Tree Strategies for Heat Island Reduction

Matt Grubisich: Hi. Thank you. Welcome. Let me know when you're seeing with wide screen.

Lauren Pederson: That's it.

Matt Grubisich: There? All right.

Slide 1: Title Slide

Well, thank you. Welcome. Thank you for having me on this call. It sounds to me they told me that a lot of municipality, public leaders, decision makers are the key audience for this call and that's great, because those are the people I'm always trying to get in front of.

I'm with the Texas Trees Foundation. My name is Matt Grubisich. I'm the program coordinator and urban forester. And we are a nonprofit tree planting location that covers the 16 county areas of north central Texas or Dallas/Forth Worth. And if there's a place that needs help with heat island reduction is definitely Dallas/Forth Worth.

We like our cars down here and we have lots of pavement to help move them around. And we're not typically an area that is known for trees. This is typically pasture land around here, but we do heck of a job actually trying to plant trees in these areas. And we have one of our hottest summers on record just last summer, where they're estimating that we lost about 500 million trees statewide. So we have some catch up to do after the last year.

Slide 2: The Texas Trees Foundation: Creating Healthy Communities through Education, Tree Planting, and Outreach

We work with a variety of partners. We do a lot of programs to be able to get help get trees on the ground. And what I like to say is I hope communities make trees their civil servant. We got to get away from just plopping trees on the ground for the sake of plopping trees on the ground and we need to start making trees work for us.

Slide 3: Dallas Sustainable Skyline Initiative

How we kind of get started? How we got involved in this, where we got more thinking that we had to be more strategic, and how we just plant the trees came from a study that was done in a partnership with the EPA and the City of Dallas, back in early 2000 to the Dallas Sustainable Skylines Initiative, which was part of the Sustainable Skylines Initiative through the EPA. And we're one of the first pilot projects that were done to be able to figure out, kind of what some of those environmental needs were in the City of Dallas and what we could do about it.

And one of the projects that came out of that was the heat island map for the City of Dallas. And what we found is we had a lot impervious pavements and we had a lot of hotspots. And so what

came out of that report was, it was shocking I think to a lot of people that trees were the main, or one of the main tools that were recommended for reducing our heat island effect.

Slide 4: Reducing Dallas's Urban Heat Islands

Even when they polled city residents they said they wanted a change in appearance. They wanted something that was more beautiful, that was more pedestrian friendly that was cooler in the summer. And some of the recommendations that came out of there was to start identifying new planting locations, target those areas for their hotspots, to start planting trees around them you know, and then protecting the existing canopy. So that's exactly what we did.

Slide 5: Dallas Roadmap to Tree Planting and Planning

What we did then as we partnered with a local utility partner down here, you know, we came up with what we called our roadmap to tree planting in plenty. If we're going to be planting trees, we need to make sure that we're doing this smartly. We're not just planting for the sake of planting. So we want to figure out where there were no trees, where we could plant trees, but more importantly where was the best place that we can plant these trees.

And so using satellite imagery and ArcGIS, we did an urban canopy cover assessment. And what we found out was that the city, believe it or not, has 30 percent canopy cover and that seems really high. But once you start looking across the city, if I show you the map of the City of Dallas, that is all focused into a very small area of the city.

Dallas is 375 square miles and in this part we have a very, very large inland urban forest, the runs along the Trinity River, which is the main river that runs through town. And that's where the bulk of our tree canopy was.

When you got into the surrounding neighborhood, that tree canopy averaged closer to 8 to 9 percent. And so we realized that we really have problem, even though we look on the large scale, when you actually start to focus down in the individual neighborhood and individual council district the tree canopy cover wasn't all that great.

Slide 6: Dallas Roadmap to Tree Planting and Planning

So we know we needed to start planting trees. And what we found out was that there were 1.8 million potential planting locations within the city. And so that kind of got us geared up to get going when we looked at all of these different planting locations by size, by if they were available for energy efficiency, so if they were in the north or west side, of a single family residential, socioeconomic, land use type, and one of the important ones was the urban heat island effect.

And as you see, there are 893,000 planting locations that fall into our middle heat island range of 120 to 130 degrees Fahrenheit, which is pretty hot.

Slide 7: Dallas Roadmap to Tree Planting and Planning

So what this became for us is that it actually became a tool, and we are able to integrate other environmental factors like stream flow data, heat island, even partnered with SMU Department of Engineering down here where we look at actual traffic flow patterns. We're able to figure out where on our arterial cars are parked the longest during rush hour, so where they are sitting producing heat, releasing CO_2 and then – we've plugged all that into our models, so that what we can then do is we can go now and start searching all of these planting locations based on one environmental factor we're looking for.

So if we're looking just for stormwater runoff before looking for heat island mitigation. We can look for those areas and then start to target this. And it's really become a tool that we use on a daily basis. Any time that somebody calls up, a partner calls up, wanting to do a tree planting project, or we go out to do a tree planting project, we actually use this tool, and we pull it up on our GIS system, and we search out that area, and we look for that area for the best places that we can plant trees out there so that we can mitigate heat island effect.

Slide 8: Dallas Roadmap to Tree Planting and Planning

And how this works is we kind of – there're a couple of different ways that you can search the data, one is you can just pull a bulk of tree planting locations and then pull up this – the different temperature ranges and look where your tree planting locations are there. As you can look down at it across your neighborhood, and actually what you're seeing there is all the red, white – red, yellow, and blue is an actual tree planting location based on what their heat island temperature significance is.

Slide 9: Dallas Roadmap to Tree Planting and Planning

And one interesting thing that we found out while doing this is the U.S. Forestry Service recommends an average tree canopy cover for a city of 40 percent, and what was really interesting is when we got into some of this neighborhood, you didn't actually see a reverse cooling effect from this neighborhood and from this tree canopy cover until you hit about 40 percent. Below 40 percent and if you're really below 30 percent, you saw that reverse heating effect from the heat island emerging itself and going into the surrounding neighborhood. You didn't get that reverse cooling effect until you got over 40 percent.

Slide 10: Dallas Roadmap to Tree Planting and Planning

So what that told us was, "Yes, it's good to plant trees, but we need to plant lots of trees and we need to plant lots of trees strategically." Obviously, parking lots, as we've already heard of this, is a big source of our heat island, and so we kind of wanted to be prepared for that. So we'd look at parking lots and we want to say, "Hey, if we needed to go on and start planting trees in parking lots, how many trees would you need to plant in or around there? Start putting some canopy cover in there."

Slide 11: Planting Locations in Areas Hotter than 130°F

And this is kind of just a screenshot of what it is – of how this tool works and what you do as you can go on and you select the temperature range that you want, and then it brings up all your tree planting locations, and then highlight based on the ones that meet your criteria, and if you can then narrow that down to how many trees that you want to plant. It does really become a very, very effective tool, and that there're a lot of programs out there and a lot of canopy cover studies that have been done out there that when you're done with, like, "Oh, that's wonderful. What do we do with all of this information?"

And this is one that we've actually been able to use on a day-to-day basis and the more GIS information we get, the better we are able to make this tool work. For instance, we were able to get overlying utility corridors. So now we can put in there and we've actually eliminated all of the tree planting locations that fell underneath power line. So those don't even come up as a potential place to plant trees anymore. So the better the GIS information, we can get the more dynamic, we are able to make this tool better.

Slide 12: Trees Create Livable Communities = $$

And what we're able to find is, you know, trees work hard for us and they also – they pay us back pretty quickly, and what we found is that we planted just half of those trees, and those trees reach 40 years of age. The annual benefits of that were quite extraordinary, and when you start putting those types of dollar values, it makes it really easy to go to our public leaders and go with, "Hey, we need to invest more money into tree planting and into doing it properly."

Slide 13: Tree Strategies for Heat Island Reduction

There're a lot of different strategies so if you don't have a program like this yet, and it could be you can start to plant trees strategically. One is existing trees are just as important as new trees, and that a lot of times may be more important because larger trees are going to shade a larger area. But looking at tree preservation during development, it's huge, mitigating for those trees if you're not preserving them.

Looking at different types of development techniques, whether it's low impact development or not, and what I found is that the scientists and the tree people and everybody else are realizing that shade – that trees are beneficial to heat island reduction, as well as all the other impacts that they give us, but the developers and the engineers are kind of slow to come up, and what we end up getting is a lot of trees that don't do very well because they're planted in downtown area though they're not maintained directly.

And that's kind of a shame because there're a lot of great development techniques out there, whether it's using structural soils or impervious pavement, or any host of a different of other options that are out there that we can be planting trees in urban areas, and not reducing the amount of places for parking lot for people to be moving around, and we can still have large healthy trees that can mitigate heat island.

Most of cities are going to have some sort of GIS data which are very easy to go in there and look at your parking lot from your sidewalks and your streets, and start to identify those areas

that you can start to plant trees and, of course, planting trees for energy efficiency. If we can reduce the amount of time air-conditionings are running out there, it's going to – it's going to mean less heat put out and less power that's going to have to be provided.

But just being smart about how we plant trees and planting them strategically is a huge thing, and what a lot of engineers might talk about them is that, you know – when I start talking to my – I can talk all day long about how trees will reduce the heat in their city, but when I tell them that when you plant a tree over their sidewalk or over their street, you're going to extend the lifespan of that pavement for seven to 12 years, then their eyes pop up, but there're all kinds of other host of things that we're talking about out there and making people aware of the other benefits of trees.

Slide 14: Successful Partnerships is the Key

So being nonprofit and doing any program anywhere, successful partnership is going to be the key. We have a very strong relationship with the City of Dallas, and we partnered with the Office of Environmental Quality, the Parks and Recreation Department, our local, state forestry agency, the EPA, and if it wasn't for those local partners, then we wouldn't have been able to get these things done.

To address these funding issues, one thing that is kind of tough is this project is actually funded by Oncor, which is a utility power provider that would be regulated in Dallas, which is a lot different in a lot of different places. So it makes it a little bit harder, but one of our biggest yearly sponsors is a power company now here producing energy. But when you look at the amount of giving that goes on through foundations, and through especially corporations that are out there, it's actually less than 12 percent in terms of their overall giving for corporation, and that's pretty low, and you can't compare trees to a lot of the other things that people give us – for education, obviously, those things can take priority.

But when we have to do a better job with saying, "Hey, we need to be planting trees just like conference calls like this," and within your committee going back and saying, "You know trees not only pay us back and they are worth money, but they're going to help us reduce our heat island effect. They're going to make our communities healthier. They're going to make them a better place to live. And the more that you can get that message out, the more we can get that message out, that's going to hopefully help with increase funding over time.

Slide 15: What Can a Non-Profit Do For You

So nonprofits are the very resource from your community. If you're not currently working with one, I suggest you kind of search one out because we can really be that go-between. We work in the public sector, as well as in the private sector. You know we can work locally and regionally, which are huge because anytime we're talking about environment and we're talking about the heat island, I just look at one municipality. We got to be looking at region wide.

We can look and so that helps us look upstream versus downstream. It helps us connect policy to implementation, just like we did here. The city didn't have the resources to be out and go start

planting trees for energy efficiency, but between the partnership with them and the partnership with us, we've put together some really, really strong tree planting programs. So we are able to take those policies and actually implement them out in the field.

And we can just – we can work with those corporations. We can make corporations really look green. It's good to be green right now, and we want to make sure that there's not green-washing is going out there. There're a lot of corporations that are putting money into organizations with their trees are coined into the – into the neighborhood and into the communities where they are at, and that's something that we need to make sure is taking place.

Slide 16: Other Tree Non-Profits Across the Country

So if – a good resource is the Alliance for Community Trees, there are national organizations, and if you go to their website, you can click on where you live, it will give you a green nonprofit or tree planting nonprofit within your community, and there're also lists of other ones here that you can look at, and if one of those is within your area, I recommend you giving them a call because they really are a great resource, and they are doing a lot of really good things out there. A lot of times they don't have the recognition that they deserve, a lot of times they don't want that, what they're really trying to do is getting those trees into the ground and making those trees work for us.

So I kind of went through a lot of that really quickly, I would definitely be happy to answer any questions people have at the end, and please feel free to contact me if you're interested in doing program like this in your community, or you have further questions on how we implement our various programs. Thank you.

Poll Question #4

Neelam Patel: Thanks, Matt, and thanks for those tips on action on what people can do to get started. One of the things that Matt covered is the analysis they did and also the different types of benefits, and this is not only from Matt's presentation but also from Brendan's. So in terms of getting a sense of where you stand, we'd like know which of the benefits that have been mentioned so far are of most interest to you, and so if you can take us a moment to check all that apply.

And now if we can show the results, and one of the areas that there's most interest is the energy savings from buildings that can come from not – from trees as Matt pointed out, but also maybe some of the other mitigation strategies that have been covered – increased vegetation, cool pavements, and cool roof. So with that being said, I do – we did hear that from – we did hear from both Chula Vista and the Texas Tree Foundation and Dallas that they did partner with their utility to make this happened, and that connection could be a very helpful line.

And then there is – there are some mix of other interest areas. So with that in mind, as we think more about benefits and connecting them to the mitigation strategies, I'd like to introduce Norman Muraya who will talk about Austin's Heat Island Program, and spend some time talking about how they developed their Cool Roof Program, which not only has cooling or cooling surface temperature benefits but also under the energy efficiency benefits. Norman?