Brad Brandt: Joe, I've had the pleasure of knowing you, spending time in the field with you, working with you for some time now through our partnership, just in region five alone. I can honestly say that through our work, we have planted millions of trees in the last decade in the state of California. So I know quite a bit about you, but our audience isn't as lucky as I am, so I was hoping you could tell us about your history, what brought you to this work, and why you think forests are important?

Joe Sherlock: Okay, well, maybe I should start out with, this is year number 42 for me. And I've had a lot of experiences over all those years, you know, and I first became interested in the field of forest management, of all interesting times perhaps, during the college years where that was a place to go on the weekends to disconnect a little bit from the academic universe.

And for some reason, the forest really connected with me, and I thought that was the place that I wanted to spend my time and energy. So I pursued a forestry degree. Got it way back in 1977 from Southern Illinois University — way down in Carbondale, the unglaciated part of Illinois. And it started there on the Shawnee National Forest, worked there for a little while then got a job in Wyoming with the Bureau of Land Management.

And then the next step was to California. I'd never imagined going that far west, but I did. And it's been my home ever since then. Worked about 25 years on the Stanislaus National Forest on the western slope of the Sierra Nevada. It's the National Forest just to the north of Yosemite National Park. And I've collected 25 years of experience there. And really all of my experience really has been involved with silviculture.

So the work associated with caring for and reestablishing forests has been something that I've been doing essentially my whole career. And about 15 years ago, I took a position in the regional office here in Vallejo, California, with responsibilities for all of the forests in California. And unfortunately, in the last several years, the number of fires, the extent of fires has been certainly beyond my expectations, my visions of what possibly could happen.

And so a lot of the work has been focused on reforestation. We still of course care and actively work on living forests, and we try to care and nurture them so that they persist through droughts and through bark beetle infestations, et cetera. But it's really been the fires that have been most challenging. Reforestation is a big part in my life lately, and it's become really, really critical to do something because it doesn't come back as easily here in California.

Brad Brandt: Yeah, that's a great segue, Joe. I was just looking at between July and December of 2018, and an estimated 8,000 fires burned across California — affecting more than 1.8 million acres of forestland. Five fires alone combined to destroy more than 22,000 structures and kill more than 98 people. Losses and damages from these fires are estimated at easily more than a billion dollars. I'm just wondering, are these fires different than they were a decade ago, Joe? So what's different than a decade ago, and maybe what's the same?
Joe Sherlock: Well, I think there's two primary things. And one of the most people have certainly heard about is that a warming climate has made it a lot easier for fires to start and to be sustained and to run over vast acreages — and pretty quickly. Of course, you bring up the consideration about people's properties and their homes, our work, or my work is primarily related to the care of the National Forest land that doesn't have homes on it.

But these other types of fires that have destroyed people's homes, threatened people's lives — those are beyond anything, certainly beyond anything I ever expected to see happen. I've always, like many others, like perhaps the residents of those communities had assumed that that type of fire just wouldn't affect them. But those are so different than the work that I'm responsible for. But certainly a warming climate is associated by many people to be responsible for as the types of fires that we've been experiencing.

The other thing that I've been recognizing, of course, is that every single year there's another increment of growth. There's another increment of fuel that's placed on the forest floor. You know, needles, branches, dying trees. Year after year, they add more and more fuel, and it's very difficult and challenging to try to slow down that accumulation of fuel or to reduce that amount of fuel. And given the warming climate, giving the accidents that sometimes happen, with starting fires, it's just very difficult to try to cope with both these major factors — the warming climate, the extending of growing seasons to the extension of summer temperatures and drying temperatures. It's very difficult to try to do something and in a hurry, and we move forward with treatments, you know, there's fuel reduction treatments that are part of our nature here in California. It's something that all of us that manage forests regard as very important.

The use of fire to nibble away at accumulating fuel is important. The removal of wood too, certainly in the context of durable wood products is part of the equation and treatment of smaller fuels. If there's a way to remove the smaller trees and put them to good use — for example, to generate electricity — is pretty valuable. And we do that wherever we can. We're fortunate in California to have a few of those locations. I wish there was one almost everywhere. We need one, but that's not the case right now. But if it was, that would be a great way to start moving fuel from the forest and leaving less to burn and certainly creating environments where the fires are not as severe and intense as they are now. So sometimes it's just a matter of reducing the amount of fuel. It's just that it's hard to do, and there's so many acres where the work needs to be done.

Brad Brandt: Understood. Joe, most of the news coverage that people are seeing is really while the fire is still burning and people are being evacuated and the brave men and women on the ground are working to contain the fires. What people don't see is really the next step in the process, which is what we're here to talk about a little bit. And that is restoration. Can you give the listeners a sense and walk us through the steps taken from post-fire assessments all the way through the planting of new seedlings?

Joe Sherlock: Oh sure. I certainly can. So one of the first things that occurs very quickly after the fire — and actually on some of the larger fires it starts before the fire has been controlled and contained — is an evaluation of where the risks of important resource damage might occur. One of the things that's important on steeper slopes and especially in
association with streams and rivers is, there's a real chance that a lot of soil moves down slope in erosion caused by the winter rains. And there's many places where the risk is higher and actions are taken to try to minimize the movement of soil into water courses.

So that's one of the things that's really important in the immediate future after a fire. That's a step that that occurs promptly. The next step, which is an effort to try to reestablish forests over the area that's been affected is to look and see, aided by satellites, where the fire damage has been most severe. And so people like me look for places where most or all of the trees have been killed by the fires and try to make sense of where to go first. Where to work to reestablish a favorable environment, to reestablish seedlings or to look for places where nearby living trees are able to distribute their own seed and give the forest the chance to grow, to restart from the living neighboring trees.

In our world here in California, given the extent and the nature of the fires, that's not as helpful to us as I wished that it was. Most our fires, if they're to be reestablished as forest in a short term, really need our help. And so the work that we start in the first year and continue for as many years as we're able to sustain it is to try to create a favorable environment for these trees to be reestablished in. There's two big problems that we face in California for reestablishing forests. One of them is the amount of wooden fuel that's left after a fire. And the other one is the nature of the forest vegetation itself. Woody shrubs, grasses, they cope with fire pretty well. And so typically after a fire, there's an awful lot of re-sprouting of woody shrubs, for example. There's an awful lot of trees that are re-sprouting from top killed oak trees for example. And there's a lot of vegetation that with a seed that's been buried in the soil for decades, once the fire comes, it opens up the seed coat and off they go germinating, in some cases, well many thousands of woody shrubbed seedlings.

Let me talk about the two important things that make a lot of difference in how well we succeed with reestablishing forests. One of them is the amount of woody fuel that's on the ground and still standing, and every piece that's standing is eventually going to fall. So in a number of decades, it's just an enormous amount of woody fuel that can be laying on the surface soil and all of that. All of that dry wood over the years becomes the next fuel bed for the next fire. It's not a very hospitable place to reestablish a forest when you know that there's an eventual fire coming to threaten and consume it.

The other thing that makes a lot of difference to seedlings are plants that compete for soil moisture. Recognizing that California is a place where during the summer there's essentially no useful soil moisture that's recharged from rainfall. So different from other places in the country where there's rain during the growing season, here in California is a long period where there's essentially nothing to recharge the soil. We depend on that stored soil moisture though, for the seedlings to grow. And of course, if there's a lot of other plants using it more quickly, then the seedlings are placed at a disadvantage. So trying to control the fuel environment by making sure there's as little of it as possible to threaten the new floors with the next fire. And also to minimize the number of competing plants so that the tree seedlings can use the soil moisture and thrive. Those
are the two most important things to deal with after the fire. And those are the things that we actively deal with in many of our fires.

Brad Brandt: Joe, what would you say the timeframe is between the assessment, once the fire is out, all the way to tree plant scene. Is there an average time frame? My sense is it's at least a year maybe longer depending on the situation. But would you say that I'm correct in saying a year as an average time at least?

Joe Sherlock: Yes. And here's why. So for example, if a fire occurred last year, it would be during the last fall that planters on the ranger districts to the forest have made an assessment of what they need to reestablish forests. So they place orders to our nursery to grow seedlings to reestablish forests in portions of the fire. So that's the first step, is making the seedling orders in the fall of the fire. And it's typically not for the whole extent of the fire. So it's parsed out over several years. But here's the timing, so the fire's last year, the seedlings are ordered in the fall of that fire, and that whole next year is spent growing vigorous seedlings in our nursery. And so it's not until, in this example that I'm using here, it's not until 2020 for the 2018 fire where we can start to first establish new forest with planted seedlings. So there's that first delay and there's almost no exception to that. Sometimes you could find excess seedlings from other sources, but in general, that doesn't apply. There's always this gap of the year that it takes to grow the seedlings.

And as most of our larger fires are planted over a number of years, you just keep adding another year and another year and another year. Because it takes time to manage the fuel and to manage the vegetation. Those two aspects that I talked about earlier, it's really important to deal with those things first before you insert new forest plants, new seedlings into the forest. They need to thrive. They can't just persist and get along. They need to really thrive to make a new forest work.

Brad Brandt: Joe, what are some of the hurdles that you and your colleagues face when planting in a high-intensity burn scar? I know I've talked to folks in the field who mentioned the hydrophobic soils, competition, which you mentioned, but what are maybe two or three of the biggest hurdles that you face when coming in post fire to plant some of these areas?

Joe Sherlock: Well, some of them, well, I'd be negligent to not at least recognize that this is an expensive operation. It does take money to get the work done, the processes that are available to reduce fuel, to reduce vegetation, to create a hospitable site. That costs money, and we don't always have the right amount of money at the right time. It's just like in every other aspect of our lives, there's competition for other things that need to be done. So the competition for funding is an important part of the process. The other one is really associated with well, one, the reduction of fuel. If we are engaged in efforts to reduce fuel, for example, via timber sales that remove the valuable products so that it isn't there to fall on the ground and become fuel for the next fire, that takes time and it's a separate operation. And in some cases, it could take a couple of years before they're finished accomplishing that work.
So that can't be ignored, and it's a very helpful process. Wherever it makes sense in the context of all the resources that we're trying to care for. So money, timing associated with work to create a favorable environment, those are probably the biggest challenges. We are improving the staffing levels on our forests with skilled, experienced people that are able to help make this work go as fast as possible. But it's unfortunate that money doesn't grow on trees because we'd like to have some of that to make things work as quickly as possible.

Ben Wilinsky: Joe, this is Ben Wilinsky from the Corporate Partnerships team. Thanks so much for your comments today. It's been really helpful to help us to paint this picture about what the process is like, what the issue is in California beyond you know, maybe what we hear in the news. And I think the restoration process and understanding a little bit more about that was really helpful. What I'd love to hear your thoughts on as I sit on the Corporate Partnerships team, on a daily basis, corporations, groups of individuals are asking me, “What can we do to help?” What do we need to know to be an informed citizen and an informed corporate citizen? What do you feel like can be done to — from a corporate sense, from an individual sense — to help to solve or curb this really serious growing issue of wildfires in California?

Joe Sherlock: You know, it's very difficult to say how to slow this down and how to stop it, however, the work that people can do, the work that individuals can do would be to understand what it takes to make this reforestation process work so that they can be supportive of it. I mentioned funding earlier; funding helps. I'm not on the street with a tin can in my hand trying to ask people for money, but it would be foolish to not acknowledge that it does take funds to help some of these processes work. In the past there's been lots of discussion about the influence that the Smokey Bear campaign has led us to, and I think, I hope that we're beyond most of that fire is important in California. If it's a low-intensity fire, it consumes fuel, that would be the fuel that would cause these high-severity, high-intensity fires. So we're a few steps behind though in the use of fuel so that the fires are not the type of fires that we see on TV or read about in the newspapers.

We would really like to have low-intensity fires occur periodically so that these types of devastating fires, these ones that replace thousands of acres of forest, would be less frequent. You know, support and funding to supplement what we're able to get from our normal appropriations is important. Not advertising, you know, not asking for people to give money. It's not the role that I play in the forest service, but people that do contribute by, in ways, it goes two ways that, in a sense, the philosophical support, the belief in what we're doing. That's helpful. And if they wanted to contribute in the ways that the Arbor Day Foundation contributes to help at least pay part of the cost of seedlings, that's another way that people can help. It makes a lot of difference to us to be able to depend on the money that the Arbor Day Foundation offers us to reimburse some of our seedling costs.

Ben Wilinsky: Joe, it might be interesting to hear how the Arbor Day Foundation support helps you to do your work more effectively. And maybe you'll even describe a little bit, we tell our friends that their support will plant trees in your forest. Maybe you can give a little bit more detail as to what that support does?
Joe Sherlock: So our nursery near Placerville, California, grows our seedlings, and they have seed storage where over the years we've collected seed from the trees that we like to reestablish in our forest. And what happens is we pull them from the freezer, pull them from storage, and get them ready to sow into either containers or into the soil at the nursery. So that's the start of the process. It's an expensive process, takes time and an experienced staff to make it work. And over the year of growth in the summer, the seed germinates, the seedlings thrive. There are practices that are used in the nursery to get them to grow quickly. And at the end of the growing season, we have a seedling that's ready to be transplanted in the next year into the sites on these places that have been affected by fires.

It's an expensive process. It takes time. But we know what we're doing. Thankfully, we know an awful lot about how to care for the seedlings at the nursery, in the transportation process to the planting sites, and how they need to be planted. So all of that is supported by agency funds as well as the generous funds of donors that have contributed to the process. And we really depend on some contributions like that because there just isn't enough money to go around to fund everything that we'd like to do on the National Forest system. So contributions for things like seedling costs are very important and very much appreciated and welcomed by us.

And large fires, it's an especially daunting task, well one, to prepare the sites as they talked about earlier and then also to get the seedlings planted in the right way and as quickly as possible. It's an important process that occurs in a very short number of weeks — two or three weeks, sometimes a little bit longer at the higher elevations. We want to have the seedlings placed in the ground when there's adequate soil moisture. It's the right soil temperature so the seedlings can grow, and we want to get this work done before the rainfall shuts off for the season. And we're confronted with drier days, warmer days, and make sure that those trees have had a chance to establish some beneficial root system so that they can make it throughout the summer.

Brad Brandt: Hey Joe, this is Brad. Just one quick follow-up on that. You know, a lot of people ask me, why do you work with state forestry or why do you work with the Forest Service? And one of my simple answers that I use quite a bit is because they're the best at what they do. And you touched on it a little bit right there, but I was hoping maybe you could expand on that a little bit in terms of the survival of the seedlings, the care for the seedlings. I know I've been on these planting projects where there are Forest Service employees walking along with the planters, doing a lot of different things. I was hoping you could just expand on why you do what you do and why you're the best at what you do, and your colleagues as well?

Joe Sherlock: So the Forest Service has been confronted with trying to replace forests that have been affected by fire for decades. And over the years, we've gained a tremendous amount of knowledge from the research community and from practical experience. We know how to have them established in the nursery. We know how to move them from the nursery to the planting site, which we use coolers to maintain appropriate temperatures for the seedlings. These little seedlings are given an awful lot of care from the origins, those early days of taking the seed from the coolers, from the freezers, and placed in favorable sites and nurseries to grow into the seedlings we want to plant the next year,
all the way to the planting site and the people that we have that work through all these processes for us. These are trained, these are experienced people that know what they're doing.

There's parameters that we place on all of the processes for example, temperatures, for moisture, number of days that are favorable for planting seedlings in the woods. These are all accomplished by trained and experienced people have benefited from the decades previous to us today and also by the hard work that others have done to research how to make this process work effectively. And we've got people that know what they're doing.

It really is a story about finances to a degree. You know, we don't always have enough people; we don't always have enough money. But that's life. So that's a reflection of not just the Forest Service but an awful lot of other places, and it really does help, the money that you guys offer us as reimbursement for planted seedlings. We count on that. So it's not trivial at all. Every year when we're thinking about how much money do you think we're going to get from our normal appropriations, we're trying to make sense. Okay. But I think we can count on contributions for reimbursement for seedling costs. This is really, if it hasn't been clear to you guys, I'd like to make it perfectly clear, it is something we count on. And I hope that we can continue this cooperative relationship forever. It does help us.

It does help us, and especially stories that you guys can tell the people about how the work that we do is done by experienced and competent people. It's done because we believe in what we're doing, and it's really important to get this work done. We depend on forests for so many things. I'm sure you're familiar with stories about habitats for animals that are important to us. I'm sure you hear stories about forests can provide wood products for people and think of the recreation. I mean the number of opportunities for people to benefit from forests are immense. And what we do with reforestation speeds up the process of providing those forests for people to benefit from faster than they otherwise would be. This is especially true in California where things don't re-sprout.

For example, I said something about the re-sprouting that occurs after the fire for oaks, for example; the oaks are welcome. And so that isn't something we're trying to get rid of or to reduce. Thankfully they have a root system that re-sprouts and they can get going, but the conifers don't. So we need this type of planting exercise to get things in place and moving forward so that in the future we have a real forest to visit and benefit from.

Brad Brandt: Speaking of the benefits, we talk a lot about — and you mentioned it — the benefits of these forests. We work a lot in the urban forests, and a lot of times we talk about the end users who are benefiting from these forests and how they're benefiting. It seems really easy to talk about that and in the urban landscape. Could you talk a little bit, I know you touched on it some in your last remarks, but what are the benefits, who is benefiting from this restoration after these large severe fires that we've been hearing about in the news?
Joe Sherlock: Well, I think all of us benefit from the reestablishment of forest after losses that have occurred during wildfires. There are of course benefits associated with just being in a forested environment again, and of course the work that we're talking about, the reestablishment process. There's other benefits. There's people that are receiving income and salaries for the work that goes on. It's not as simple as volunteers going out and planting a few trees on a few weekends. This is a process that benefits from established contractors that know what they're doing. Our ability to arrange with these contractors the work that needs to be done. You know, the numbers in ways that people benefit from forests is, I think, really substantial. They are highly varied from, from those that are just associated with recreational aspects of having forests to enjoy to those that have been involved in the nuts and bolts of reestablishing the forest, the growing of the seedlings, the planting of the seedlings, the management of woody fuel, and the management of vegetation that we try to displace a bit so that the seedlings can thrive instead of always the woody shrubs, for example.

In the absence of action after a wildfire, places with woody shrubs will turn into shrub fields. And it isn't instinctively bad or negative to have places reestablished as shrub fields, but they're not forests. So places that used to be forest, there's a chance that if we don't do anything to shift the development of woody shrubs, it'll turn into a shrub field and stay as a shrub field for many decades. Sometimes seedlings establish within the shrubs, and they can take decades before they emerge to the top height of the shrubs and start to be able to get enough light for them to thrive. But you know that in a place where frequent fires are normal, it's more likely that they may not, that the shrub field will burn again.

It's a very complicated question and it depends on the types of woody shrubs, but the trajectory that we established by rapidly reestablishing forests is one that will lead to forest quickly. If we take too much time or we let it just do whatever it does, it's likely that we'll get mixed results. Some places we're working someplace won't cause. That's one of the really important reasons why doing something is the way to get forest reestablished. The trends in California were very highly adapted to fire of woody shrubs for example, they lead to more shrub fields and it takes time. And if you don't want to take the time, if you don't want to let the decades go by, then you need to do something. And that's why the support from people, both philosophical as well as financial support is important.

And sometimes the philosophical support is maybe more valuable at the moment because there's like, you already know, there's so many differences of opinion about everything in our world and it really depends what people want and the support that people have for doing something.

Brad Brandt: Wonderful. Thank you so much Joe. Really appreciate your time today.

Joe Sherlock: You're very welcome.

Ben Wilinsky: Thanks Joe. We look forward to many more years of working together and I'm excited about the future of our partnership.
Joe Sherlock: Thank you Brad, and we look forward to you continuing to work with you as well.