to tell us what you might use.

Chris Edwards: So they need to sort of reserve their right to, ahead of time, to be able to choose the appropriate herbicide for the conditions on the ground at the time that they go out to treat.

Seth Barnes: Exactly.

Chris Edwards: Okay. If the forester goes out and looks at the conditions on the ground and says, whoa, we've got these type of invasive species, we've got this type of competing brush, those require different herbicides, what's if the label is written just for that one herbicide? Well, what if those two mix together and create a different effect or a synergistic effect? How do we know that that's safe?

Katie Murray: So that's a good question. And it's a concern that I hear raised a lot. I'd say it's much more of a claim than an actual concern. And a couple of years ago, I actually asked EPA this question because they don't have a clear statement on the concept of synergism or any effect that's greater than additive. So something happens more than just those ingredients that you put in the tank. And tank mixes are used not just in forestry, also in agriculture. It's very common to mix products together. What I did hear back from EPA from one of their senior scientists was they do look at combination effects. And when they find that there's an issue, they will modify the label to say that this product can't be mixed with some other product. So that is a part of the regulatory system, it is considered. It's not common. So I'd say the instances of them having found this greater than additive or synergistic effect is very rare.

Chris Edwards: Okay, so I remember in 2015 in the Oregon legislature, I happened to be serving in the legislature at the time, and I was chairing the Environment and Natural Resources Committee. And we had this, you know, this issue has been around for a while. I had convened a work group back then because, you know, activists were making assertions about the protections in Oregon law as compared to other states. And so we started off with this long grounding activity to begin with, so that we were talking about apples to apples and not really confusing, making illegitimate comparisons, if you will. And it became clear that really when you started talking with a lot of citizens that were concerned, really what they wanted to be able to do is just put the horses in the barn before a spray activity was going to happen next door. You know, and in talking with foresters, most of the large landowners said, we are foresters, actually, we talk with our neighbors. But for in the cases where that might not happen, you know, folks really wanted to be able to know through this notification system, that an application was going to happen. Now that has been also addressed, has it not? In the private forest record?

Seth Barnes: Yeah, it has. I remember those same conversations, Chris. I was here in 2015 and was in a lot of those same conversations. And it was again in 2017, I think those same issues came up. And repeatedly, we had conversations with legislators and others about, you know, frankly, some of the challenges with trying to legislate being a good neighbor. Legislate relationships is difficult. It took several years of sort of back and forth

conversations about, you know, what's the best practices there. And while the industry felt strongly that we have always had best practices of reaching out to our neighbors and have always stressed that to all applicators, that they are those that are, you know, license applicators to reach out to your neighbors when you're doing those applications, let them know what's happening so that they can put their horse in the barn, so to speak, if they're concerned with that. It became apparent that concern was still there, very prevalent, especially for a few folks in the legislature.

And so that was very much a part of, in fact, maybe the signature piece of this agreement in 1602 was the real time notification to neighbors. And we really put our heads together as foresters and tried to think of a way that we could solve that concern for legislators to the extent where neighbors would be notified. And we've got now in the system, Ferns helps us do that. Neighbors can opt in when they live in proximity to forest land that's going to be pesticides applied on. They will then receive a notice the day before.

Chris Edwards: And you said Ferns? Okay, so that's the name of the notification system. I won't press you on what Ferns is an acronym for. Seth, I have a question for you. That Ferns real-time notification system has been in play now for, I think, close to two years.

Seth Barnes: I think that's right. Going on two years.

Chris Edwards: Well, this real-time notice. The real-time notice, which is the night before an application, which is part of what was agreed upon in the Senate Bill 1602. Do you have a number about how many people have signed up to receive notifications through that system?

Seth Barnes: It's not a lot. I know that. Well, I guess depending on statewide, there's... I don't. I don't have a number. From what I've heard, it's under 20.

Chris Edwards: So just interesting to note that, you know, how many hundreds of thousands of dollars were invested in the system. Foresters all over the state are having to notify whether or not they have people receiving the notifications. Yet on the other end, it seems there's very little actual interest in receiving them. So, you know, it's just sometimes we have to really dig down and look and see how these things play out on the ground. And it tells us a lot about where the concerns are and aren't.

Seth Barnes: And Katie, I would say, thank you. I would say that that's largely because what we've been saying for years is true, which is foresters do a really good job of reaching out and actually talking with their neighbors to the extent where many of them are not needing this sort of bureaucratic solution because they have real people to talk to.

Chris Edwards: So if the Forest Electronic Reporting Notification System, I'm guessing that that's what Ferns stands for. If that's about the upfront notification, how do we know that the rules are being complied with?

Seth Barnes: Yeah, so another good question. So compliance at the Department of Forestry is done in two levels. One is the actual compliance foresters, which are called stewardship foresters at ODF. And ODF has an army of these folks out there, guys and gals who have areas largely the size of a county or so that they are stewards over for the state for forestry purposes. And they will review notifications as they come in, and they'll review them as they're happening. So oftentimes forest landowners will let those folks know as well and even invite them out when they're doing the application just so they can be a part of it, see it, make sure that they concur that things are being done well.

So that's one level of compliance, and that happens in real time all over the state, you know, every day on harvest operations, road building and pesticide application as well when those activities are happening. The other compliance mechanism at the Department of Forestry is called compliance monitoring, and that is a systematic sort of more statistical review that happens. The Salem office of the Department of Forestry is in charge of compliance monitoring, and it's blind to any sort of local control sort of thing. And they will go around and inspect notifications. They draw randomly numbers of notifications throughout the state, and then they go to each of those two, and they do sort of after the fact assessments of whether the rules are followed. And then they come up with an overall number, and they don't look at every rule every year in every place. There's too many rules. There's too much regulation. So they'll look at certain areas of the regulations in a given year, and they'll put those in the report. And for many years, and most years, they look at riparian, so stream protections of some sort. Last year's was actually on reforestation, looking at how successful have we been at complying with the reforestation laws. But I will say across the board, as that's been done in my tenure at OFIC, we have been in the 90s, 95-plus percentile for compliance with the Forest Practices Act, whether you're looking at harvest rules, whether you're looking at road construction or reforestation. So we have a very high compliance rate.

And then the other place that you can look for there is the Department of Agriculture and the number of times where they're called out to go look at something, you know, through a neighbor complaint or something like that, and the investigations that they do and how often they turn up any sorts of issues. And it is also extremely low compared to the number of applications that are done in forestry.

Chris Edwards: OK, so what happens when there is a violation?

Seth Barnes: ODF has ample compliance authorities, and it can be anything from an educational opportunity to tens of thousands of dollars worth of fines that are given.

Chris Edwards: Well, the penalties for violating the aerial application rules are fairly stiff.

Seth Barnes: Yeah, people can lose their license. Really, it's lose your livelihood if you are really a bad actor. And in fact, also as part of the Private Forest Accord, they created a new area of repeat violators in the rules. So there's now a definition for what is a repeat violator of significant violations. And those people not only lose their, in this space, would lose their pesticide application license, but would also be placed on a list of repeat violators in the state and would have to put up a bond before they're even allowed to turn in a notification. So in essence, sort of a ban from the industry.

And the industry has always supported that type of strong compliance because we also have no interest in fostering folks that do a really bad job or ignore regulation because that makes all of our jobs harder. And we live here too. We want clean water. We want safe recreating opportunities. You know, we live and work and play in these forests as well. We drink the water. We have families. And so we care and we want to be stewards. And people that are bad actors, we don't want them out there just as much as anybody else.

Chris Edwards: Yeah. So we've, I appreciate that perspective. We've talked a bunch about the application, the use of herbicides in forestry, how they're applied, the notification system, et cetera. Now I want to turn to Katie to talk a little bit about the actual products themselves. So let's start out with just sort of high level. How are these products regulated at the federal and state level?

Katie Murray: Okay, sure. So starting with the federal level is best because that's how we initially get a registration for any pesticide. Before that registration happens, there's usually somewhere between 10 and 15 years of data and trials that have to be gathered across a number of different contexts. So looking at environmental impacts, looking at human impacts, all of that information goes to the EPA, the Environmental Protection Agency, and then they begin their process of evaluating that data and making a decision about whether or not to register it. Those products are re-evaluated on a regular time scale through the EPA, and I would say that every aspect of a pesticide application, from those pesticides that get registered, the labels that get developed that indicate how they can be used and the actual use itself have an extensive body of science that underlies every detail of how that's going to take place.

Chris Edwards: You've got a product that's registered, it gets the stamp of approval, and then now it's available for the market, whether it's an agricultural grower, a forester, wants

to use that product in the state of Oregon. Are they good to go and they can just go buy it and start applying at willy-nilly?

Katie Murray: So products are registered for specific uses. So some products that might be registered for a homeowner, you know, might not be registered for other use, or the same for ag or forestry. It has to be registered for its use, and also in many cases, it's registered to control specific pests or specific weeds. So yeah, you have to meet the criteria on the label, and the label is the law. So the label in many cases for a pesticide is many pages long. Sometimes you even have to go online to get additional information, and that is a big part of the training and licensing, you know, for pesticide applicators is how to read the label, how to understand, you know, the use context, where it gets used, how it gets used, how much gets used, when it gets used, who gets to apply it, all of those things in explicit detail are spelled out on the label.

Chris Edwards: So it's a little bit more complex. It's not your cereal box. It's complicated than the shampoo bottle. That says lather, rinse, repeat.

Katie Murray: Yes. It's a little more complicated than that, and it's binding. It's the law. So applying anything against what the label requires is against the law.

Chris Edwards: I guess folks are probably interested in knowing a little bit more about what are the sources of harm that they might be looking for and how are they looking at it.

Katie Murray: Right. So I should provide a little bit of context because some people are probably wondering, how does an anthropologist know anything about any of this pesticide stuff? So one of the things that I did at Oregon State University was help to coordinate comments on EPA's review processes. When they register a product or review a product or release a risk assessment on a product, there's usually a comment period. And in the Pacific Northwest, at least, they don't have a lot of information on specific usage. In other states, there's use reporting. So we can see which pesticides are used where, how much, and they have a lot more information to make their decisions on. For the Pacific Northwest, they rely on, at the time, people like me to help get industries to comment on how these decisions might impact them or how a product is being used.

Through that work, I really got to know EPA's process pretty closely. So all of the different risk assessments that get performed, which are looking at ecological risks, looking at health risks that include dietary risks, drinking water, other routes of exposure. So they're looking at a potential use of a product and all the different ways that a person or an animal or a plant could be exposed to that product. And they're working back from that to provide the protections that end up on the label that make that use safe.

Chris Edwards: I mean, it seems to me like it would be impossible. The label may specify how it's to be applied. And so as long as the label is being followed, which again, we have licensed applicators that have to follow the law, which is the label, probably not so much at the homeowner level, but when you have professionals out there applying it per the label, they should be applying it at the prescribed concentrations per acre, et cetera. But how does the EPA know that there's just not too much concentration in a watershed?

Katie Murray: Well, there's a lot of monitoring. That's the number one tool that's used across the whole country, certainly used in Oregon by several different state agencies. And we have a lot of specific programs here. So the Department of Environmental Quality does a lot of water quality monitoring that looks at pesticide concentrations in water. We have the Pesticide Stewardship Partnership here, which is a very unique program in Oregon, where again, watersheds are monitored for concentrations. And that program is designed to then feed into education for local applicators. And by and large, the data that we have in Oregon shows that our water and watersheds are not of significant concern. There is an extensive amount of monitoring done to ensure that pesticides are not a concern in the water.

Chris Edwards: I know that there have been some studies. I believe there's one in the McKinsey watershed. Maybe you could talk a little bit about that, Seth, and what's interesting about that one.

Seth Barnes: I can pick up on it first, and then Katie can add anything I maybe forget. But I think you're referring to the EWEB study. Eugene Water and Electric Board. So Eugene Water and Electric Board, they have an intake there on the McKinsey River watershed. It feeds down to it, I think, everyone in the town of Eugene, Springfield. They do a water study, I think, continuously, frankly. And then they produce a report on their water and on their watershed every, I think, it's every couple of years or something like that. And in their latest report that they came out with, I think it was published in 2022. It's on their website right now. You can go to it and look for it.

I think it's fascinating that despite the fact that forestry and private forestry actually is, I think, the number one deleting use of the land within that watershed, despite that fact, they report that they didn't find any contamination from the forest. And they looked for, I think it was somewhere around 300 chemicals that they were testing for at their intake and found that chemicals from forestry were not a contamination source for their watershed, which is fantastic. And I think coincides, as far as I'm aware, they've always found that conclusion, frankly. I think back in 2012, they actually definitively stated that forestry pesticide use is not considered a likely threat to the drinking water quality. And that, again, is despite the fact that the most of their watershed is found in an active forest management.

Chris Edwards: Yeah, that's right, and that's been an inconvenient study for activists that have wanted to drum up a lot of fear by folks in a number of communities. And we've got this really big study, ongoing study in a significant watershed, feeding a big population. I live in Eugene. I drank that water. I am what one might consider a chemical-averse person. And I have no fear whatsoever about the quality of the drinking water that comes from those actively managed forests in the Mackenzie. I just don't.

Seth Barnes: And I would say that you're right. That Eugene E-Web study is a really good one because it's been ongoing. They're well-funded. They continue to do that testing, which is a fantastic sort of bellwether for folks. But you can look across the state, and there are different, even smaller watersheds where they have done testing as well, either through the pesticide stewardship program that Katie talked about earlier, or even other sites where they looked at targeted applications, whether it was private landowner themselves or in conjunction with DEQ or others. And I would say what you find with that E-Web study is not uncommon. In fact, that's very common. What we've found everywhere we've looked, as far as I'm aware, in my tenure in this position, is that we find clean water coming off of private forest land. And I think it's largely because we're following all of those regulations. And that was all even before the private forest accord, where even larger buffers are in place now. And there's more protections, as I've already gone over, with larger intake protections and things like that.

Chris Edwards: All right. So, I mean, it occurs to me that most folks, their concerns about pesticides are mostly rooted in health fears. So, how does the EPA really assess health? I mean, is it saying, well, these pesticides are safe up to this level, and so that is the level that's put on the label, and you can't go past that?

Katie Murray: That's a very simplified version of looking at it. But no, there's much more protection built into the system. So, EPA takes worst-case scenarios. For example, you know, looking at some of their exposure scenarios would place a child on a stump at the edge of the forest field that's being sprayed. And from that risk scenario, they would provide tenfold the number of protections that need to be in place in order to protect that child. And that's what ends up on some of these labels. So there's orders of magnitude of protection. It's not just that limit is the limit. It's let's take that limit and multiply it by ten.

Seth Barnes: I heard a toxicologist once say that it was equivalent to a child on a playground sucking on a piece of bark that was recently sprayed. And if you sucked on that all day long, is that child going to have any bad effects? And so they would back that off by several fold, as you're talking about. And then that would be the level. So, you know, it's taking it to a ridiculous extreme and then backing it off several orders of magnitude to ensure safety.

Chris Edwards: OK, so now that we've talked a little bit about sort of the broad regulatory mechanism, we've talked about the label, how the label is developed, the buffer of safety, the margin of safety in there. No conversation would be complete about herbicide use without talking about a few of the big ones, glyphosate in particular. So roundup. So I'd like to talk a little bit about, you know, we've heard that glyphosate is carcinogenic. Is it carcinogenic or not?

Katie Murray: Well, it definitely depends on who you ask. You know, we had one body that was not a regulatory body evaluate glyphosate and evaluate a small group of studies looking at the potential of the product itself to cause cancer. And that was the IARC. And they determined that there's a probability there. I can say that every regulatory body across the entire world that has looked at glyphosate in the context of its use, either in agriculture or forestry or household, has not come to that determination. And that is a product of the studies that are evaluated, which are peer reviewed, the weight of evidence, so what's the quality of those studies? How do they relate to humans? Some of those studies don't have a strong connection to humans, and that was the case with some of the studies that the IARC looked at.

And it's also a product of how it's used. So glyphosate, within its use context, is not likely to cause cancer. And that's because, although the IARC may have found that at some maximum dosage, which would never be achieved through its use, it might have the probability of cancer, would you ever be exposed to that amount? Which is extremely unlikely or just not likely at all, given its use in forestry, agriculture, home use, all of those things.

Chris Edwards: And what is the IARC?

Katie Murray: So the IARC is the International Agency for Research on Cancer. And it is within the World Health Organization. It is not a regulatory body. They're not looking at pesticides specifically because they have a long list of things that they evaluate. Some of the other things that glyphosate shares the list with are red meat, cell phones, working night shifts, sun exposure. All of these things are on the list as potentially carcinogenic. We all know that the way that we use these things and the way that we moderate and regulate them are what prevent our risk of exposure. So with the IARC, you're really looking at their evaluation of something's potential in a vacuum, not your risk of exposure to that.

Chris Edwards: Yeah, I mean, there's no question that armchair science definitely drives fear, and that drives legislative action often. And I think today we live in a time where things are so divided and trust in institutions generally across the board is at such a low level that people just don't know who to trust. Who can they trust? I mean, we saw it in COVID.

Responses to COVID regulations and recommendations were very partisan, pro or against whatever the action may have been. And that certainly, like for those of us that follow policymaking in the Oregon legislature, that wasn't really a big surprise because a lot of matters that are really matters of science and research come down to similar splits, unfortunately. So that's just a little observation from myself.

Katie Murray: Misinformation is a huge problem, particularly when it relates to pesticides. I was at a talk recently in Nashville where these two women from Public Health and Epidemiology have started a podcast called the Unbiased Science Podcast. And they presented that somewhere around 28% of the US population is scientifically literate, but actually double that, think they are, or are interested in gauging on topics related to science or that would require some literacy in order to understand in depth. And I'd say pesticides, you know, take that another level of how much you need to understand in order to really make your own determinations.

A lot of people think, I'll just Google it, I can figure this out. And actually, we heard this from some of the elected officials that we worked with on the controversial issues in the counties. People are trying to do their own research and try to sort out the science. What does it actually tell us? Is this safe? None of us are equipped to do that. We have whole systems with thousands of people who are contributing their expertise to solving these problems and answering those questions. It's not going to be an individual Googling who can figure that out. So, you know, the EPA's process is transparent. If you want to dig in to their risk assessments, you can find them. And it's hard to navigate their website, but it's all on there. And it relies on peer review, which is a system that we trust across the board in order to make decisions about all sorts of things that we decide to engage in related to science.

Seth Barnes: I think the way that our system of life, of government, our society is set up, that's the role of these agencies, whether they're state or federal agencies, is to help us as unbiased as possible processes to come to some conclusion about, you know, what is the best thing to do here for the protection of people and the production of whether it be food or fiber in this case. And the other thing to remember is that these individuals, in this case studying pesticides, these are people that have spent their lives preparing. So these aren't people that did a Google search and then got a job, right? These are people that have dedicated their lives to the pursuit of science and chemistry and have really put themselves in that position. And it's not just one person, right? It's teams of people at the state and federal level who do this work, who are those types of individuals. And I'm not saying that other people shouldn't check it out for themselves, but there should be a level of trust that comes with that, that these agencies, that's what they're set up to do. And the

individuals that work for them take their jobs very seriously and are striving to make the best choices for all of us. And it doesn't happen overnight either. These are very slow, long, they take their time to evaluate. It's multiple studies that go into these, into a licensing of a pesticide.

Chris Edwards: How many years does it take on average?

Katie Murray: Ten to fifteen. Yeah. I mean, this is not something that happens overnight. Ten to fifteen years with teams of people, of researchers, looking at gobs of studies.

Chris Edwards: Yeah. So I just want to clarify, it's not subjective. It's not human saying, I think we'll decide this. There's a lot of objective information that goes into those decisions.

Seth Barnes: We have one of the most rigorous regulatory systems in the world, right here in the US. When I worked for the state of Washington, it was always interesting to me, slightly separated from the conversation we're having of pesticides, but just forestry regulation in general. I worked in that space for many years, and inside the agency, we always used to laugh a little bit because we were pulled constantly from people on either side of these issues, whether they were environmental interests that hated us for one issue or loved us for another issue, or whether it was industry that hated us for one thing or loved us for another. When it came time for funding the agency, that's where both those sides could agree that the agency needed to be funded. And I think that that's where those agencies should be, frankly. They should be in a place where they're necessary because they are that middle broker that's trying to create the space where this is truth as far as we know it, and in this space of pesticides, that comes after years of rigorous study and looking at these chemistries. And then from there, that regulatory layer gets placed on top of that for the use of the pesticide in the forest setting as we're talking about.

Chris Edwards: I think we all understand that life is not without risk. You mentioned sun exposure. I'm confident that I have a higher risk of developing cancer from sun exposure than I do from pesticide exposure in Oregon. I'm very confident of that. But I like being in the sun. It feels good. I get vitamin D. I get a nice warm glow to my skin. So there's some benefit to me. And I think that folks don't necessarily see the benefit of pesticide use. They think, oh, yeah, well, some farmer or some timber company is getting some benefit from that. But how does that benefit me? How does that benefit society? Can't we just do without it? There's very little understanding of the benefit.

Katie Murray: Some of this also relates to how people perceive risk. And there's a whole body of research on that. And I once heard a talk from a social scientist who looks at this question. And the conclusions of that are if you can control the risk, you perceive it as much less than if you can't control it. And I think that's another thing that snares pesticides,

because it's not something that we as individuals can control if our neighbor wants to apply it to their small woodland or large woodland or to their rose garden. It's not within our control. We might choose behaviors that carry much greater risks, but we're making that choice so we don't perceive the risk.

Chris Edwards: Yeah, driving versus flying. I'm behind the wheel of the car, even though I might not really be in control of that risk. I think that I am. I'm not flying the plane.

Seth Barnes: I can tell you as a forester who drives around looking at other people's forests as they've tried to reestablish after harvest, and I can tell you where people have done a good job and where they haven't. And where they haven't is often where they did not apply pesticide at the right time. It's a brush hole. The trees are not establishing very well. If at all, the conifers are hard to pick out, and they're being drowned out by a lot of brush. And those persist for a long time, and it produces less valuable habitat for wildlife species. It produces less carbon sequestration, and it's not going to lend itself to a good forest harvest. In 40 to 60 years, that would then turn into, you know, wood products for people's homes. So there are consequences for sure, but I get what you're saying, that it's not easily recognizable to most people.

Katie Murray: And I think in agriculture, it's even more difficult because, you know, year on year, if you don't have pesticides, you're going to lose your crop to some form of pest, whether it's a disease, an insect, a weed, or all three. And until you've actually gone out and had to grow that crop, it's really hard to understand the impact of that and what that means for someone trying to run a business. And also, you know, people think, well, why can't you just do it organically? Well, common misconception, but organic growers also use pesticides. So these are tools that are used in all forms of agriculture because in order to grow food or wood, you have to outcompete the other forms of life that are trying to get your crop.

Chris Edwards: OK, and then there's been in years past in the legislature some discussion and concern about the impacts of pesticides on pollinators. And could either one of you speak a little bit to that and then whether or not that intersects with forestry?

Seth Barnes: Yeah, I can take that. There was a study that was a multi-year study. In fact, I think it's still going. They keep extending it, you know, because it's always fun to... If you can get funding, keep looking at year after year because the forest continues to grow, so you can continue to get more data. They did a study. They call it the Intensive Forest Management or IFM study at OSU, the College of Forestry, and they looked at different rates of application from no application of herbicide to sort of a light approach, which was just a couple of times, I believe, and then moderate, which was five or six times, and then to

intensive, which was like we're spraying it every year. Of course, as you now know from this podcast, the industry would fit more in the light or moderate somewhere in that realm, never in the intensive, as they described it, category.

But in that study, they looked at pollinators. They looked at the effects of the vegetation. They looked at elk and deer. They looked at a bunch of different… Songbirds, I think, was the original to see how that affected birds in the area. But they did look at pollinators as well. And I believe what they found was that there was not a big impact in the light and moderate. And in fact, it dissipated and there was no signal after a couple of years in terms of difference between the control, which was no application. You can look for that study. It's the Intensive Forest Management Study. But that was helpful for foresters to, you know, sort of ensure that our practices were not deleteriously affecting those species.

And if you look at from a broader scale of what we're doing as we apply pesticides, you look at those stands that have been treated. And largely, you can start seeing after, because we apply a couple of times, right? After about year five or six, all the way up to seven, eight, nine, ten, you can see that those stands are no longer just the Douglas fir or hemlock or whatever has been planted, just the trees. They're now, there's a bunch of different stuff in there underneath. And it's just that the leaders are sticking up, those tree leaders. And so they're going to out compete. So, of course, as you get further along away from the application, all of those bees and moths and all those pollinators come back. Yeah, by year eight, you can't walk through it. Yeah, I mean, it's just it's just thick with these species that had previously been treated for. And like you said, once those trees get established, they're growing on their own. There's no more treatment. But it was fascinating. Even with even looking at pollinators, even during those years of application, when you could still see that the plants that were being targeted were being held back so the trees could get a head start. We were still seeing abundant pollinators in the area.

Katie Murray: And I'll just tag on to that just to speak a little bit more broadly. The EPA started to evaluate risks to pollinators as part of their pesticide registration process. And that is every product that's registered or re-registered has to have this pollinator risk assessment completed. So we know that that's taken place. I'd say the incidents that we've seen in Oregon and I think it was the Linden Tree in the Wilsonville parking lot that got the attention of legislators. And that wasn't an issue of the label being wrong. That was an issue of a product being used, not according to the label. So again, the label is the law. In that case, the applicator was not applying the pesticide according to the label. And that unfortunately led to a bad outcome. And we know that that does happen, but that again doesn't mean that we can't trust the regulatory system and can't trust the labels.

The other piece of this is education. Oregonians for Food and Shelter is part of the Oregon Bee Project Advisory Committee, and we contribute a lot of time and expertise and partnership towards protecting pollinators in Oregon and helping them get funding for education to applicators, because we know that that's the number one place where we can provide protection, considering that the label is already considering pollinators.

Chris Edwards: All right. Well, this has been a very informative conversation for me. I know I've learned a lot. Katie, Seth, do you have any final thoughts that you want to leave us with?

Katie Murray: You know, I think this is a really difficult topic. I have the lucky job of getting to talk about it every day. We've barely scratched the surface today of, you know, the extensive body of science that underlies the use of pesticides. But I, you know, the idea of misinformation getting in the way here, I can't stress enough. And any decision makers that are wanting to engage on these topics, it's just so critical to make sure that you're accessing science and quality science. You talked earlier about good science, bad science, and that's definitely an issue. So, you know, we have a very strict, extensive regulatory system. We have a lot of data that we can point to that demonstrates that those regulations work. And, you know, we're here as a resource, so I hope that we get utilized in that way to direct people to the agencies and the information that can provide what they need.

Seth Barnes: And I would just end by saying, you know, reminding once again kind of where we started from, that a forester's job is to ensure a healthy, vigorous, you know, growing forest for the next generation. I think every Oregonian has that goal also in mind, that the next generation, their children, their grandchildren will get to enjoy Oregon's forests. They'll be healthy, they'll be lush, they'll be growing, they'll be storing carbon, they'll be providing, you know, wood products for future generations. And that's our goal as well. And pesticides is just one small tool in one small time, but important time, right as a forest is established, that we use in forestry to ensure that that legacy of stewardship is passed on to future generations.

Katie Murray: I have one more parting thought too. And that is just to touch again on technology and innovation. We tend to focus any efforts, even policy funding, on other industries when we talk about innovation and technology. We're perfectly happy to support these tools and innovations and technologies in, you know, the health field or manufacturing, semiconductors. And I just want people to remember that for the production of food and fiber, innovation, technology, modern advancements are just as critical. We're going to be relying on these tools. And the tools themselves are becoming more advanced, constantly evolving, and trying to meet the needs and the desires of the public at the same time. And so being able to have the license to continue to do that is really important to continuing to feed people.

Chris Edwards: I love that big picture perspective that you both brought to the discussion today. I think it's really important that people keep that big picture in mind. So thank you both for being here. This has been a great conversation. And maybe we'll have you back and take some follow up questions in the future.

Katie Murray: Thanks, Chris. Yeah, happy to.

Chris Edwards: I hope you enjoyed this episode. Be sure to check back for new content coming your way soon on the Forestry Smart Policy Podcast. And as always, if you have a question about this episode or something else, just drop us a note at podcast at ofic.com. And who knows, maybe in a future episode we will address your question or whatever beef you may have with what we have presented.