

# Webinar

## ULI Exclusive: Wildfire Resilience Demonstration with IBHS

Date: June 15, 2021

00:00:00 --> 00:00:03: Hello and welcome to today's Web and RAULI exclusive Wildfire

00:00:03 --> 00:00:04: resilience demo.

00:00:04 --> 00:00:07: With my BHS, my name is Katherine Burgess and I'm

00:00:07 --> 00:00:11: the vice president of the Urban Resilience program at the

00:00:11 --> 00:00:12: Urban Land Institute.

00:00:12 --> 00:00:16: Were thrilled to be hosting this webinar in partnership with

00:00:16 --> 00:00:17: IPHS and 10 ULI councils.

00:00:17 --> 00:00:20: Our program today will feature both the demo and a

00:00:20 --> 00:00:24: panel from a number of national wildfire resilience experts including

00:00:24 --> 00:00:25: Daniel Gorham,

00:00:25 --> 00:00:27: Lisa McKay, Lee Dan Richter,

00:00:27 --> 00:00:30: an ROI right as people continue to join all get

00:00:30 --> 00:00:31: started and get.

00:00:31 --> 00:00:34: One set up today. Please be ready to provide questions

00:00:34 --> 00:00:38: through the Q&A function and to sit back and enjoy

00:00:38 --> 00:00:39: today's demo.

00:00:39 --> 00:00:42: An opportunity for learning and peer exchange.

00:00:48 --> 00:00:51: Before we get started, I'd like to thank all of

00:00:51 --> 00:00:54: the UI Councils who came together to Co host today's

00:00:54 --> 00:00:57: web and R along with my VHS on the line

00:00:57 --> 00:01:00: we have you lie members with you lie Arizona Austin.

00:01:00 --> 00:01:02: You like Colorado. You like Houston,

00:01:02 --> 00:01:05: you will Idaho you lie Orange County Inland Empire you

00:01:05 --> 00:01:06: lie Sacramento,

00:01:06 --> 00:01:09: San Diego, and Tijuana, San Francisco and Utah.

00:01:09 --> 00:01:12: So it's truly a team effort and a mouthful to

00:01:12 --> 00:01:12: say.

00:01:12 --> 00:01:15: Thank you and welcome to all of our Council members.

00:01:15 --> 00:01:19: Thanks again, and we're looking forward to both having a

00:01:19 --> 00:01:23: dynamic conversation today and to continue this discussion about wildfire

00:01:24 --> 00:01:28: risk and resilience through future ULI programming content and convenings.

00:01:30 --> 00:01:34: Alongside today's webinar, I would encourage all of our attendees

00:01:34 --> 00:01:37: to download our recent National Research report on wildfire risk

00:01:37 --> 00:01:38: and resilience.

00:01:38 --> 00:01:42: Firebreak. This report was produced by utilizing Urban Resilience Program,

00:01:42 --> 00:01:45: which I lead in which is focused on how building

00:01:45 --> 00:01:48: cities and communities can be more prepared for the impacts

00:01:48 --> 00:01:49: of climate change.

00:01:49 --> 00:01:51: The report looks at wildfire risk,

00:01:51 --> 00:01:55: which has increased dramatically due to the impacts of climate

00:01:55 --> 00:01:55: change.

00:01:55 --> 00:01:58: Just last year, California saw six of its largest fires

00:01:58 --> 00:01:58: ever.

00:01:58 --> 00:02:01: Report also looks at the Community and industry.

00:02:01 --> 00:02:05: Impacts from wildfire risk and best practices for wildfire resilience

00:02:05 --> 00:02:05: at the site scale,

00:02:05 --> 00:02:08: the district scale and at the regional scale,

00:02:08 --> 00:02:10: and provides a number of case studies.

00:02:10 --> 00:02:13: Both of development projects and policies which are seeking to

00:02:13 --> 00:02:15: address wildfire resilience.

00:02:15 --> 00:02:18: We developed this report in partnership with more than 50

00:02:18 --> 00:02:20: experts from utilized membership and beyond,

00:02:20 --> 00:02:22: and I truly believe that you will.

00:02:22 --> 00:02:25: I offers a very unique platform and coalition to address

00:02:25 --> 00:02:26: resilience topics.

00:02:26 --> 00:02:30: Given that our membership includes professionals from the real estate,

00:02:30 --> 00:02:34: land use, urban design, architecture and built environment industries.

00:02:34 --> 00:02:37: So we encourage you all to check out the report

00:02:37 --> 00:02:40: and I also like to thank the Kreski Foundation for

00:02:40 --> 00:02:44: its support of this research and their resilience program overall.

00:02:44 --> 00:02:47: You'll be hearing from our esteemed panelists team today about

00:02:47 --> 00:02:50: both the demo and the wildfire resilience approaches,  
00:02:50 --> 00:02:52: which they're using it their projects.  
00:02:52 --> 00:02:55: Some of the big picture key takeaways from our fire  
00:02:55 --> 00:02:56: break for port,  
00:02:56 --> 00:02:59: which may align with some of the conversations today know  
00:02:59 --> 00:03:01: from the ULI membership,  
00:03:01 --> 00:03:04: we saw an increased awareness of wildfire risks both within  
00:03:04 --> 00:03:07: the wildland urban interface and in urban areas.  
00:03:07 --> 00:03:10: And we also heard about the continued consumer demand in  
00:03:10 --> 00:03:14: areas at risk from wildfires and the incredible challenges with  
00:03:14 --> 00:03:15: housing attainability.  
00:03:15 --> 00:03:18: We heard from policy makers who are trying to both  
00:03:18 --> 00:03:21: balance the increased risk to people into property and the  
00:03:21 --> 00:03:24: costs of managing wildfires and the and the need to  
00:03:24 --> 00:03:27: protect economic, vitality and Community identity.  
00:03:27 --> 00:03:29: And we also heard from developers,  
00:03:29 --> 00:03:33: owners and designers who are implementing wildfire  
resilience best practices,  
00:03:33 --> 00:03:36: many of which you will see right in front of  
00:03:36 --> 00:03:39: your own eyes with the demo today and finally from  
00:03:39 --> 00:03:40: our interviewees.  
00:03:40 --> 00:03:42: We unanimously heard that there is a need for more  
00:03:42 --> 00:03:46: coordination and coalition building across the different.  
00:03:46 --> 00:03:49: I built environment, industries and sectors to achieve better  
wildfire  
00:03:49 --> 00:03:51: resilience and I hope you will.  
00:03:51 --> 00:03:54: I can be a vehicle to help us get there.  
00:03:54 --> 00:03:57: And with that, I'd like to turn this over to  
00:03:57 --> 00:03:58: our esteemed panel.  
00:03:58 --> 00:03:59: Will first hear from Roy Wright,  
00:03:59 --> 00:04:02: who is the President and CEO of IBHS.  
00:04:02 --> 00:04:03: Roy joined I BHS from FEMA,  
00:04:03 --> 00:04:06: where he served as the chief executive of the National  
00:04:06 --> 00:04:07: Flood Insurance program,  
00:04:07 --> 00:04:11: led the agencies federal insurance and mitigation  
administration,  
00:04:11 --> 00:04:14: and directed many resilience programs.  
00:04:14 --> 00:04:16: We'll also hear from Daniel Gorham,  
00:04:16 --> 00:04:18: who will be leading our Wildfire resilience demo,  
00:04:18 --> 00:04:20: and he leads the team at IBA Chess,  
00:04:20 --> 00:04:24: which is dedicated to better understanding wildfire risk and  
how  
00:04:24 --> 00:04:26: to make communities more resilient.

00:04:26 --> 00:04:29: On our response panel after the demo we will hear  
00:04:29 --> 00:04:30: from Doctor Lisa McKay Lee,  
00:04:30 --> 00:04:33: who's the President and CEO of the Pepperwood Foundation  
in  
00:04:33 --> 00:04:34: California.  
00:04:34 --> 00:04:37: Pepperwood Foundation manages the Pepperwood  
Preserve,  
00:04:37 --> 00:04:39: which is a 3200 acre preserve,  
00:04:39 --> 00:04:42: which is serves as a refuge for over 900 species  
00:04:42 --> 00:04:43: of plants and animals,  
00:04:43 --> 00:04:47: and which produces critical research on ecosystem  
management.  
00:04:47 --> 00:04:49: And we'll also hear from Dan Richter,  
00:04:49 --> 00:04:51: who is the Managing director of Aviemore.  
00:04:51 --> 00:04:54: Aviemore is a master planned community on on the 23,000  
00:04:55 --> 00:04:56: acre site in the foothills of Boise,  
00:04:56 --> 00:04:59: which has been designated as a firewise community.  
00:04:59 --> 00:05:02: And with that I will turn the floor over to  
00:05:02 --> 00:05:02: Roy.  
00:05:02 --> 00:05:05: Thank you, Roy, and thank you to all of our  
00:05:05 --> 00:05:07: audience for joining us today.  
00:05:07 --> 00:05:10: Thank you so much. It is great to be with  
00:05:10 --> 00:05:11: you all.  
00:05:11 --> 00:05:14: Welcome to the Research Center here at at I VHS.  
00:05:14 --> 00:05:17: You know, as we're in a season right now is  
00:05:18 --> 00:05:21: drought and heat continued to make headlines.  
00:05:21 --> 00:05:26: Western communities are left grappling with this risk of  
wildfire  
00:05:26 --> 00:05:26: embers,  
00:05:26 --> 00:05:29: and we all know that embers are what drives so  
00:05:30 --> 00:05:32: much of the ignition that happens,  
00:05:32 --> 00:05:36: particularly is the built environment.  
00:05:36 --> 00:05:40: Into the season where we see those embers intrude,  
00:05:40 --> 00:05:43: moving from the WUI into suburbia.  
00:05:43 --> 00:05:48: Ann is at that point that the stakeholder relationships become  
00:05:48 --> 00:05:49: even more critical.  
00:05:49 --> 00:05:53: I, BHS, has a unique ability here at our Research  
00:05:53 --> 00:05:56: Center to replicate Ember storms.  
00:05:56 --> 00:05:59: The only place in America where we do this,  
00:05:59 --> 00:06:03: where full size structures can then be met with embers  
00:06:03 --> 00:06:07: where we can control everything in the environment.  
00:06:07 --> 00:06:12: This is something that was funded by the insurance industry  
00:06:12 --> 00:06:14: about a decade ago.

00:06:14 --> 00:06:18: More than 100 insurers make an annual investment to keep  
00:06:18 --> 00:06:21: this research moving forward.  
00:06:21 --> 00:06:25: Really, with the stated goal to bend down that risk  
00:06:25 --> 00:06:25: curve.  
00:06:25 --> 00:06:30: And how can we prevent the avoidable part of the  
00:06:30 --> 00:06:32: damages last fall?  
00:06:32 --> 00:06:36: I BHS did some work to bring together about a  
00:06:36 --> 00:06:38: decade's worth of our work,  
00:06:38 --> 00:06:44: and some of our collaborators across the broader Fire  
Protection  
00:06:44 --> 00:06:45: industry,  
00:06:45 --> 00:06:49: and laid out some what we call our suburban wildfire  
00:06:50 --> 00:06:51: adaptation.  
00:06:51 --> 00:06:55: Rd maps, providing guidance very specifically.  
00:06:55 --> 00:06:57: For urban areas, you know,  
00:06:57 --> 00:07:01: the guidance that is in place for the WUI is  
00:07:01 --> 00:07:02: actually.  
00:07:02 --> 00:07:05: Pretty clear, you know. We know what to do for  
00:07:05 --> 00:07:06: zero to 5 feet,  
00:07:06 --> 00:07:09: 5 to 30 and then 3200 feet out.  
00:07:09 --> 00:07:11: We know how to make that progression.  
00:07:11 --> 00:07:16: How to give yourself space to guard against the kind  
00:07:16 --> 00:07:18: of ignitions that can take place.  
00:07:18 --> 00:07:25: But honestly, few homers have the luxury of this much  
00:07:25 --> 00:07:25: land.  
00:07:25 --> 00:07:29: Reality looks far more like this where by the time  
00:07:29 --> 00:07:32: you get from the five to 30 foot zone you  
00:07:32 --> 00:07:35: are already in your neighbors kitchen and by the time  
00:07:35 --> 00:07:38: you get out to 100 feet you look across here  
00:07:39 --> 00:07:39: and there.  
00:07:39 --> 00:07:43: Maybe six other structures or more that are within that  
00:07:43 --> 00:07:47: radius and so our work has put a particular emphasis  
00:07:47 --> 00:07:51: on this suburban context in the specific actions that we  
00:07:51 --> 00:07:54: could do. We published these and will share the these  
00:07:55 --> 00:07:56: elements with you.  
00:07:56 --> 00:07:59: All on these elements. 8 specific areas.  
00:07:59 --> 00:08:02: Things like the roofs in the eaves,  
00:08:02 --> 00:08:06: the building shape, the fuel's as well as the walls  
00:08:06 --> 00:08:09: and look collectively at these pieces.  
00:08:09 --> 00:08:13: And it's not a binary way to approach this.  
00:08:13 --> 00:08:17: Rather, it's a series of nested ways to get from  
00:08:17 --> 00:08:22: imagining a perfect answer to some practical pieces that are

00:08:22 --> 00:08:22: there.

00:08:22 --> 00:08:26: One thing became really clear to us as we did

00:08:26 --> 00:08:26: this.

00:08:26 --> 00:08:30: We had to find a way to break this down

00:08:30 --> 00:08:35: into specific actions that people could imagine and take,

00:08:35 --> 00:08:39: because unlike other hazards that I work in,

00:08:39 --> 00:08:44: weather that is on the flood or the wind front,

00:08:44 --> 00:08:47: wildfire truly is a system.

00:08:47 --> 00:08:51: Yeah, there are three kind of circles that build out

00:08:51 --> 00:08:51: from there.

00:08:51 --> 00:08:54: Is the structure on the parcel itself.

00:08:54 --> 00:08:59: There's the neighborhood and community and there's the broader ecosystem.

00:08:59 --> 00:09:03: Think all too often when I have conversations with policy

00:09:03 --> 00:09:04: leaders and the like,

00:09:04 --> 00:09:08: they go. Well, yeah. Who has to go first?

00:09:08 --> 00:09:11: Well, the right answer is we all need to make

00:09:11 --> 00:09:13: progress on this.

00:09:13 --> 00:09:17: Yes we need work on forest management at ecosystem level.

00:09:17 --> 00:09:20: Yes, we need to have the right building codes for

00:09:20 --> 00:09:21: the new construction,

00:09:21 --> 00:09:25: but also ways to layout retrofits at firebreaks and other

00:09:25 --> 00:09:28: things at the Community scale,

00:09:28 --> 00:09:31: and then the parcel itself matters.

00:09:31 --> 00:09:33: When you go out West,

00:09:33 --> 00:09:36: Oftentimes this is what a parcel would look like.

00:09:36 --> 00:09:41: You see the kind of landscaping the elements that are

00:09:41 --> 00:09:43: all laid out on this home.

00:09:43 --> 00:09:46: But what we are now doing is finding ways to

00:09:47 --> 00:09:51: reimagine this knowing the criticality of the first five feet

00:09:51 --> 00:09:55: closest to the house and paying attention to everything that

00:09:55 --> 00:09:58: is combustible inside that five feet.

00:09:58 --> 00:10:01: We know that if you lay it out in such

00:10:01 --> 00:10:02: a way,

00:10:02 --> 00:10:04: you can change that landscaping,

00:10:04 --> 00:10:09: create the space, and substantively reduce the risk babies by

00:10:09 --> 00:10:10: as much as 70%

00:10:10 --> 00:10:14: by giving that kind of space that is in play.

00:10:14 --> 00:10:17: It isn't that you can't have any elements that are

00:10:17 --> 00:10:18: in here,

00:10:18 --> 00:10:22: but you have to shift to things like rocks and

00:10:22 --> 00:10:27: succulents and other kinds of walkways and push that landscaping

00:10:27 --> 00:10:28: a bit farther away.

00:10:28 --> 00:10:32: All too often what we see is up around the

00:10:32 --> 00:10:35: home is all kinds of mulch and other kinds of

00:10:35 --> 00:10:39: things that really act like just piles and piles of

00:10:39 --> 00:10:42: matches that become harbors for the embers.

00:10:42 --> 00:10:45: When we run a full scale piece.

00:10:45 --> 00:10:48: This is what it looks like out in the test

00:10:48 --> 00:10:53: chamber where we take in shower structures with those embers

00:10:53 --> 00:10:56: that we know drive so much of the ignition.

00:10:56 --> 00:10:58: It's not just one or two embers,

00:10:58 --> 00:11:01: its tenets when a set of those collect.

00:11:01 --> 00:11:03: And begin to take hold.

00:11:03 --> 00:11:05: So with that context laid,

00:11:05 --> 00:11:09: I'm going to hand this to my colleague Dan Gorham,

00:11:09 --> 00:11:12: who is in the test chamber about 50 feet away

00:11:12 --> 00:11:15: from me and in real time we're going to look

00:11:15 --> 00:11:17: at these dynamics.

00:11:17 --> 00:11:20: He'll narrate that for us Dan to you.

00:11:20 --> 00:11:23: Thanks Roy yeah and appreciate everyone joining us today for

00:11:24 --> 00:11:25: this demonstration.

00:11:25 --> 00:11:27: So as Roy mentioned we are here at the Abhs

00:11:27 --> 00:11:30: Research Center out in what we call the Chamber.

00:11:30 --> 00:11:33: This is the facility where we recreate the hazards and

00:11:33 --> 00:11:36: what we have today is a pretty small scale for

00:11:36 --> 00:11:37: US demonstration.

00:11:37 --> 00:11:40: I'm going to get this started and as it's going

00:11:40 --> 00:11:42: we're going to talk our way through it.

00:11:42 --> 00:11:44: So ready 321 ignition.

00:11:44 --> 00:11:47: And So what I did there at ignition my colleague

00:11:47 --> 00:11:50: over here actually sent some electricity to cartridge heaters.

00:11:50 --> 00:11:52: And with these cartridge heaters do,

00:11:52 --> 00:11:53: is they simulate the embers,

00:11:53 --> 00:11:56: those hot burning particles that Roy mentioned and we can

00:11:56 --> 00:11:59: already see those hot particles have landed in,

00:11:59 --> 00:12:02: in this case combustible mulch and are starting to smolder

00:12:02 --> 00:12:04: and smoke and will eventually turn into flame,

00:12:04 --> 00:12:06: and I see a little bit of flames over in

00:12:06 --> 00:12:07: the corner and again,

00:12:07 --> 00:12:10: I'm just going to talk my way through this,

00:12:10 --> 00:12:11: so these are surrogate embers,  
 00:12:11 --> 00:12:13: but they act the same way.  
 00:12:13 --> 00:12:15: They're hot, they're smoldering, they can ignite.  
 00:12:15 --> 00:12:18: Things they land in receptive fuels and in this immediate  
 00:12:18 --> 00:12:20: zone around the house.  
 00:12:20 --> 00:12:22: What we call the five foot home ignition zone.  
 00:12:22 --> 00:12:24: If you have combustible mulch,  
 00:12:24 --> 00:12:25: say like this wood mulch,  
 00:12:25 --> 00:12:27: those embers can land in there.  
 00:12:27 --> 00:12:29: They can almost get in little kind of nest,  
 00:12:29 --> 00:12:31: and then they can ignite and also,  
 00:12:31 --> 00:12:34: as Roy mentioned, it's oftentimes not just a single lumber.  
 00:12:34 --> 00:12:36: Is the accumulation of them,  
 00:12:36 --> 00:12:38: so some of our work looks at where do those  
 00:12:38 --> 00:12:40: embers accumulate on and around the home,  
 00:12:40 --> 00:12:43: and then we're coming in a little bit closer.  
 00:12:43 --> 00:12:46: Here we see some of these embers have turned into.  
 00:12:46 --> 00:12:48: Claims and at the corner of the house.  
 00:12:48 --> 00:12:50: Right here I have some Bush is you might have  
 00:12:50 --> 00:12:54: ornamental shrubs in your yard and threaten this immediate  
 zone,  
 00:12:54 --> 00:12:55: but you also need to water those,  
 00:12:55 --> 00:12:58: and we highly recommend making sure that those are well  
 00:12:58 --> 00:12:59: irrigated.  
 00:12:59 --> 00:13:02: Caswell water plants are going to be more resistant  
 inherently  
 00:13:02 --> 00:13:03: to ignition,  
 00:13:03 --> 00:13:06: but to water those plants you might have a hose  
 00:13:06 --> 00:13:08: and you might have your hose and the hose holder.  
 00:13:08 --> 00:13:11: So when we think about that 5 foot zone and  
 00:13:11 --> 00:13:13: defensible space and what is around the structure,  
 00:13:13 --> 00:13:15: it's not just the vegetation,  
 00:13:15 --> 00:13:18: it's importantly the vegetation. That mulch on the ground,  
 00:13:18 --> 00:13:20: which accumulates the embers, but it can be what we  
 00:13:21 --> 00:13:23: consider or what we describe as structural fuels,  
 00:13:23 --> 00:13:24: and in this case again,  
 00:13:24 --> 00:13:27: it's a plastic hose holder.  
 00:13:27 --> 00:13:30: But we can see that pretty quickly we're only just  
 00:13:30 --> 00:13:33: under 2 minutes into this started this test.  
 00:13:33 --> 00:13:35: Those embers ignited the mulch pretty quickly,  
 00:13:35 --> 00:13:39: and we've actually conditioned this mulch to be  
 representative of  
 00:13:39 --> 00:13:40: Western states.



00:13:40 --> 00:13:42: A California or Nevada Oregon,  
00:13:42 --> 00:13:44: so it's drier and less humid than it is here  
00:13:44 --> 00:13:45: in South Carolina.  
00:13:45 --> 00:13:48: That's one of the things that we have to do  
00:13:48 --> 00:13:49: at the lab.  
00:13:49 --> 00:13:51: We have to recreate those conditions,  
00:13:51 --> 00:13:55: but we've dried out the mulch and we've conditioned the  
00:13:55 --> 00:13:58: fuels so it's representative and you see how quickly that  
00:13:58 --> 00:14:01: dry mulch can transition into flames.  
00:14:01 --> 00:14:03: And so, while this is again just a little bit  
00:14:03 --> 00:14:06: under 2 1/2 minutes in in this case for the  
00:14:06 --> 00:14:07: plastic it's starting to melt,  
00:14:07 --> 00:14:10: so we see vegetative fuels and plastics fuels behave a  
00:14:10 --> 00:14:12: little bit differently.  
00:14:12 --> 00:14:14: I want to talk a little bit about the structure  
00:14:14 --> 00:14:16: that we have that this 5 foot zone is up  
00:14:17 --> 00:14:17: against.  
00:14:17 --> 00:14:19: This is the structure that we build.  
00:14:19 --> 00:14:22: That's again pretty representative of what we believe is  
common  
00:14:22 --> 00:14:23: in California,  
00:14:23 --> 00:14:26: and really in that suburban context that Roy talked about.  
00:14:26 --> 00:14:29: So you'll see the siding here is actually T1-11 or  
00:14:29 --> 00:14:30: plywood siding,  
00:14:30 --> 00:14:32: but we've put in exterior code on it.  
00:14:32 --> 00:14:35: And so combustible siding is something that we know which  
00:14:35 --> 00:14:38: flames get to that that combustible siding can ignite,  
00:14:38 --> 00:14:41: and fire can spread up the siding into the EVE  
00:14:41 --> 00:14:41: area.  
00:14:41 --> 00:14:44: One of the things that we know we can do  
00:14:44 --> 00:14:47: to reduce the potential for that is where embers accumulate  
00:14:47 --> 00:14:48: at the base of the ground.  
00:14:48 --> 00:14:52: Even if you have a combustible siding making that bottom  
00:14:52 --> 00:14:54: 6 inches something of non combustible,  
00:14:54 --> 00:14:56: and in this case we use fiber cement board.  
00:14:56 --> 00:14:59: So if we didn't have this wood mulch here at  
00:14:59 --> 00:15:02: the embers were landing right up there in the corner  
00:15:02 --> 00:15:02: of the house.  
00:15:02 --> 00:15:05: They would be sitting on something non combustible on the  
00:15:05 --> 00:15:06: ground.  
00:15:06 --> 00:15:07: Ideally instead of wood mulch,  
00:15:07 --> 00:15:10: we'd have rock mulch or maybe hardscaping,

00:15:10 --> 00:15:12: and that hot particle wouldn't have anything to ignite in  
 00:15:13 --> 00:15:14: the same way on the wall.  
 00:15:14 --> 00:15:16: That 6 inch zone at the base of the wall,  
 00:15:16 --> 00:15:19: because we have it of non combustible fiber cement board.  
 00:15:19 --> 00:15:21: Again it doesn't have anything to ignite and so it  
 00:15:21 --> 00:15:24: just kind of gets hot and maybe hopefully gets blown  
 00:15:24 --> 00:15:27: away so that small little detail even if you have  
 00:15:27 --> 00:15:31: combustible siding. Having a 6 inch noncombustible zone at  
 the  
 00:15:31 --> 00:15:32: bottom makes a big deal.  
 00:15:32 --> 00:15:34: And so now I'm actually going to walk around to  
 00:15:35 --> 00:15:37: the front side of the building and show you a  
 00:15:37 --> 00:15:40: little bit about this vegetation as the mulch is starting  
 00:15:40 --> 00:15:42: to burn up a little bit more if we look  
 00:15:42 --> 00:15:44: over here to the far right side,  
 00:15:44 --> 00:15:46: we have some of the smaller vegetation and these are  
 00:15:46 --> 00:15:49: the kinds of things that one might describe as fire  
 00:15:49 --> 00:15:51: resistant vegetation around your home.  
 00:15:51 --> 00:15:53: These are smaller, well maintained fuels,  
 00:15:53 --> 00:15:56: again irrigated and watered, so you could still get fire  
 00:15:56 --> 00:15:57: at the base of them,  
 00:15:57 --> 00:16:00: but they're less likely, they just have less of that  
 00:16:00 --> 00:16:00: fuel to burn.  
 00:16:00 --> 00:16:03: If it does ignite.  
 00:16:03 --> 00:16:05: And so so the flames over here on these smaller  
 00:16:05 --> 00:16:07: bushes aren't that big of a deal.  
 00:16:07 --> 00:16:10: But as we start to see some of these larger,  
 00:16:10 --> 00:16:13: more boxwood style and if there are some landscape  
 architects  
 00:16:13 --> 00:16:15: or people that are more into landscaping,  
 00:16:15 --> 00:16:18: and I apologies by using the wrong terms here,  
 00:16:18 --> 00:16:20: but these larger vegetation, right?  
 00:16:20 --> 00:16:22: This is just they can just have more fuel and  
 00:16:22 --> 00:16:25: one of the other important things to note about these  
 00:16:25 --> 00:16:28: larger Bush is is that they can have dead and  
 00:16:28 --> 00:16:29: dying fuel inside of them.  
 00:16:29 --> 00:16:32: So on the outside here this might look green and  
 00:16:32 --> 00:16:35: great but inside of it we actually have that dead  
 00:16:35 --> 00:16:35: and dying fuel.  
 00:16:35 --> 00:16:37: We talked about those embers,  
 00:16:37 --> 00:16:39: hot particles that dead and dying,  
 00:16:39 --> 00:16:42: fuel on the inside of it is more combustible than  
 00:16:42 --> 00:16:44: the green vegetation on the outside of it.

00:16:44 --> 00:16:46: So actually, the bigger the Bush,  
00:16:46 --> 00:16:48: the more important it is to maintain it.  
00:16:48 --> 00:16:50: One of the other things to note here is that  
00:16:50 --> 00:16:53: we have these shrubs so close to the structure,  
00:16:53 --> 00:16:56: just moving them away, even three to five feet outside  
00:16:56 --> 00:16:59: of this immediate zone would be a big improvement.  
00:16:59 --> 00:17:01: And so let's talk a little bit about some of  
00:17:01 --> 00:17:03: the fire behavior going on right now.  
00:17:03 --> 00:17:05: So we have this kind of corner of the house  
00:17:05 --> 00:17:06: set up right now,  
00:17:06 --> 00:17:08: and the wind coming out.  
00:17:08 --> 00:17:09: It's about 12 mile an hour,  
00:17:09 --> 00:17:12: so pretty slow, relatively. When we think about potential fire  
00:17:12 --> 00:17:12: spread.  
00:17:12 --> 00:17:14: But that fire here at the corner.  
00:17:14 --> 00:17:17: Some of the wind dynamics is why we're starting to  
00:17:17 --> 00:17:18: see the flames actually lengthen,  
00:17:18 --> 00:17:20: right? And so it's a little bit of the fuel  
00:17:20 --> 00:17:21: to bottom.  
00:17:21 --> 00:17:22: We had that burning plastic,  
00:17:22 --> 00:17:25: which we know is going to burn more intensely,  
00:17:25 --> 00:17:26: and it's going to have longer flames,  
00:17:26 --> 00:17:29: but some of the geometry of the building actually makes  
00:17:29 --> 00:17:32: a difference in how it might be affected by a  
00:17:32 --> 00:17:32: fire.  
00:17:32 --> 00:17:35: And so we see that this corner in effect basically  
00:17:35 --> 00:17:37: along gauge the flame.  
00:17:37 --> 00:17:40: And now we see the flames about 3/4 of the  
00:17:40 --> 00:17:40: way up.  
00:17:40 --> 00:17:42: We can see the the syngene.  
00:17:42 --> 00:17:45: We can see the a little bit of soot on  
00:17:45 --> 00:17:46: the trim there.  
00:17:46 --> 00:17:48: And if we get fire up into that EVE area,  
00:17:48 --> 00:17:49: which I can see now,  
00:17:49 --> 00:17:51: it's starting to darken. So this is the challenge we  
00:17:52 --> 00:17:53: have fire on the ground.  
00:17:53 --> 00:17:55: No one wants to lose their their shrubs or there,  
00:17:55 --> 00:17:57: and I can hear it with the audio.  
00:17:57 --> 00:17:59: I don't know if you can hear it on the  
00:17:59 --> 00:17:59: stream.  
00:17:59 --> 00:18:01: I could hear that Bush starting to burn,  
00:18:01 --> 00:18:03: and you can probably see it now,

00:18:03 --> 00:18:05: right? But it's it's like a freight train.  
00:18:05 --> 00:18:08: Once it starts going when it really gets going.  
00:18:08 --> 00:18:11: And when we have flames up into this EV area,  
00:18:11 --> 00:18:13: this is a challenge. So fire at the base of  
00:18:13 --> 00:18:14: the wall.  
00:18:14 --> 00:18:16: Not great, but if we can keep the fire down  
00:18:16 --> 00:18:17: there,  
00:18:17 --> 00:18:19: we might return to a home that just needs new  
00:18:19 --> 00:18:20: landscaping.  
00:18:20 --> 00:18:22: If we have fire that starts at the base of  
00:18:23 --> 00:18:25: the wall and say gets up into the even through  
00:18:25 --> 00:18:26: the eve,  
00:18:26 --> 00:18:28: you get into the attic of the structure,  
00:18:28 --> 00:18:31: then you're much more likely for that home day and  
00:18:31 --> 00:18:31: night.  
00:18:31 --> 00:18:35: And what we know from post fire investigations and looking  
00:18:35 --> 00:18:37: at the data is that homes that Ignite have a  
00:18:38 --> 00:18:38: 90%  
00:18:38 --> 00:18:39: chance up to a 90%  
00:18:39 --> 00:18:42: chance. Of being destroyed, and this is another one of  
00:18:42 --> 00:18:43: the things that Roy was highlighting.  
00:18:43 --> 00:18:46: Makes wildfire a bit different from some of the other  
00:18:46 --> 00:18:47: perils.  
00:18:47 --> 00:18:49: Is that the damage mode is more binary and we  
00:18:49 --> 00:18:51: think about that as you might come to a community,  
00:18:51 --> 00:18:54: you see homes that are completely untouched and you see  
00:18:54 --> 00:18:56: homes that are completely destroyed,  
00:18:56 --> 00:18:58: and so this is the binary nature of fire.  
00:18:58 --> 00:19:01: So the name of the game is reducing and preventing  
00:19:01 --> 00:19:04: the likelihood and potential further as ignitions.  
00:19:04 --> 00:19:06: I mentioned the embers again,  
00:19:06 --> 00:19:08: as this flame is starting to spread up into the  
00:19:08 --> 00:19:10: EVE area and will see here.  
00:19:10 --> 00:19:12: Live live demonstrations are always fun to do.  
00:19:12 --> 00:19:15: We'll see what happens. We'll see if it gets up  
00:19:15 --> 00:19:16: into the EVE area,  
00:19:16 --> 00:19:18: but while this is going on,  
00:19:18 --> 00:19:20: I want to talk a little bit about embers and  
00:19:20 --> 00:19:21: how important they are,  
00:19:21 --> 00:19:23: and so we attribute up to 90%  
00:19:23 --> 00:19:26: of home ignitions alright so we just blew the the  
00:19:26 --> 00:19:28: shrub over and so now we have fuel sitting on

00:19:28 --> 00:19:29: the ground.

00:19:29 --> 00:19:32: All that fuel that that fire that maybe hadn't got

00:19:32 --> 00:19:32: up into it.

00:19:32 --> 00:19:34: The fuel came to it but we know up to

00:19:34 --> 00:19:35: 90%

00:19:35 --> 00:19:38: of home ignitions. Are attributed to embers.

00:19:38 --> 00:19:41: And so the thing about embers is that they can

00:19:41 --> 00:19:42: travel up to miles,

00:19:42 --> 00:19:43: maybe not 10s of miles.

00:19:43 --> 00:19:44: They can, but you know,

00:19:44 --> 00:19:46: up to a mile ahead of the fire front.

00:19:46 --> 00:19:49: So even if your community isn't at the edge of

00:19:49 --> 00:19:51: the wildland urban interface as we call it,

00:19:51 --> 00:19:54: even if the forest or the brush land isn't in

00:19:54 --> 00:19:55: your backyard,

00:19:55 --> 00:19:57: those Ambler members can travel up to a quarter mile

00:19:57 --> 00:19:58: up to a mile ahead,

00:19:58 --> 00:20:01: and they can land on in and around your structure.

00:20:01 --> 00:20:03: And that's the challenge right now.

00:20:03 --> 00:20:05: And So what we're seeing here?

00:20:05 --> 00:20:08: This is a recreation of what we would describe as

00:20:08 --> 00:20:09: an indirect ember ignition.

00:20:09 --> 00:20:11: So those embers, they landed around your home,

00:20:11 --> 00:20:13: they could get into your home.

00:20:13 --> 00:20:16: They could get in through vents they could get in

00:20:16 --> 00:20:17: through open windows or open doors,

00:20:17 --> 00:20:20: but they could also ignite things around your home that

00:20:20 --> 00:20:22: otherwise wouldn't have ignited again,

00:20:22 --> 00:20:24: that fire front hasn't spread to the home,

00:20:24 --> 00:20:27: but they might ignite something around it and that burning

00:20:27 --> 00:20:30: Bush or that burning hose holder that might ignite the

00:20:30 --> 00:20:31: structure and the gal.

00:20:31 --> 00:20:34: We can definitely see some of the fire spreading up

00:20:34 --> 00:20:34: the siding,

00:20:34 --> 00:20:36: and so this is that indirect ember ignition.

00:20:36 --> 00:20:39: And so again, Members are really important in a focus

00:20:39 --> 00:20:41: of a lot of the research that we do here

00:20:41 --> 00:20:42: at IVHS.

00:20:42 --> 00:20:45: Members have always been a part of fire phenomenon.

00:20:45 --> 00:20:48: Wildland fire phenomenon, but it wasn't only until maybe the

00:20:48 --> 00:20:50: past 20 or 30 years that we started to realize

00:20:50 --> 00:20:51: their importance.

00:20:51 --> 00:20:53: There was some hypothesis of oh,  
00:20:53 --> 00:20:56: it's always the tsunami of flames or the big wall  
00:20:56 --> 00:20:57: of fire that ignites structures.  
00:20:57 --> 00:21:00: But then we were seeing homes burned again miles away  
00:21:00 --> 00:21:01: from the fire perimeter.  
00:21:05 --> 00:21:07: And so we can see how intense the fire is  
00:21:07 --> 00:21:08: burning here at the corner.  
00:21:08 --> 00:21:10: But if we just look at the ground on the  
00:21:10 --> 00:21:11: other side of the structure,  
00:21:11 --> 00:21:14: right? We had the same ignition scenario.  
00:21:14 --> 00:21:16: We had those surrogate embers in the same mulch.  
00:21:16 --> 00:21:18: We had similar fuels, but those smaller shrubs,  
00:21:18 --> 00:21:20: those smaller little ornamental vegetation,  
00:21:20 --> 00:21:22: aren't burning nearly as much,  
00:21:22 --> 00:21:25: and we could see the difference of the building geometry.  
00:21:25 --> 00:21:27: Now this isn't something you can modify after the home  
00:21:27 --> 00:21:28: was built,  
00:21:28 --> 00:21:30: and I'd like to talk a little bit about some  
00:21:30 --> 00:21:32: of the things that we know to build homes with  
00:21:33 --> 00:21:35: materials and design and features that are going to be  
00:21:35 --> 00:21:38: more wildfire resilient. The shape isn't one of them,  
00:21:38 --> 00:21:40: but we can see how big and important it is  
00:21:40 --> 00:21:42: and the importance of the shape.  
00:21:42 --> 00:21:44: Let's look at that corner now.  
00:21:44 --> 00:21:46: The flame from the base of that wall or up  
00:21:46 --> 00:21:47: into that EVE area,  
00:21:47 --> 00:21:50: right? And fires into the Evavia have an easier pathway  
00:21:50 --> 00:21:51: into the attic.  
00:21:51 --> 00:21:54: Now for this structure we have a 6 inch zone  
00:21:54 --> 00:21:56: at the base of the wall of non combustible and  
00:21:56 --> 00:21:58: then we have combustible siding.  
00:21:58 --> 00:22:01: So good 6 inch vertical zone at the base of  
00:22:01 --> 00:22:01: the wall,  
00:22:01 --> 00:22:03: flammable or wood siding. Not so good.  
00:22:03 --> 00:22:05: But then what we did is we have a box  
00:22:05 --> 00:22:08: and even this is the devils in the details of  
00:22:08 --> 00:22:08: wildfire.  
00:22:08 --> 00:22:11: And so a boxed in eave isn't going to be  
00:22:11 --> 00:22:11: fireproof,  
00:22:11 --> 00:22:14: but that little bit of a barrier is going to  
00:22:14 --> 00:22:17: be more resistant to the flames penetrating as we can  
00:22:17 --> 00:22:19: kind of see if we get the camera a little

00:22:19 --> 00:22:21: bit underneath, but I can tell you we're about 10  
 00:22:21 --> 00:22:22: or 15 feet away.  
 00:22:22 --> 00:22:26: We're just over 10 minutes into this demonstration and we're  
 00:22:26 --> 00:22:27: taking steps back away from it,  
 00:22:27 --> 00:22:29: 'cause the intensity of this fire,  
 00:22:29 --> 00:22:32: the heat that I'm feeling on my skin is enough  
 00:22:32 --> 00:22:34: that I wouldn't want to get close to it,  
 00:22:34 --> 00:22:37: which is something to mention as we think about wildfire  
 00:22:37 --> 00:22:40: disasters over the past centuries and really in recent history.  
 00:22:40 --> 00:22:43: We think about all the destruction and a lot of  
 00:22:43 --> 00:22:47: credit duly given is to the firefighters and emergency  
 responders  
 00:22:47 --> 00:22:49: that are able to protect structures when they can.  
 00:22:49 --> 00:22:52: But it's important to note that they're doing that at  
 00:22:52 --> 00:22:54: some of their own risk,  
 00:22:54 --> 00:22:57: and they have appropriate training and personal protective  
 equipment.  
 00:22:57 --> 00:23:00: PPE to do it. But sometimes these fires are so  
 00:23:00 --> 00:23:01: intense.  
 00:23:01 --> 00:23:04: Sometimes the energy is so much that even firefighters have  
 00:23:04 --> 00:23:07: to pull back and so again talking about the binary  
 00:23:07 --> 00:23:10: destructive natures of fire we see in talking with emergency  
 00:23:10 --> 00:23:13: responders. After a fire has passed through an area you  
 00:23:13 --> 00:23:16: know there might have been an engine at the corner  
 00:23:16 --> 00:23:17: of that street last year,  
 00:23:17 --> 00:23:19: in 2020, we went up to Santa Rosa.  
 00:23:19 --> 00:23:22: After the glass fire impacted the community of the Skyhawk  
 00:23:22 --> 00:23:23: community,  
 00:23:23 --> 00:23:26: and this was a little bit relevant because this was  
 00:23:26 --> 00:23:28: very close to an area that was impacted by the  
 00:23:28 --> 00:23:30: 2017 tubs pipe Fire Coffey Park,  
 00:23:30 --> 00:23:33: which I imagine many of you are probably familiar with.  
 00:23:33 --> 00:23:36: Coffey Park had thousands of homes and structures  
 destroyed.  
 00:23:36 --> 00:23:38: Fortunately, in the 2020 class fire,  
 00:23:38 --> 00:23:41: we didn't see that amount of destruction,  
 00:23:41 --> 00:23:42: but we did see homes Lawson.  
 00:23:42 --> 00:23:45: And to get back to my point about emergency responders  
 00:23:45 --> 00:23:46: and defensive actions,  
 00:23:46 --> 00:23:49: we know that emergency responders were there.  
 00:23:49 --> 00:23:51: They were able to, you know,  
 00:23:51 --> 00:23:54: post and communicate. And with technology now we can  
 actually

00:23:54 --> 00:23:55: understand what's happening.

00:23:55 --> 00:23:57: But we knew firefighters were there.

00:23:57 --> 00:24:00: Yet we saw homes destroyed and this is the reality.

00:24:00 --> 00:24:03: They have a finite amount of resources personnel,

00:24:03 --> 00:24:06: but also water supply and hoses and all of those

00:24:06 --> 00:24:09: important things that firefighters need to do their Fire Protection.

00:24:09 --> 00:24:12: They have a finite amount of resources and during a

00:24:12 --> 00:24:14: wildland urban fire situation.

00:24:14 --> 00:24:16: That isn't always their number one priority.

00:24:16 --> 00:24:19: Life safety is there always number one priority.

00:24:19 --> 00:24:21: This life safety of the public.

00:24:21 --> 00:24:24: So helping with evacuations. Fire trucks have to go in

00:24:24 --> 00:24:26: and that can't stop people from getting out.

00:24:26 --> 00:24:28: And so again, all of this just to say is

00:24:28 --> 00:24:31: that sometimes we know that in those wild and urban

00:24:31 --> 00:24:34: disaster situations you might see firefighters,

00:24:34 --> 00:24:35: photos or videos of homes,

00:24:35 --> 00:24:38: free burning and then not spraying water on it because

00:24:38 --> 00:24:41: they are challenged by saving and protecting as many structures

00:24:41 --> 00:24:42: as they can.

00:24:42 --> 00:24:44: And sometimes it gets to a point where.

00:24:44 --> 00:24:46: Home would need so much water.

00:24:46 --> 00:24:49: All of the resources that is not viable and to

00:24:49 --> 00:24:52: some of the people in the audience that are more

00:24:52 --> 00:24:53: into community plenty.

00:24:53 --> 00:24:56: And that's one of the things that we talk about.

00:24:56 --> 00:24:59: One ingress and egress. This is for firefighters to get

00:24:59 --> 00:25:02: in so this is things like the widths of the

00:25:02 --> 00:25:05: road and turnabouts but also room for citizens and pedestrians

00:25:05 --> 00:25:09: to evacuate. But also water supply and this is really

00:25:09 --> 00:25:11: important in more rural areas.

00:25:11 --> 00:25:13: But as we talk about suburban situations,

00:25:13 --> 00:25:16: you know you typically have fire hydrants or you have

00:25:16 --> 00:25:17: municipal water supply.

00:25:17 --> 00:25:20: But again, it's a finite resources and so when we

00:25:20 --> 00:25:22: get to these disastrous type situation Bloomberg,

00:25:22 --> 00:25:25: you know Bernie thousands of homes at a time,

00:25:25 --> 00:25:27: they just overwhelmed that. So so one of the things

00:25:27 --> 00:25:30: as a former firefighter myself that I just mentioned to

00:25:30 --> 00:25:34: people is that firefighters and emergency responders will



always do  
00:25:34 --> 00:25:36: what they can to save lives and property.  
00:25:36 --> 00:25:38: But there is a limit to that.  
00:25:38 --> 00:25:41: And so it's important that we think about the design  
00:25:41 --> 00:25:44: and planning of communities with wildfire resilience in mind.  
00:25:44 --> 00:25:47: We think about planning having home spaced apart so we  
00:25:47 --> 00:25:49: don't have building to building ignition.  
00:25:49 --> 00:25:52: We think about having codes and standards and  
requirements so  
00:25:52 --> 00:25:55: that each of those homes are built with materials and  
00:25:55 --> 00:25:58: designed in such a way that they're going to be  
00:25:58 --> 00:26:00: more resistant to fire. And so as we're starting to  
00:26:00 --> 00:26:02: wrap up our demonstration here,  
00:26:02 --> 00:26:04: let's just go over what we saw and what we're  
00:26:04 --> 00:26:05: talking about.  
00:26:05 --> 00:26:07: Again, the research that we do it,  
00:26:07 --> 00:26:08: I hear it, I BHS.  
00:26:08 --> 00:26:11: Is rooted in science, so we always want to understand  
00:26:11 --> 00:26:12: what is going on.  
00:26:12 --> 00:26:14: What can we learn for it and ultimately,  
00:26:14 --> 00:26:17: how can we take that and have the most real-world  
00:26:17 --> 00:26:19: impact and translating it into more resilient,  
00:26:19 --> 00:26:23: existing and future communities? And so one of the things  
00:26:23 --> 00:26:25: that Roy highlighted is we know which what you do  
00:26:26 --> 00:26:27: to your structure.  
00:26:27 --> 00:26:30: Like many other hazards, it's materials you use its design  
00:26:30 --> 00:26:30: features.  
00:26:30 --> 00:26:33: Sometimes a little bit more detailed for wildfire.  
00:26:33 --> 00:26:35: But if we think about wind engineer and we want  
00:26:35 --> 00:26:38: to continuous load path for those homes that might be  
00:26:38 --> 00:26:39: in the pathway of hurricanes.  
00:26:39 --> 00:26:42: That continuous load path is a really important feature of  
00:26:42 --> 00:26:43: that building,  
00:26:43 --> 00:26:45: so that's important for wildfire.  
00:26:45 --> 00:26:47: But it's also important what's around the structure,  
00:26:47 --> 00:26:50: and So what we have in this case immediate 5  
00:26:50 --> 00:26:50: foot zone.  
00:26:50 --> 00:26:53: The Home ignition zone? That's really important.  
00:26:53 --> 00:26:56: And then the challenge, the difference between those two,  
00:26:56 --> 00:26:58: which is what you do to the structure.  
00:26:58 --> 00:27:01: It's one the materials that you use to build it  
00:27:01 --> 00:27:01: with,

00:27:01 --> 00:27:04: and eventually you're going to have to change out your  
00:27:04 --> 00:27:05: roof and maintaining it.  
00:27:05 --> 00:27:08: But really importantly, the area around the home,  
00:27:08 --> 00:27:11: and so we see community programs like firewise like.  
00:27:11 --> 00:27:13: We'll hear about Dan's group in Boise,  
00:27:13 --> 00:27:16: ID. Later fire Wise is a great program and it  
00:27:16 --> 00:27:19: really incorporates the community and get them to talk about  
00:27:19 --> 00:27:22: and understand and realize their risk and take the actions  
00:27:22 --> 00:27:24: that they can to. Reduce and minimize it,  
00:27:24 --> 00:27:26: so again, it's what you do.  
00:27:26 --> 00:27:30: This structure, it's what you do immediately around the  
structure  
00:27:30 --> 00:27:31: in that 5 foot phone.  
00:27:31 --> 00:27:34: Our science guidance recommends having non combustibles  
there.  
00:27:34 --> 00:27:36: So not wood, mulch, rock,  
00:27:36 --> 00:27:39: mulch or hardscaping. If you do have combustibles there like  
00:27:39 --> 00:27:41: ornamental vegetation,  
00:27:41 --> 00:27:43: make sure it's watered and those other things.  
00:27:43 --> 00:27:45: It's not only about the vegetation.  
00:27:45 --> 00:27:48: Think about in this case we saw a host role  
00:27:48 --> 00:27:50: but you know on your front porch you might have  
00:27:50 --> 00:27:51: a doormat.  
00:27:51 --> 00:27:54: You might have a welcome sign that allows people into  
00:27:54 --> 00:27:55: your home.  
00:27:55 --> 00:27:57: That's a great place for embers to catch,  
00:27:57 --> 00:27:59: and all you need is a doormat to ignite and  
00:27:59 --> 00:28:02: that burning doormat might ignite something next to the door,  
00:28:02 --> 00:28:05: and that might ignite the home and so you can  
00:28:05 --> 00:28:06: see this propagation effect,  
00:28:06 --> 00:28:08: but again, to close on a more positive note,  
00:28:08 --> 00:28:11: we know that there are things that people can do.  
00:28:11 --> 00:28:13: We know we can build new homes that are going  
00:28:13 --> 00:28:15: to be more wildfire resilient,  
00:28:15 --> 00:28:17: and we know there are things that we can do  
00:28:17 --> 00:28:18: to existing structures,  
00:28:18 --> 00:28:21: and Roy highlighted that in the suburban road map things  
00:28:21 --> 00:28:23: that we can do to make them more resilient,  
00:28:23 --> 00:28:26: and so I hope that this has been an informative  
00:28:26 --> 00:28:27: demonstration were about.  
00:28:27 --> 00:28:30: Wrapping it up here and I hope everyone has enjoyed  
00:28:30 --> 00:28:31: this again.  
00:28:31 --> 00:28:34: Roy, thank you for mentioning this suburban road map.

00:28:34 --> 00:28:36: The work that we've done here at I BHS over  
 00:28:36 --> 00:28:38: the past ten years has really LED us to to  
 00:28:38 --> 00:28:40: put that into work,  
 00:28:40 --> 00:28:43: and we're continuing that. Roy mentioned the structure  
 separation and  
 00:28:43 --> 00:28:46: one of the other projects that we have in the  
 00:28:46 --> 00:28:47: research facility.  
 00:28:47 --> 00:28:50: Right now we're doing a little bit of double dipping.  
 00:28:50 --> 00:28:53: Is looking at how fire spreads through vegetative fuels,  
 00:28:53 --> 00:28:56: and we can think about how this might affect community  
 00:28:56 --> 00:28:59: planning and the design and need for fuel breaks around  
 00:28:59 --> 00:29:00: the structures.  
 00:29:00 --> 00:29:02: And so with that, I think we're going to end  
 00:29:02 --> 00:29:03: the video here in the Chamber,  
 00:29:03 --> 00:29:05: and I'm going to pass it back to you,  
 00:29:05 --> 00:29:07: Catherine, and I'll see everyone on the panel discussion.  
 00:29:13 --> 00:29:16: Wow, thank you so much Ken and our whole I  
 00:29:16 --> 00:29:17: BHS team.  
 00:29:17 --> 00:29:21: We so appreciate your being willing to host this demo  
 00:29:21 --> 00:29:24: for us and you know it's a reminder of how  
 00:29:24 --> 00:29:28: critical it is to build structures which are prepared for  
 00:29:28 --> 00:29:34: wildfire risks and that terrifying visceral experience that I think  
 00:29:34 --> 00:29:36: we all just.  
 00:29:36 --> 00:29:39: Experience virtually luckily not in person today,  
 00:29:39 --> 00:29:41: so thank you. Thank you again.  
 00:29:41 --> 00:29:44: I BHS and Daniel both for your expertise as a  
 00:29:44 --> 00:29:47: expert on building design and as a former firefighter.  
 00:29:47 --> 00:29:50: And so with that I'd like to turn the discussion  
 00:29:50 --> 00:29:52: over to Dan Richter,  
 00:29:52 --> 00:29:54: Antalis Lisa McKay, Lee, Dan,  
 00:29:54 --> 00:29:57: and Lisa. I'd appreciate it if you could start by  
 00:29:57 --> 00:30:01: introducing yourselves and the projects which are here to  
 represent  
 00:30:01 --> 00:30:04: and 1st speak a bit about the wildfire risk and  
 00:30:04 --> 00:30:07: on what the wildfires that you face.  
 00:30:07 --> 00:30:10: And any commentary you'd like to share on recent wildfire  
 00:30:10 --> 00:30:11: events?  
 00:30:11 --> 00:30:13: Thank you. But let's start with Dan.  
 00:30:19 --> 00:30:22: Little bit of a technical difficulty hit the wrong button.  
 00:30:22 --> 00:30:24: Hi, my name is Dan Richter.  
 00:30:24 --> 00:30:28: I am the managing partner for the album or community.  
 00:30:28 --> 00:30:31: Ava Moore is a planned community on 23,000 acres of

00:30:31 --> 00:30:35: grasslands located about four miles north of Eagle,  
 00:30:35 --> 00:30:40: ID, which is a part of the Boise Metro area.  
 00:30:40 --> 00:30:43: One complete over the next couple of decades have a  
 00:30:43 --> 00:30:46: more will consist of a series of villages and Hamlets  
 00:30:46 --> 00:30:48: connected by trails.  
 00:30:48 --> 00:30:52: Will have about 12,000 homes and 900,000 square feet of  
 00:30:52 --> 00:30:55: supportive commercial properties.  
 00:30:55 --> 00:30:59: Currently, right now we have about 700 single family homes  
 00:30:59 --> 00:31:04: in about 25,000 square feet of commercial properties  
 completed.  
 00:31:04 --> 00:31:08: At buildout we will have developed on 7000 of the  
 00:31:08 --> 00:31:14: 23,000 acres leaving 16,000 acres is their native grasslands  
 and  
 00:31:14 --> 00:31:15: open space.  
 00:31:17 --> 00:31:22: My partners in this project or the McLeod family have  
 00:31:22 --> 00:31:25: been on this land for 105 years.  
 00:31:25 --> 00:31:29: We've got a shared vision of conservation on the lands,  
 00:31:29 --> 00:31:32: and sharing the lands with not just our homeowners,  
 00:31:32 --> 00:31:35: but the general public. Which presents a couple problems  
 when  
 00:31:35 --> 00:31:38: you're when you want to be a firewise community.  
 00:31:40 --> 00:31:43: As part of our homeowners association,  
 00:31:43 --> 00:31:46: we have a manager who we called the art of  
 00:31:47 --> 00:31:48: Living Director.  
 00:31:48 --> 00:31:51: He runs our hoia, but more importantly he runs an  
 00:31:52 --> 00:31:53: education program.  
 00:31:53 --> 00:31:57: We call it evermore 101 where at least monthly or  
 00:31:57 --> 00:31:58: maybe more.  
 00:31:58 --> 00:32:02: We have presentations. I'd love to have this video of  
 00:32:02 --> 00:32:05: this burn on one of our ever more one on  
 00:32:05 --> 00:32:07: one is to lift the homeowner.  
 00:32:07 --> 00:32:10: See that I was. Taken aback by watching that hose  
 00:32:10 --> 00:32:11: reel,  
 00:32:11 --> 00:32:13: I'm gonna go out now and look at explore our  
 00:32:13 --> 00:32:16: neighborhood for hose reels adjacent to the homes.  
 00:32:16 --> 00:32:21: We also employ an artist or a conservation director.  
 00:32:21 --> 00:32:25: To our ever more stewardship organization.  
 00:32:25 --> 00:32:28: You know, I know. I was introduced as an expert  
 00:32:28 --> 00:32:29: in this,  
 00:32:29 --> 00:32:33: but it's really the only consultants that we hired.  
 00:32:33 --> 00:32:36: They gave us all of the insight on what we  
 00:32:36 --> 00:32:39: needed to do to be the first planned community in  
 00:32:39 --> 00:32:41: Idaho from inception to be a firewise community.

00:32:41 --> 00:32:43: I learned a lot from them,  
00:32:43 --> 00:32:45: and I learned a lot here today.  
00:32:48 --> 00:32:51: It's also important to have a more that are open  
00:32:51 --> 00:32:51: space.  
00:32:51 --> 00:32:53: Be well, as I mentioned,  
00:32:53 --> 00:32:56: inclusive, as the Macleods reminded me.  
00:32:56 --> 00:32:59: And continually remind me, is not if we have fires  
00:32:59 --> 00:33:00: on a rangelands,  
00:33:00 --> 00:33:03: but when we have fires.  
00:33:03 --> 00:33:06: With that in mind, we designed our community to be  
00:33:06 --> 00:33:10: the first firewise community from inception.  
00:33:10 --> 00:33:13: You know, we're proud of that we.  
00:33:13 --> 00:33:14: We have a lot of guidelines.  
00:33:14 --> 00:33:18: You know that we follow and I'll get into that  
00:33:18 --> 00:33:20: in a little later in detail.  
00:33:20 --> 00:33:22: But thank you.  
00:33:22 --> 00:33:25: Thank you Dan. Be great to hear from you,  
00:33:25 --> 00:33:27: Lisa.  
00:33:27 --> 00:33:29: Hi everyone, thanks for including me today.  
00:33:29 --> 00:33:31: My name is Lisa McKay,  
00:33:31 --> 00:33:34: Lee Ann. I'm the President of the Pepperwood Foundation  
and  
00:33:34 --> 00:33:37: we manage a 3200 acre research reserve that was founded  
00:33:37 --> 00:33:40: originally with the California Academy of Sciences.  
00:33:40 --> 00:33:43: So I'm going to use my background screen to give  
00:33:43 --> 00:33:46: you a little context or looking down at the landscape  
00:33:46 --> 00:33:48: right now that we manage.  
00:33:48 --> 00:33:52: And our real focus is on bringing science to climate  
00:33:52 --> 00:33:56: and fire resilience of where I don't have experience as  
00:33:56 --> 00:33:57: a builder.  
00:33:57 --> 00:34:01: We're not really developers, but we were burnt over  
completely  
00:34:01 --> 00:34:03: in the Tubbs fire of 2017,  
00:34:03 --> 00:34:07: and this is a picture of the Kinkaid Fire 2019  
00:34:07 --> 00:34:10: hitting us for a second time and we were directly  
00:34:10 --> 00:34:13: in the path of the glass fire last year.  
00:34:13 --> 00:34:17: Likely the the winds died down so you know,  
00:34:17 --> 00:34:19: we both focus on resilient structures.  
00:34:19 --> 00:34:21: And I'll say this is our.  
00:34:21 --> 00:34:25: Education Center I'm going to completely glass,  
00:34:25 --> 00:34:29: concrete and steel building and it was pretty much  
unscathed,  
00:34:29 --> 00:34:34: even though this entire building was completely surrounded

00:34:34 --> 00:34:37: by fire,  
 00:34:37 --> 00:34:41: not so much for our staff residences,  
 00:34:41 --> 00:34:42: which were pretty much I would call them Redwood shacks  
 00:34:42 --> 00:34:47: that we had and do.  
 00:34:47 --> 00:34:50: The ember driven fires. We lost those wooden structures,  
 00:34:50 --> 00:34:51: so we embarked on the journey to try to rebuild  
 00:34:51 --> 00:34:53: in a more fire resilient way.  
 00:34:53 --> 00:34:56: One of the structures we lost was our supply barn  
 00:34:56 --> 00:34:59: and our utility of our in office.  
 00:34:59 --> 00:35:02: We have completely rebuilt this with a metal kit product  
 00:35:02 --> 00:35:06: that's very ignition resilient and I will say,  
 00:35:06 --> 00:35:09: you know my original instinct was to try to use  
 00:35:09 --> 00:35:12: the same kinds of materials that we had for the  
 00:35:12 --> 00:35:14: white Center for our residences.  
 00:35:14 --> 00:35:17: I was at the time advise that that was not  
 00:35:17 --> 00:35:21: very practical and that it would be very expensive to  
 00:35:21 --> 00:35:23: try to do steel frame buildings.  
 00:35:23 --> 00:35:25: So we went with more of a.  
 00:35:25 --> 00:35:30: Ignition resilient design where there's wooden frame on the  
 00:35:30 --> 00:35:33: inside  
 00:35:33 --> 00:35:36: of the buildings but the outside of the buildings have  
 00:35:36 --> 00:35:37: a lot of materials like Hardie board,  
 00:35:37 --> 00:35:39: stucco.  
 00:35:39 --> 00:35:42: And there is some wood as you can see we  
 00:35:42 --> 00:35:42: went with.  
 00:35:42 --> 00:35:45: We were going to go with a very expensive Japanese  
 00:35:45 --> 00:35:46: treated wood.  
 00:35:46 --> 00:35:49: We ended up with Cedar so I think we kind  
 00:35:49 --> 00:35:53: of ended up with a compromise solution on our structures.  
 00:35:53 --> 00:35:56: We're really, really happy with them.  
 00:35:56 --> 00:35:59: We are very adherent to defensible space and and there's  
 00:35:59 --> 00:36:03: basically rock mulch around all of these buildings.  
 00:36:03 --> 00:36:05: Now with that 55 foot diameter.  
 00:36:05 --> 00:36:08: But I will say going through the insurance renewal process  
 00:36:08 --> 00:36:09: this year,  
 00:36:09 --> 00:36:11: our primary.  
 00:36:11 --> 00:36:16: Insurer would not insure these buildings and we went to  
 00:36:16 --> 00:36:19: 30 providers and found one.  
 00:36:19 --> 00:36:21: Policy that was sort of prohibitively expensive,  
 00:36:21 --> 00:36:25: so it's an interesting tradeoff now to think about whether  
 00:36:25 --> 00:36:27: the additional expense.  
 00:36:27 --> 00:36:30: Going with steel might have been worth it and I

00:36:30 --> 00:36:33: will say that in terms of the insurance coverage,

00:36:33 --> 00:36:36: we went very much above and beyond the other thing.

00:36:36 --> 00:36:39: We really focused on was having non toxic buildings as

00:36:39 --> 00:36:40: an ecology institute.

00:36:40 --> 00:36:43: It was quite devastating to realize in the Tubbs fire

00:36:43 --> 00:36:46: that pretty much every home site became a toxic waste

00:36:46 --> 00:36:49: site that had to be contained for the wet season

00:36:49 --> 00:36:51: and that's a real water quality threat to us.

00:36:51 --> 00:36:54: So we kind of went above and beyond with non

00:36:54 --> 00:36:54: toxicity,

00:36:54 --> 00:36:57: ignition resilience and that meant that about.

00:36:57 --> 00:37:01: Only 60% of our construction costs were covered by our

00:37:01 --> 00:37:01: insurance,

00:37:01 --> 00:37:05: so that's sort of my real world experience and a

00:37:05 --> 00:37:08: lot of our work is actually estimating fire hazards across

00:37:08 --> 00:37:10: the scale of Sonoma County.

00:37:10 --> 00:37:14: Napa County, located about an hour hour and a half

00:37:14 --> 00:37:16: north of San Francisco.

00:37:16 --> 00:37:20: So we're also bringing to bear sort of understanding the

00:37:20 --> 00:37:21: forest conditions.

00:37:21 --> 00:37:24: The impacts of drought on flammability of the forest through

00:37:24 --> 00:37:24: life,

00:37:24 --> 00:37:27: moisture, etc. So that's sort of the other angle of

00:37:27 --> 00:37:29: our work on wildfire.

00:37:29 --> 00:37:31: Resilience, thanks. Yeah, thank you,

00:37:31 --> 00:37:33: Lisa Ann. Both Lisa and Ann.

00:37:33 --> 00:37:36: You alluded a bit to some of the learnings that

00:37:36 --> 00:37:39: you had from watching the demo just now.

00:37:39 --> 00:37:41: At least you're mentioning defensible space.

00:37:41 --> 00:37:45: Space, for example, would either of you like to share

00:37:45 --> 00:37:48: more of your reactions from the demo and how you

00:37:48 --> 00:37:51: connecting what you saw to the buildings and facilities and

00:37:51 --> 00:37:55: developments that you oversee? Sure.

00:37:55 --> 00:38:00: But you know, I was very impressed with the video

00:38:00 --> 00:38:02: and very encouraged because.

00:38:02 --> 00:38:06: We are practicing all the defensible spaces we manufacture

00:38:06 --> 00:38:06: or

00:38:06 --> 00:38:08: produce our own rock mulch.

00:38:08 --> 00:38:11: We're fortunate enough to have a lot of rock.

00:38:11 --> 00:38:15: We can crush it. It's all zero landscaping.

00:38:15 --> 00:38:17: You were surrounded by glass,

00:38:17 --> 00:38:20: grasslands, and when those fires start moving,

00:38:20 --> 00:38:24: they move pretty quickly. But I.

00:38:24 --> 00:38:26: Yeah, I learned a lot from the video.

00:38:26 --> 00:38:29: I'm glad we're doing all the things we're doing I.

00:38:29 --> 00:38:32: I think we hired the right consultants working with the

00:38:32 --> 00:38:33: local fire district.

00:38:33 --> 00:38:36: I think we're doing a lot of things right.

00:38:36 --> 00:38:38: But as I said, I probably can drive through my

00:38:38 --> 00:38:41: neighborhood and watch look at a lot of plastic hose

00:38:42 --> 00:38:43: reels next to houses.

00:38:43 --> 00:38:45: I want to educate our people on.

00:38:45 --> 00:38:47: That was very eye opening.

00:38:47 --> 00:38:51: Yo most I think a lot of our success is

00:38:51 --> 00:38:55: because we do spend so much time on education.

00:38:55 --> 00:38:57: When a new person moves in.

00:38:57 --> 00:39:01: We sit down, we talk about our conservation efforts are

00:39:02 --> 00:39:03: firewise plan.

00:39:03 --> 00:39:05: Uhm?

00:39:05 --> 00:39:10: Anyone anybody that backs into any of the Wildlands?

00:39:10 --> 00:39:14: We do a review of their home when it's landscape

00:39:14 --> 00:39:17: and we do all of the landscaping as well.

00:39:17 --> 00:39:18: At one time I contacted it,

00:39:18 --> 00:39:20: but it didn't seem like I would.

00:39:20 --> 00:39:24: The people were educated enough in Firewise technology,

00:39:24 --> 00:39:26: so we formed our own landscape company.

00:39:26 --> 00:39:30: We had our people trained or all of our managers

00:39:30 --> 00:39:32: and our designers trained.

00:39:32 --> 00:39:35: We're also basically trying to focus on plants that are

00:39:35 --> 00:39:36: not quite as combustible.

00:39:36 --> 00:39:39: The native varieties which are so hard to get,

00:39:39 --> 00:39:42: so we're starting our own nursery to grow our own

00:39:42 --> 00:39:46: native plants to use in our landscaping around the homes.

00:39:46 --> 00:39:49: I was very encouraged. I think we're doing a lot

00:39:49 --> 00:39:51: of the right things,

00:39:51 --> 00:39:53: but there's a couple things we can do better.

00:39:53 --> 00:39:55: We do use cement siding.

00:39:55 --> 00:39:58: We, you know, do all of those things right.

00:39:58 --> 00:40:01: But again, we gotta get this hose reels away from

00:40:01 --> 00:40:02: their homes.

00:40:04 --> 00:40:05: Thank you Dan.

00:40:07 --> 00:40:11: Yeah, I I found the demonstration super interesting just to

00:40:11 --> 00:40:12: watch.

00:40:12 --> 00:40:14: You know how the process unfolds.



00:40:14 --> 00:40:17: I think the education for me as an environmental scientist  
00:40:18 --> 00:40:21: and after the fire getting to know more fire prevention  
00:40:21 --> 00:40:24: specialist is this whole idea of starting with a home  
00:40:24 --> 00:40:28: and working out how important that is.  
00:40:28 --> 00:40:31: Now we live in a fire adapted landscape and from  
00:40:31 --> 00:40:32: ecological point of view,  
00:40:32 --> 00:40:36: the wildlands maybe are almost be benefiting from some of  
00:40:36 --> 00:40:37: these fires,  
00:40:37 --> 00:40:38: but.  
00:40:38 --> 00:40:40: You know?  
00:40:40 --> 00:40:43: Are we participate a lot with firewise communities or Fire  
00:40:43 --> 00:40:46: Safe Council and just reinforcing as much as we're on  
00:40:46 --> 00:40:49: the forest management side of the expertise?  
00:40:49 --> 00:40:51: You know you have to start at your house and  
00:40:52 --> 00:40:52: work out,  
00:40:52 --> 00:40:54: and when I share with people,  
00:40:54 --> 00:40:56: I mean we have people leaving this,  
00:40:56 --> 00:40:59: you know, rural interface zone and people are going to  
00:40:59 --> 00:41:02: come in from other areas and it's really urgent that  
00:41:02 --> 00:41:05: we educate new arrivals in particular that you know your  
00:41:05 --> 00:41:09: most important wildfire resilient strategy is having your house  
00:41:09 --> 00:41:10: prepared  
00:41:10 --> 00:41:13: way in advance.  
00:41:10 --> 00:41:13: In evacuating during this severe fire weather,  
00:41:13 --> 00:41:16: and it's not about staying there defending.  
00:41:16 --> 00:41:19: It's about being buttoned up and getting out of harm's  
00:41:19 --> 00:41:22: way to let the first responders do their work.  
00:41:22 --> 00:41:24: So I think the idea of Ember spread fire is  
00:41:24 --> 00:41:27: something that people don't really get.  
00:41:27 --> 00:41:30: They think that fire comes is that wall that moves  
00:41:30 --> 00:41:33: along the ground and that really is not our most  
00:41:33 --> 00:41:34: hazardous kind of fire.  
00:41:34 --> 00:41:36: That's the kind that we can stop.  
00:41:36 --> 00:41:39: The Ember spread is really what people need to be  
00:41:40 --> 00:41:41: prepared for an.  
00:41:41 --> 00:41:43: I think that you know we I have friends who  
00:41:43 --> 00:41:47: lived in Fountaingrove who started rebuilding and right away I  
00:41:47 --> 00:41:49: was like so do you have Ember control technology on  
00:41:49 --> 00:41:51: your buildings and they really?  
00:41:51 --> 00:41:54: What do you mean? I said almost certainly your home  
00:41:54 --> 00:41:57: was ignited by Members getting sucked in the HVAC system.  
00:41:57 --> 00:42:00: So in the fact that folks that lost their homes

00:42:00 --> 00:42:03: that way still need to hear that message is important.

00:42:03 --> 00:42:06: But I think it is challenging as a homeowner in

00:42:06 --> 00:42:07: a Fire Zone as well.

00:42:07 --> 00:42:11: I only just finished getting all my vents replaced.

00:42:11 --> 00:42:13: I think it can be overwhelming to people and even

00:42:13 --> 00:42:16: my friends who are experts are like sometimes there's only

00:42:16 --> 00:42:18: so far you can go with your house and.

00:42:18 --> 00:42:19: You take it as far as you can.

00:42:19 --> 00:42:21: Then you're thinking about what?

00:42:21 --> 00:42:24: What you would do if you had the opportunity to

00:42:24 --> 00:42:24: rebuild?

00:42:27 --> 00:42:31: Catherine, I might add something regarding our education and so

00:42:31 --> 00:42:35: forth where we are fortunate enough to have control of

00:42:35 --> 00:42:39: the surrounding lands around Avamar and as part of that

00:42:39 --> 00:42:43: we also have an active restoration and rehabilitation for the

00:42:43 --> 00:42:47: native plants that have been taken over by some of

00:42:47 --> 00:42:48: the more invasive species,

00:42:48 --> 00:42:51: well in its.

00:42:51 --> 00:42:54: Your revegetating plan is usually done by volunteers from

00:42:54 --> 00:42:55: within

00:42:55 --> 00:42:57: our community,

00:42:57 --> 00:43:00: and all of those from the public,

00:42:57 --> 00:43:00: general public that we allow access to our trails and

00:43:00 --> 00:43:01: so forth.

00:43:01 --> 00:43:03: We've put a fire we had worked with Eagle Fire

00:43:04 --> 00:43:07: District to put a 30 foot wide boundary around our

00:43:07 --> 00:43:09: community where we've planted a forage kochia.

00:43:09 --> 00:43:12: At first they didn't think it was taken is about

00:43:12 --> 00:43:15: three years old that all of a sudden the forage

00:43:15 --> 00:43:16: kosher is coming in.

00:43:16 --> 00:43:20: And I think it's going to be successful.

00:43:20 --> 00:43:23: We've we purchased a slope mower so we mowed the

00:43:23 --> 00:43:25: slopes behind a lot of our community.

00:43:25 --> 00:43:28: We also actively in grazing the land so every spring

00:43:28 --> 00:43:31: and fall when we bring the cattle and sheep.

00:43:31 --> 00:43:35: Then we keep him close to the community to consume

00:43:35 --> 00:43:38: a lot of the fuels around the community.

00:43:38 --> 00:43:41: One of the most prone areas are the areas where

00:43:41 --> 00:43:45: cheap grass is taken over and we've tried to revegetate,

00:43:45 --> 00:43:48: but. Early in the year will run the cattle into

00:43:48 --> 00:43:49: those areas.

00:43:49 --> 00:43:51: They find it kind of tasty when it's nice and  
 00:43:51 --> 00:43:51: green,  
 00:43:51 --> 00:43:54: so we're really fortunate we have all of these things  
 00:43:54 --> 00:43:56: going on to help benefit that.  
 00:43:56 --> 00:43:59: We hope when it wildfire does come and we have  
 00:43:59 --> 00:44:02: had two wildfires since I've been here.  
 00:44:02 --> 00:44:05: They both started from the highway and given that after  
 00:44:05 --> 00:44:08: having experienced two of those,  
 00:44:08 --> 00:44:10: and eagle fire, did a great job,  
 00:44:10 --> 00:44:13: got him under control. They actually got right up to  
 00:44:13 --> 00:44:15: a couple of our houses,  
 00:44:15 --> 00:44:18: but are. Our perimeter defenses around the home stopped  
 00:44:18 --> 00:44:19: him  
 00:44:18 --> 00:44:19: at the perimeter.  
 00:44:19 --> 00:44:22: They didn't get any further.  
 00:44:22 --> 00:44:24: But since then, we've got a permit from my TD  
 00:44:24 --> 00:44:26: that we can mow the highway,  
 00:44:26 --> 00:44:29: and we control the fuels along the highway as well  
 00:44:29 --> 00:44:29: so.  
 00:44:29 --> 00:44:31: We put in trails. We mow around the trails,  
 00:44:31 --> 00:44:33: give us even to slow down fires.  
 00:44:33 --> 00:44:35: Whenever they do feel threatened.  
 00:44:35 --> 00:44:37: We hope that we're doing a good job and and  
 00:44:37 --> 00:44:40: never see him get that close to the community again.  
 00:44:40 --> 00:44:43: Although we know it will happen someday.  
 00:44:43 --> 00:44:47: But yeah, I was really impressed and I've learned a  
 00:44:47 --> 00:44:48: lot from the video.  
 00:44:48 --> 00:44:51: Well then I'm glad to hear that the community fared  
 00:44:51 --> 00:44:51: well,  
 00:44:51 --> 00:44:54: and those recent fires I see we now have.  
 00:44:54 --> 00:44:56: Daniel Gorham joined us. Thank you again,  
 00:44:56 --> 00:44:58: Daniel, for that fantastic demo.  
 00:44:58 --> 00:45:01: We have a few technical questions which have started to  
 00:45:02 --> 00:45:02: come in for you.  
 00:45:02 --> 00:45:04: But before we get there,  
 00:45:04 --> 00:45:07: I'd like to ask one more big picture question to  
 00:45:07 --> 00:45:10: Dan and Lisa and hope we can have quick responses  
 00:45:10 --> 00:45:11: so we have time.  
 00:45:11 --> 00:45:14: For more Q&A. Lisa, you shared your challenges with  
 00:45:14 --> 00:45:15: insurance  
 00:45:14 --> 00:45:15: coverage stand.  
 00:45:15 --> 00:45:17: You mentioned the challenges you had,  
 00:45:17 --> 00:45:22: identifying landscapers who were? Familiar with firewise

practices,  
00:45:22 --> 00:45:24: I'd like to briefly hear from each of you what  
00:45:24 --> 00:45:28: market signals you're seeing right now around wildfire risk  
and  
00:45:28 --> 00:45:28: resilience,  
00:45:28 --> 00:45:31: and what barriers you see to advancing wildfire.  
00:45:31 --> 00:45:34: Resilient development. From a market perspective.  
00:45:37 --> 00:45:41: Well, you know, I think that.  
00:45:41 --> 00:45:44: Our buyers, most of them are coming from California and  
00:45:44 --> 00:45:45: they've very,  
00:45:45 --> 00:45:49: very familiar with wildland fires from the recent years.  
00:45:49 --> 00:45:52: Uhm?  
00:45:52 --> 00:45:54: So they do ask our question of our Salesforce.  
00:45:54 --> 00:45:55: What are you guys doing?  
00:45:55 --> 00:45:59: What makes it? Nice that they are familiar as they  
00:45:59 --> 00:46:02: are less resistant to the things we ask them to  
00:46:02 --> 00:46:05: do as part of their is part of the construction  
00:46:05 --> 00:46:10: is part of their landscaping maintaining defensible spaces.  
00:46:10 --> 00:46:13: No. Every five years we have a conservation directorates that  
00:46:13 --> 00:46:17: reviews their landscaping to make sure no ones done  
anything  
00:46:17 --> 00:46:21: that shouldn't have been done or to trim back these  
00:46:21 --> 00:46:24: things and very very few cases where we have to  
00:46:24 --> 00:46:25: as a Community Association,  
00:46:25 --> 00:46:28: you know.  
00:46:28 --> 00:46:30: Have to deal with anybody that doesn't want.  
00:46:30 --> 00:46:33: I mean, they're all very.  
00:46:33 --> 00:46:35: Respective of our wildfire plan.  
00:46:38 --> 00:46:41: Thank you Dan Lisa.  
00:46:41 --> 00:46:43: Well, I guess I'm not I I defer to Dan  
00:46:43 --> 00:46:45: around the development questions,  
00:46:45 --> 00:46:47: but I will say just as a lay observer of  
00:46:47 --> 00:46:50: how our Tubbs fire footprint is developing.  
00:46:50 --> 00:46:53: You see many homes with fire resilient materials,  
00:46:53 --> 00:46:56: at least covering them. An ignition resistant,  
00:46:56 --> 00:47:00: resilient materials. I think the building community is definitely  
gotten  
00:47:00 --> 00:47:01: the message around.  
00:47:01 --> 00:47:06: Upping the wildfire resilience and probably beyond what's still  
required  
00:47:06 --> 00:47:07: by the regulations.  
00:47:07 --> 00:47:11: I'll just say around meeting the Forest Management  
challenge and

00:47:11 --> 00:47:13: that is a big challenge for us.

00:47:13 --> 00:47:17: Because. Early with the interruption of of indigenous fire and

00:47:17 --> 00:47:19: prescribed fire in our community,

00:47:19 --> 00:47:22: we really have this huge fuels build up and I'd

00:47:22 --> 00:47:23: say it's a mixed bag.

00:47:23 --> 00:47:26: I think some people get it and they're overwhelmed with

00:47:26 --> 00:47:30: this game scale of the challenge were involved in informing

00:47:30 --> 00:47:33: quite a few sort of financial incentive programs for people

00:47:33 --> 00:47:36: to start to have some resources to match their own

00:47:36 --> 00:47:37: resources for this.

00:47:37 --> 00:47:40: But I would also say that within folks who identify

00:47:40 --> 00:47:43: themselves as part of the environmental community,

00:47:43 --> 00:47:45: there's some resistance to you.

00:47:45 --> 00:47:48: Even defensible space and the compromise with habitat.

00:47:48 --> 00:47:53: So I think adjusting people's expectations that the landscape can

00:47:53 --> 00:47:57: look different but still be healthy from ecological point of

00:47:58 --> 00:47:58: view.

00:47:58 --> 00:48:01: That fire, I mean, if ever we were pursuing fuels

00:48:01 --> 00:48:03: reductions as an ecological treatment,

00:48:03 --> 00:48:07: I think it also helps improve our water supply and

00:48:07 --> 00:48:08: the available water.

00:48:08 --> 00:48:11: We have an there can be habitat benefits for the

00:48:11 --> 00:48:13: species in our area too,

00:48:13 --> 00:48:16: so I think overcoming some.

00:48:16 --> 00:48:20: Barriers in terms of perceptions and what's healthy is something

00:48:20 --> 00:48:24: we're up against in terms of the environmental community.

00:48:24 --> 00:48:25: Thank you Lisa and Dan Gorham.

00:48:25 --> 00:48:27: Thanks again for joining us today.

00:48:27 --> 00:48:30: We've got a number of questions coming in from the

00:48:30 --> 00:48:34: audience and I'd encourage everyone to keep adding your questions

00:48:34 --> 00:48:35: and what we don't have time for.

00:48:35 --> 00:48:38: We'll see if we can address them in writing or

00:48:38 --> 00:48:39: otherwise after the event.

00:48:39 --> 00:48:43: Thought I'd start with the question around the definition of

00:48:43 --> 00:48:44: the wild link urban interface,

00:48:44 --> 00:48:47: and I'd also be happy to share some you will

00:48:47 --> 00:48:50: I perspective on this from some recent technical assistance that

00:48:50 --> 00:48:52: we carried out in Sonoma County Dan Forum.

00:48:52 --> 00:48:54: How how would you define wildy?

00:48:54 --> 00:48:59: Interface, our attendee has asked about defining it as a  
00:48:59 --> 00:49:03: set of conditions versus location and how this might impact  
00:49:03 --> 00:49:05: perception of risk.  
00:49:05 --> 00:49:08: Yeah, that's a great question for the participant,  
00:49:08 --> 00:49:11: and thanks for asking it because it's a question that  
00:49:11 --> 00:49:12: I often get asked.  
00:49:12 --> 00:49:13: And as you mentioned, you know,  
00:49:13 --> 00:49:16: entrusted with the firebreaks document,  
00:49:16 --> 00:49:18: and again the question kind of has some of the  
00:49:18 --> 00:49:20: talking points in it,  
00:49:20 --> 00:49:22: and so I think oftentimes when we talk about wildland  
00:49:23 --> 00:49:26: urban interface that interface third were being the key there,  
00:49:26 --> 00:49:29: we think of a geographical location and when we look  
00:49:29 --> 00:49:31: at kind of jurisdictional definition,  
00:49:31 --> 00:49:34: whether it be at the federal level or at the  
00:49:34 --> 00:49:34: state level,  
00:49:34 --> 00:49:37: oftentimes. Interface is defined as a geography.  
00:49:37 --> 00:49:40: It's also worth mentioning there's other term,  
00:49:40 --> 00:49:43: wild and urban intermix, and just very briefly,  
00:49:43 --> 00:49:47: they oftentimes described them as the ratio of vegetative  
land  
00:49:47 --> 00:49:50: cover to population density or structures.  
00:49:50 --> 00:49:52: And so when you hit this right ratio of more  
00:49:52 --> 00:49:54: vegetation than structures,  
00:49:54 --> 00:49:57: then you're an intermix. But then when the ratio changes  
00:49:57 --> 00:49:59: a little bit your interface.  
00:49:59 --> 00:50:03: But yeah, those are geographical definitions and I think again  
00:50:03 --> 00:50:06: the other point in the question was it's more a  
00:50:06 --> 00:50:08: set of conditions which describe.  
00:50:08 --> 00:50:10: The work that we do here at BHS,  
00:50:10 --> 00:50:13: and ultimately what we're talking about when we think about  
00:50:13 --> 00:50:14: resilient to wildfires,  
00:50:14 --> 00:50:15: or wild and urban fires.  
00:50:15 --> 00:50:18: It is that set of conditions not necessarily where you  
00:50:18 --> 00:50:19: are.  
00:50:19 --> 00:50:20: And I know Lisa you talked about,  
00:50:20 --> 00:50:23: and you're very familiar with the 2017 Tubbs fire.  
00:50:23 --> 00:50:24: And there are other examples,  
00:50:24 --> 00:50:27: but I'll just use it as kind of one that  
00:50:27 --> 00:50:29: we've talked about today is that we know that the  
00:50:29 --> 00:50:32: fire spread beyond what I don't say anyone would think,  
00:50:32 --> 00:50:35: but many people would have thought would be the wildfire

00:50:35 --> 00:50:36: perimeter.

00:50:36 --> 00:50:38: And in fact Coffee Park was designated and right or

00:50:38 --> 00:50:39: wrong?

00:50:39 --> 00:50:41: No, pointing blame. As an unburnable area,

00:50:41 --> 00:50:44: but the reality is in the facts show that it

00:50:44 --> 00:50:46: could be burned and the reason that it could burn

00:50:47 --> 00:50:50: was because embers from that wild and fire entered that

00:50:50 --> 00:50:53: community. They ignited the same way that they would is

00:50:53 --> 00:50:55: a classically defined interface.

00:50:55 --> 00:50:58: Intermix right, there is building features and around the home

00:50:59 --> 00:51:02: are consistent or are translate where you are in space.

00:51:02 --> 00:51:05: And so yeah, I think the definition for me is

00:51:05 --> 00:51:08: a set of conditions and not just geography.

00:51:08 --> 00:51:11: Thank you Dan and all share for those who are

00:51:11 --> 00:51:14: on the urban resilience email list with you a lie.

00:51:14 --> 00:51:17: We did advisory services panel in Sonoma about two months

00:51:17 --> 00:51:20: ago where we brought together a team of you lie

00:51:20 --> 00:51:23: member experts to give advice to the county and the

00:51:23 --> 00:51:26: City of Santa Rosa, and one of the key recommendations.

00:51:26 --> 00:51:31: Coming from Mali, Maui, whose wildfire resilience planning

00:51:31 --> 00:51:34: practitioner in

00:51:34 --> 00:51:37: Colorado was to consider everything in the we,

00:51:37 --> 00:51:38: you know, to no longer differentiate between what was and

00:51:38 --> 00:51:41: was not in that.

00:51:41 --> 00:51:42: Designated area and to instead build everything to the

00:51:42 --> 00:51:44: highest

00:51:44 --> 00:51:46: standard.

00:51:46 --> 00:51:49: We've got a ton of questions Dan for you on

00:51:49 --> 00:51:52: some of the more technical aspects of the demo.

00:51:52 --> 00:51:53: I'd love to see how many we can quickly run

00:51:53 --> 00:51:56: through and then we'll also email out resources both from

00:51:56 --> 00:51:59: IB HSN from Firebreak afterwards.

00:51:59 --> 00:52:00: Can you tell us a bit about how critical windows

00:52:00 --> 00:52:03: are in preventing ignition and to break in high heat?

00:52:03 --> 00:52:07: How do we deal with that?

00:52:07 --> 00:52:10: And perhaps at the same time you could address it?

00:52:10 --> 00:52:12: An additional question about what's the ideal building

00:52:12 --> 00:52:14: geometry and

00:52:14 --> 00:52:18: materials as you're looking to mitigate suburban?

00:52:18 --> 00:52:21: Sure, yeah, and I'll try to hit those quickly and

00:52:21 --> 00:52:24: I could talk about any of them,

00:52:24 --> 00:52:27: but windows are important. Windows provide a very

00:52:27 --> 00:52:30: important function

00:52:18 --> 00:52:18: in buildings.

00:52:18 --> 00:52:21: They allow light in and they allow Aaron when open,

00:52:21 --> 00:52:23: but any place that we can let air through is

00:52:23 --> 00:52:26: a place for flames and embers to get into.

00:52:26 --> 00:52:29: So Windows are important. It's important that we keep Windows

00:52:29 --> 00:52:29: closed,

00:52:29 --> 00:52:33: particularly wildfires approaching, and I like the comment before about

00:52:33 --> 00:52:34: when you know it's coming.

00:52:34 --> 00:52:37: Be prepared and evacuate, and as part of that evacuation

00:52:37 --> 00:52:38: plan,

00:52:38 --> 00:52:40: getting yourself out is closing those windows.

00:52:40 --> 00:52:42: That doesn't mean that window won't break,

00:52:42 --> 00:52:45: but it makes it a little bit more resilient.

00:52:45 --> 00:52:48: We know that window glazing the glass essentially matters.

00:52:48 --> 00:52:51: Tempered glass is more resistant than annealed glass and multiple

00:52:52 --> 00:52:52: panes.

00:52:52 --> 00:52:54: When you have two panes of glazing,

00:52:54 --> 00:52:57: that air gap in between in between essentially acts as

00:52:57 --> 00:52:57: an insulator.

00:52:57 --> 00:52:59: So the short answer is,

00:52:59 --> 00:53:00: embers are part of me.

00:53:00 --> 00:53:02: Windows are important, they create a pathway.

00:53:02 --> 00:53:05: I don't think I find him the weakest link,

00:53:05 --> 00:53:07: but it's important to consider the factors again.

00:53:07 --> 00:53:10: Having multi pane and tempered glass windows are going to

00:53:10 --> 00:53:11: be.

00:53:11 --> 00:53:13: More resilient than say you're single pane or just in

00:53:13 --> 00:53:14: your class,

00:53:14 --> 00:53:16: and I know there was another question there.

00:53:16 --> 00:53:18: Sorry I got lost in my response,

00:53:18 --> 00:53:20: no problem. There's a lot to answer.

00:53:20 --> 00:53:23: The additional question was an ideal building geometry.

00:53:23 --> 00:53:26: Building geometry, right? So I was talking about the corner

00:53:26 --> 00:53:29: in effect in the demonstration that we had today,

00:53:29 --> 00:53:31: so I think I don't know if I would describe

00:53:31 --> 00:53:33: an ideal building shape,

00:53:33 --> 00:53:35: but I will say that the more complex the building

00:53:35 --> 00:53:36: shape is,

00:53:36 --> 00:53:39: the more corners all of those corners and angles one

00:53:39 --> 00:53:41: create path for debris to accumulate.



00:53:41 --> 00:53:43: Debris accumulate that's where embers accumulates,  
00:53:43 --> 00:53:46: and if Ember ignites that debris that those hard corners  
00:53:47 --> 00:53:50: that geometry can with the wind flow essentially propagate  
the  
00:53:50 --> 00:53:50: flame.  
00:53:50 --> 00:53:53: And so again I don't want to say there is  
00:53:53 --> 00:53:54: an ideal geometry.  
00:53:54 --> 00:53:56: What we know is more complex geometry,  
00:53:56 --> 00:53:58: both in the building shape and on the roof,  
00:53:58 --> 00:54:01: creates some additional challenges. Fortunately,  
00:54:01 --> 00:54:04: those challenges can be addressed by knowing that  
reentrant corners.  
00:54:04 --> 00:54:06: You know if you have a fire there,  
00:54:06 --> 00:54:08: it's going to be more intense,  
00:54:08 --> 00:54:10: so that's a really important area,  
00:54:10 --> 00:54:13: even if you have 5 feet around most your house.  
00:54:13 --> 00:54:15: That reentrant corner maybe make that 7 feet maybe make  
00:54:15 --> 00:54:19: that even more hardened against the fire potential cause  
geometry  
00:54:19 --> 00:54:19: matters.  
00:54:19 --> 00:54:22: We know about it before the fire occurs and that  
00:54:22 --> 00:54:25: allows us to take the actions to prepare the home.  
00:54:25 --> 00:54:29: Thank you Dan. Some more questions around resources that  
attendees  
00:54:29 --> 00:54:33: can access afterwards would be great to hear from you.  
00:54:33 --> 00:54:37: Any commentary on best practices for matching policy or  
finance  
00:54:37 --> 00:54:41: policy for retrofits for homeowners who are looking to  
improve  
00:54:41 --> 00:54:46: wildfire resilience and then one other resource that's been  
requested.  
00:54:46 --> 00:54:50: Dan Richter. If you're able to speak to whether Aviemore  
00:54:50 --> 00:54:55: has a community wildfire plan that is publicly accessible.  
00:54:55 --> 00:54:57: Great. Would you like to start?  
00:54:57 --> 00:54:59: Dan Gorham? Sure yeah, I think it's a really good  
00:54:59 --> 00:55:01: question about retrofitting.  
00:55:01 --> 00:55:04: So Roy mentioned the work that we did with the  
00:55:04 --> 00:55:06: suburban road map in from a kind of consumer facing  
00:55:06 --> 00:55:08: or the homeowner perspective.  
00:55:08 --> 00:55:11: We formatted that and what we call wildfire ready and  
00:55:11 --> 00:55:14: wildfire ready again is the synthesis of those steps along  
00:55:14 --> 00:55:15: the road map.  
00:55:15 --> 00:55:17: The clustering of actions and if you go on to  
00:55:17 --> 00:55:22: [disasterstate.org/wildfire ready](https://disasterstate.org/wildfire-ready) you'll see those actions in

00:55:22 --> 00:55:24: addition to kind  
 00:55:24 --> 00:55:26: of the plain speak description of what it means to  
 00:55:26 --> 00:55:28: have a fire resistant roof.  
 00:55:28 --> 00:55:31: What it means and why it's important to learn if  
 00:55:31 --> 00:55:32: your deck we put some estimates and what some of  
 00:55:32 --> 00:55:34: this cost would be,  
 00:55:34 --> 00:55:35: and some of the big ticket items.  
 00:55:35 --> 00:55:37: Again, like replacing your roof,  
 00:55:37 --> 00:55:39: are pretty obvious there. Fortunately,  
 00:55:39 --> 00:55:42: there are handful of sweat equity things,  
 00:55:42 --> 00:55:43: again maintaining adding some mesh on your vent.  
 00:55:43 --> 00:55:45: If you can do that.  
 00:55:45 --> 00:55:46: So there are some lower cost options there.  
 00:55:46 --> 00:55:49: I just as a closing thought.  
 00:55:49 --> 00:55:52: I'll mention that we did a study with Headwaters Economics  
 00:55:52 --> 00:55:53: in Montana looking at the cost of wildfire resistant  
 00:55:53 --> 00:55:56: construction  
 00:55:56 --> 00:55:58: built up to the ICC.  
 00:55:58 --> 00:56:00: We code, and in short if you're building new and  
 00:56:00 --> 00:56:02: you have the choice of materials.  
 00:56:02 --> 00:56:04: Wild fire resistant construction doesn't necessarily cost more.  
 00:56:04 --> 00:56:06: That's building new and again just to kind of tease  
 00:56:06 --> 00:56:07: some of the current work that we're doing.  
 00:56:07 --> 00:56:10: We're looking at all right?  
 00:56:10 --> 00:56:12: Well, if you're not building new,  
 00:56:12 --> 00:56:14: what about those materials? And how about retrofitting and  
 00:56:14 --> 00:56:16: that  
 00:56:16 --> 00:56:19: some of the active work that we're doing?  
 00:56:19 --> 00:56:22: It's a bit more challenging with retrofitting,  
 00:56:22 --> 00:56:25: but work we're getting too.  
 00:56:25 --> 00:56:28: Hey. Thank you.  
 00:56:28 --> 00:56:31: Dan Richter would you like to share anything on a  
 00:56:31 --> 00:56:33: Community protection plan for Aviemore?  
 00:56:33 --> 00:56:35: You know the Community protection plan is something we've  
 00:56:35 --> 00:56:39: been  
 00:56:39 --> 00:56:40: working on with our local fire district.  
 00:56:40 --> 00:56:43: Everything from evacuation plans to,  
 00:56:43 --> 00:56:46: but we've not perfected it yet,  
 00:56:46 --> 00:56:47: nor we shared it with any of our residents yet.  
 00:56:47 --> 00:56:48: That we are working on.  
 00:56:48 --> 00:56:50: It should be done soon as we grow.  
 00:56:50 --> 00:56:52: Well, thank you for these responses as we're coming up  
 00:56:52 --> 00:56:54: on time,  
 00:56:54 --> 00:56:56:

00:56:47 --> 00:56:49: I'd love to end with what your call to action  
00:56:49 --> 00:56:52: is for the attendees on the line today,  
00:56:52 --> 00:56:55: knowing that we have within the UI membership real estate,  
00:56:55 --> 00:56:58: developers, investors, owners and also designers and engineers,  
00:56:58 --> 00:57:01: etc. What do you think the folks on the line  
00:57:01 --> 00:57:04: can do to advance wildfire resilience in their own markets  
00:57:04 --> 00:57:06: and through their own work?  
00:57:06 --> 00:57:09: And after that will close and we will send out  
00:57:09 --> 00:57:12: the information on the recording on knowledge Finder to everyone.  
00:57:12 --> 00:57:16: So you're able to. Listen and learn and even share  
00:57:16 --> 00:57:19: this demo with fellow colleagues.  
00:57:19 --> 00:57:21: Dan Gordon, would you like to start as RCB HS?  
00:57:21 --> 00:57:24: Co-host Sharon. I'll just be brief and to say that  
00:57:24 --> 00:57:26: my work and the work that we do here at  
00:57:26 --> 00:57:28: my VHS is to do and understand the science and  
00:57:28 --> 00:57:31: communicated outward. So I just want to thank everyone on  
00:57:31 --> 00:57:33: this web and R for participating.  
00:57:33 --> 00:57:35: That's a big, important role of what we do.  
00:57:35 --> 00:57:38: Being educated, understanding, understanding embers,  
00:57:38 --> 00:57:41: important understanding community, building features,  
00:57:41 --> 00:57:43: and so. With that I'll just say thank you for  
00:57:43 --> 00:57:46: being thirsty for knowledge and please continue to do so.  
00:57:49 --> 00:57:52: Dan Richter, yeah, you know,  
00:57:52 --> 00:57:57: I can't express enough how happy I am that we've.  
00:57:57 --> 00:58:00: You know, started from the inception of the Firewise community,  
00:58:00 --> 00:58:03: it gives me, makes me sleep a little better this  
00:58:04 --> 00:58:07: time of year when the wildfire danger gets up.  
00:58:07 --> 00:58:09: You know it's there's a financial investment.  
00:58:09 --> 00:58:12: Every house you build, every landscape you put in is  
00:58:12 --> 00:58:13: a little more cost,  
00:58:13 --> 00:58:16: but boy, I'll tell you what the you sleep better  
00:58:16 --> 00:58:19: at night and you know your project hopefully is not  
00:58:19 --> 00:58:21: going to be impacted in a big way by a  
00:58:21 --> 00:58:25: wildfire because you've done all the right things and the  
00:58:25 --> 00:58:26: project will broaden.  
00:58:26 --> 00:58:28: Maturity.  
00:58:28 --> 00:58:34: Help. No suffering through a horrible wildfire.  
00:58:34 --> 00:58:37: And Lisa, would you like to wrap us up today?  
00:58:37 --> 00:58:39: Yeah, I just want to express my appreciation.  
00:58:39 --> 00:58:43: You know, as an organization that pepperwood dedicated to

evidence  
00:58:43 --> 00:58:44: based practice.  
00:58:44 --> 00:58:45: It's so great for me as a,  
00:58:45 --> 00:58:48: you know, more of a resource scientists learn about the  
00:58:48 --> 00:58:51: building sciences and to understand that we really have an  
00:58:51 --> 00:58:53: experimental approach to generating,  
00:58:53 --> 00:58:57: you know, recommendations for everyone in builders and  
homeowners,  
00:58:57 --> 00:59:00: etc. So just I'm appreciated for that work and this  
00:59:00 --> 00:59:03: one gifted well fired me as I'm learning about things  
00:59:03 --> 00:59:05: I never thought I'd be learning about.  
00:59:05 --> 00:59:07: Thanks well thank you to all of our speakers.  
00:59:07 --> 00:59:10: A special thank you to high BHS for hosting the  
00:59:10 --> 00:59:10: demo.  
00:59:10 --> 00:59:13: For us and look, we look forward to continuing the  
00:59:13 --> 00:59:14: conversation through future.  
00:59:14 --> 00:59:16: You will I events in programming.  
00:59:16 --> 00:59:19: Thanks again. Thanks, thank you.  
00:59:19 --> 00:59:20: I.

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