



Q+A Transcript

SE FireMap Phase II: Developing the Decision Support System

Questions presented below are **bolded** and have been edited from audio transcriptions of the webinar Q&A sessions.

Maria Doerr:

Thanks, Kevin. First, I'm curious if someone, Joe or someone on the team, can speak to how the fire map can detect all fires, both wild and prescribed. I'm curious if anyone on the panel would like to add to that point.

Todd Hawbaker:

I can follow up on that. Yeah. The Landsat Burned Area Products that we're using, if we can see the fire or the burned area from space, there's a good chance it will be detected, whether it's a wildfire, prescribed fire, or a volcano-caused fire in Hawaii, if we were working there. As long as it's visible in the imagery, we'll pick it up.

Maria Doerr:

Great. Thank you, Todd. Yes. Now we will open it up to questions. We have two in the Q&A function. If you have questions, we'd welcome you to add them there. We'll also make it possible for you to raise your hands if you'd like to ask questions directly. So the first question is from Gail: can you download any custom queried information from the Southeast FireMap?

Joe Noble:

Yeah, I can take that. Thanks for that question, Gail. Currently in the Version 1.0 Beta that's built-in viewer that is hosted in the Landscape Partnership portal, there are no custom queries and such. Those will be developed as part of the decision support tool effort as we move through next year. So you will be able to see that functionality once we release Version 2.0.

Maria Doerr:

Great, thank you.

Melanie Vanderhoof:

I can answer that as well. For the Landsat Burned Area Product, image by image processing is currently delivered and downloadable through the Earth Explorer that Todd hosts, I think on an FTP site. I believe it is functioning, but it's also delivered through SGS Science Based and is the annual burned area product. We have an article that is currently in revision at a journal for the history metrics, and the data

release for that is ready to go as soon as the article is accepted. So that will similarly be delivered through Science Based. And then you-

Joe Noble:

Yeah. Gail, I could follow up just a little bit, too. I was probably thrown off a little bit by the custom queried information, but there's also on the Landscape portal, a data use agreement that can be submitted and the fire history metrics for the time period can be delivered to you.

Maria Doerr:

Great. Thank you all. We have another question that Chip asked about increasing land area that the fire map will cover. There's an interest in Tennessee, Kentucky, Virginia, other places. What is the hope for expanding inclusion of other land areas?

Todd Hawbaker:

I can cover that one. Yeah, Chip, I think right now the base products, like Joe and Melanie mentioned in the presentation, the Landsat Burned Area Products are available for CONUS and the fire history metrics are also derived from those for CONUS. The Landsat Burned Area Products are available right now. I responded and posted the data release citation and DOI link to take you to it where you can download ZIP files of the data year by year.

Todd Hawbaker:

Melanie's paper for the fire history metrics is still in review, so we haven't released those data yet, but I imagine that we will in the next couple of months. I think if there's something you're dying to see, just email us or get in touch with us and we can connect you with some of the data, too. We're always happy to do that.

Maria Doerr:

Great, thank you. We have another attendee asking about how the Sentinel-2 harmonized product is anticipated to affect the size of fire detected in addition to the amount of fire. What can users look forward to in the improved 2.0 version?

Todd Hawbaker:

Yeah. I'm happy to take that one, too. Sentinel-2 has spectral bands that it collects that are very similar to Landsat. What it doesn't have is the thermal band that Landsat collects, so a few differences. But basically, like Melanie demonstrated with her paper looking at fires in wetlands in the Southeast, Sentinel-2 and Landsat collected together basically gives us a more dense or greater number of images over the time series.

Todd Hawbaker:

So it's more likely that we'll see a burned area or we'll have images that are cloud-free where we can actually see the burned area, and it's more likely that we'll collect those images before the vegetation has completely recovered. So we expect our omission error to go down and hopefully our commission and our false detections will go down as well.

Todd Hawbaker:

The thing I know about the harmonized Landsat Sentinel data, so NASA is producing that dataset that we'll be applying our algorithms to and testing the results. They really start in 2013 when Landsat-8 was launched. Then I think Sentinel-2A was, Melanie, correct me if I'm wrong, I think 2015. And then there's 2B that was launched in 2017. So that time series gets really dense around 2017. So from that year going forward is when we expect to see the greatest improvement in our results.

Todd Hawbaker:

In terms of detecting smaller fires, I think that five-acre lower threshold is a pretty reasonable threshold. We might change it if we see in the results that we are picking up smaller fires and have confidence in them, but I don't want to make any promises there. I hope that answers your question.

Maria Doerr:

Thank you, Todd. We have another question about how is the area ground-truthed to confirm the pixel data is correct because there's some incongruity between what is not burned and what actually was burned?

Melanie Vanderhoof:

I could speak to how that's currently being done for the Landsat Burned Area Product. We've taken a dual approach of using a commercial high-resolution imagery across CONUS. So we had, I think, nearly 300 high-res images. Burned area was classified within that and using a lot of ancillary datasets to help increase our confidence in terms of what's actually burned and what's not.

Melanie Vanderhoof:

We also, because high-resolution images from companies like Maxar and Planet tend to be pretty small in extent, oftentimes they'll only capture a part of one fire. So a lot of the error ends up being how much agreement or disagreement you see within a fire. So we provided a complementary validation approach using land imagery. We took a rather complicated approach to maximize the accuracy of the reference dataset from Landsat.

Melanie Vanderhoof:

With that, we were able to match exactly date to date and be able to validate over a much larger area and a much more extended time period. So that's our current approach.

Maria Doerr:

Thank you. We also have a question from the survey about how tribal communities have been involved in any way in the fire map, if there is any involvement.

Bridgett Costanzo:

Today, it's been more of a technical project, this is Bridgett Costanzo with NRCS, with technical experts. But the workshops that are coming in FY23 will be widely advertised and on a variety of topics. So there will be at least five opportunities to participate in the workshops over this next year.

Maria Doerr:

Perfect. Thank you so much. We'll now move to another question about the map itself about, will it be available as a GIS service that can be incorporated or accessed in Forest Service fuels treatment accomplished equal products?

Joe Noble:

Yeah. Michael, that's a really good question. Currently, we're sharing it through the data use agreement, at least for the Version 1.0 dataset. I have had that request to be able to share as a service from numerous folks, and that's just something that I think is very, very doable. It's something that I personally just need to talk with NRCS leadership and get their thoughts on that and figure out how to do that. But that is something that's on the radar.

Maria Doerr:

Thank you. We have a question from Joe about modern software development methods involving use stories to define requirements for actors. So who are the micro-level actors for this development? Also, another question there is, are the user stories available for public view?

Todd Hawbaker:

I don't know that we-

Joe Noble:

Yes. Yes. Go ahead, Todd.

Todd Hawbaker:

I was going to say, I think those use stories are things we're going to be developing in the workshops, and the actors will be the people who come and attend to those workshops and provide inputs on what they would really like to see the final implementation of Southeast FireMap, what it actually does in the end, other than visualize the fire data.

Todd Hawbaker:

The point of the workshops is to solicit from end users what types of queries and reporting and analyses they will actually need in them. So I would say that's to be defined, but I think I see a note that Ferguson Lynch would also like to answer this question.

Melanie Vanderhoof:

I'll add onto that, that this kind of speaks to a great opportunity for the audience, that if you're interested in contributing to perspective and contributing in a scenario, and you're interested in the data and possible applications, we'd really encourage your involvement and participation in the workshop, so we can make sure that those perspectives get included.

Maria Doerr:

Great. Thank you. We have a question about date of fire occurrence. Is the date of fire occurrence within a week or a day of? What is the rate of false detection right now?

Todd Hawbaker:

Yeah, I can tackle that one. If you're interested in those numbers, they're in our 2020 Remote Sensing of Environment paper that I can paste into the chat in a second. Overall, across the conterminous US, our commission error or false detection, we measured it at 28%. In our commission error or burned areas that we didn't detect, it was about 40%. Those numbers might seem quite high to you, but what we've found is that most of those errors are the fuzziness within fires.

Todd Hawbaker:

They're pretty low when you start comparing them to other globally-produced burned area products, like the MODIS Burned Area or active fire detections, which oftentimes have error rates reported of 60 to 90%, quite high in there. The detection date is a little bit tricky because it is definitely not within a day, but that's probably the one product that we have the least confidence in, just because you never know.

Todd Hawbaker:

If a fire burns today, you might have two Landsat image collections that that particular burned area were both covered by clouds. And then the third one, say, 24 days later, you actually pick it up. Those results are in our 2020 paper as well, but it's probably not viable for a day or a weekly assigning the date to the fire. It's more like, was it a spring fire or summer fire kind of thing or fall fire or winter fire for that.

Todd Hawbaker:

That's why when Casey did her paper looking at the initial fire history metrics for Florida, she developed a seasonality metric, and that's kind of where we felt most confident in lumping the dates together.

Maria Doerr:

Thank you, Todd. We have a question about emissions, as per the conversation Kevin had about future projects around emissions and curiosity around would we be able to relate emissions of prescribed fires to emissions that would be released if there was just a high intensity wildfire? Or is there a way to relate the emissions of those two to the carbon that is stored in a natural area?

Kevin Robertson:

I guess the first part would be distinguishing the prescribed fires from the wildfires, which this product doesn't specifically do. But we can make a lot of educated guesses about which is which. I wonder if somebody else on the team might speak to that.

Todd Hawbaker:

Yeah. I can talk a little bit about that. Think about what influences emissions from fires, whether they're prescribed or wild. I mean, you have the fire itself. You have the fire behavior. You have the fuels there. You have the moisture of the fuels. The usual approach is to multiply fuels or biomass by some combustion coefficient and then by an emission coefficient. So we could potentially gain scenarios by adjusting fuel moisture levels.

Todd Hawbaker:

Presumably when you're implementing a prescribed burn, you're probably not burning when fuel moisture levels are extremely low, but also not when they're extremely high and nothing's burnable. So

we could use those levers to manipulate how the emission calculations are impacted by a prescribed fire or wildfire scenario. Same thing with severity, you might do a prescribed burn for high severity, but possibly not.

Todd Hawbaker:

So you could specify what severity levels you would actually expect for your prescribed fire versus your wildfire to produce different emission estimates.

Kevin Robertson:

We at Tall Timbers have done work on the relationship between time since fire and fuel accumulation and different ecosystem types and also how the emission factors for particulate matters change with time since fire, since the relative composition of live and dead fuels changes and the chemical composition changes and those sorts of things.

Kevin Robertson:

The question I was wondering, Todd, it's correct to say that we don't flag fires in the Southeast FireMap as either prescribed fires or wildfires. Is that right?

Todd Hawbaker:

Yeah. Yeah, not currently. If you're looking at the imagery, you can often look at a burned area and it has sharp linear edges that might correspond to a property boundary or a road. You could be like, "Hey, that was most likely a prescribed fire." And then you see other wind-driven fires that were most likely a wildfire that wasn't so easy to control. But it's really difficult, just looking at the imagery, to automate labeling each burned area as prescribed fires or wildfires right now.

Todd Hawbaker:

We've talked about some ideas to do this, and this might be something— Holly had a slide in there talking about how you might link remotely-sensed burned area records or other fire records to the open burning authorization database or other prescribed fires databases. It's definitely something that we're thinking of, can we label each burned area patch as "overlaps with a known wildfire" or is it relatively close in time and space to a reported wildfire burning from it, and then make some educated guesses about whether or not it was really a prescribed fire.

Kevin Robertson:

The fires in the region are overwhelmingly prescribed fires, so probably the best approach would be to find incident reports on particular wildfires of interest and identify those in the database and then see how they relate to prescribed fire history or something like that.

Todd Hawbaker:

Yeah. Yeah. For those of you that are reporting fires, the trick for people like us to do as well is having accurate data about where that point location is. Sometimes if you're planning a prescribed fire and you have to enter a record for it and you list the location of your house, say, for example, but the prescribed fire is actually a half mile down the road, that creates uncertainty when we're trying to link those data together spatially.

Maria Doerr:

Great. Thank you. We have a question about cost share programs from NRCS and others. Is there a way or network or protocol for tracking the different cost share programs for prescribed burning?

Kevin Robertson:

That's really just kind of in the idea phase right now. We'd have to work closely with NRCS to see what kind of information that we could get that's with the landowner's name stripped off of it and that sort of thing to see the spatial database of where the cost share has been distributed in the Southeast and then to see if that corresponds to burning or changes or trends in burning over time. We thought that would be an interesting thing to investigate, but we haven't delved into it yet really.

Joe Noble:

I've had several discussions with NRCS leadership about this and, specifically, one of our decision support tools has this goal in mind. So I think as we move on, we'll see a little bit more clarity on that. Just to remind everybody that the scoping phase is, we wrap that up, and the phase two will actually officially kick off here in a couple of weeks. So we've got the team together and we're just getting going. So some of this stuff will be—stay tuned.

Maria Doerr:

Thank you. We have a question from Michael about the Southern Wildfire Risk Assessment. It's being currently [inaudible 00:49:50] be able to integrate with that assessment tool.

Joe Noble:

Yeah. Michael, I can take that one as well. I do know that SouthWRAP is being updated currently. We have had some interest with the Southeast FireMap, wondering when it was going to go national and such for land fire as well. I do know that SouthWRAP uses quite a few of the land fire layers. It may be possible at this point, since it's a Southeastern application as well, to maybe better inform the land fire disturbance layers as well.

Joe Noble:

I'll jump to your second question there, too, Michael, as well as I see it, talking about the state fire reporting and burn authorization data. One of the things that we've built is, we've built the Southeast Permit Geo Database for 13 states in the Southeast. It's got a period of record now of 11 years in that. That will be used in Southeast FireMap Version 2.0. Before we make that available, we'll have to revisit our current agreements with those state foresters and such.

Joe Noble:

But there is a plan to incorporate those burn authorizations into the final products and decision support tools.

Todd Hawbaker:

I'd like to add a little bit to that as well. If the Southern Wildfire Risk Assessment is using land fire data, like many of those risk assessments have in the past, land fire does take our data products. They're one of the end users that is asking us to produce them as quickly as we can. They use it to update their fuels

layers as well. So the burn history that we're mapping should be updated in the latest and greatest land fire data that are hopefully being used for that assessment.

Joe Noble:

Thanks, Todd.

Maria Doerr:

Great. Thank you all so much for joining us today. There is a link in the chat with a link to the Landscape Partnership portal where a version of this webinar and slides will be posted. You can view the 1.0 beta version of the FireMap there. Also, as folks have mentioned, there will be workshops happening in 2023 and would love your participation.