Seeing the City for the Trees: Urban Tree Canopy Trends and Local Strategies
Thursday, April 28, 2022, 2:00-3:30 p.m.
Hudson River Estuary Program Conservation and Land Use Webinar Series

Webinar Transcript

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00:00:05.038 --> 00:00:10.319
All right good afternoon everyone, we're going to get started.

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My name is Ingrid Haeckel and I'm a Conservation and Land Use Specialist with the DEC Hudson River Estuary Program through a partnership

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With Cornell University. Welcome to the conservation in land use webinar series. Today's webinar will profile a project.

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We funded through the Hudson River grant program to conduct an urban forest inventory and analysis for Westchester County.

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00:00:35.460 --> 00:00:44.965
Dr. Andrew Reinmann will discuss why we should care about the urban tree canopy and share results, urban forest trends and applications from that project.

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00:00:45.234 --> 00:00:57.895
And Millie McGraw will discuss how the county plans to share and use the results to inform the planting Westchester initiative and, uh, to help target future tree plantings and engage municipalities.

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So,

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thanks to our speakers today,

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before we start,

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let me review a few webinar details if you're having difficulty with your audio connection,

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you can choose to switch audio by clicking the 3 dots next to the red exit button at the bottom of the screen.

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And there, you'll find options to request a callback or to call in by phone.

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If you need help, please reach out to us through the chat icon on the bottom, right corner of the screen.

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If you have questions for the speakers, once they begin, please use the Q and a function, and it should be at the bottom right corner of your screen.

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If it's not already open, you can click the 3 dots next to the chat button in the bottom right corner to get to that.

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Note that your phone lines have been muted. The webinar is being recorded, and we will notify you when the recording is available.

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At the end of the webinar, we kindly ask that you fill out the short 3 question survey that will pop up and lastly for those of you seeking municipal training credit, you will receive an automatic email confirmation of attendance from Webex at the end of the program.

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For those of you who may be new to the series the Hudson River program is a special program at the New York State Department of Environmental Conservation established to help people enjoy, protect and revitalize the Hudson river and its Valley.

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00:02:22.914 --> 00:02:36.955
We work throughout the 10 counties, bordering the title Hudson River, shown here on the map to achieve many key benefits, including the vital

ecosystem and its fisheries and habitats, clean water, healthy tributaries.

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00:02:37.199 --> 00:02:46.259
Climate adaptive communities conserved, natural areas in the watershed and informed an engaged public and access for all to the Hudson River.

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00:02:48.930 --> 00:03:03.175
And within the program, our conservation and land use team works with municipalities and regional conservation partners to incorporate important habitats and natural areas into local land, use, planning and decision making our program.

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00:03:03.175 --> 00:03:09.685
Our Website is a clearing house for guidance and resources on these topics. And we'll share that link through the chat.

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We're very happy to announce a new member of our team Christine Vanderlan who's here with us today. she joined the program this month through our partnership with Cornell University.

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Christine will be delivering conservation, planning, outreach and technical assistance, especially in Albany.

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Columbia, Dutchess, Greene and Rensselaer counties. She previously led the community planning, an engagement program at Columbia Land Conservancy, and is looking forward to working with new municipalities and conservation partners in our watershed.

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00:03:45.865 --> 00:03:46.794
Welcome, Christine.

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Our next webinar will be on May 5th next week at 2 P. M. with Maureen Leddy. she is the director of the DEC office of climate change, and will be discussing the draft scoping plan for the climate leadership and community Protection Act.

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00:04:01.974 --> 00:04:14.814
The draft scoping plan recommends policies and actions to help New York meet the ambitious climate goals articulated in the climate act and

represents an important milestone in New York's efforts to reduce greenhouse gas emissions.

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Maureen will especially highlight recommendations related to land use and adaptation and the scoping plan is open for a public comment until June 10th.

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In addition,

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DEC’s urban and community forest program is also hosting an upcoming webinar on May 11th that may be of interest to those attending today about the role of public green spaces in providing benefits for health and well being and this,

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uh.

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00:04:43.889 --> 00:04:54.624
Uh, dovetails nicely with the work that will be presented in our webinar. The webinar will present findings from 1 of the longest running research projects in the nation on this subject.

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The green heart project in Louisville, Kentucky, I'll share links to register for all of the upcoming webinars in our follow up email.

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In addition a reminder that Hudson River grant applications are now being accepted for river, access, education and local stewardship, planning projects. grants of up to 50,000 dollars.

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00:05:16.223 --> 00:05:26.783
Each are available for municipal planning efforts, such as natural resource, inventories and open space, inventories and plans, conservation overlay zoning and connectivity studies and plans.

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Stewardship planning grants can also support efforts for planning related to climate adaptation watersheds and water infrastructure among other opportunities. And the deadline to apply is June. 1st.

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So, with that, I am very pleased to introduce our guest speakers for today's webinar.

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Andrew Reinmann is an ecologists and biogeochemist at the CUNY advanced science research center and the Department of geography at Hunter College.

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00:05:58.043 --> 00:06:02.423
Sorry, it's Department of geography and environmental sciences at Hunter College.

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00:06:02.994 --> 00:06:13.163
His research is focused on understanding how climate change land cover change forest fragmentation and invasive species impact, tree growth and the terrestrial carbon cycle.

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00:06:13.408 --> 00:06:23.129
He also conducts research on canopy cover dynamics in urban and suburban landscapes and the roles that trees play in local climate and air quality.

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00:06:23.843 --> 00:06:34.944
And Millie McGraw will be presenting next, uh, she works for Western Westchester County in the Department of environmental planning.

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00:06:35.213 --> 00:06:46.884
She is the coordinator of the soon to launch planting Westchester program the purpose of the initiative is to encourage and empower Westchester residents, municipalities schools.

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00:06:46.913 --> 00:07:00.504
Businesses and other organizations to help promote climate solutions, restoration of natural systems and local food security through growing and maintaining healthy trees and other plants. Really excited to have both of you with us today.

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00:07:00.504 --> 00:07:03.384
And I'm going to go ahead and pass you the ball.

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00:07:03.749 --> 00:07:07.288
Andy, so you can start Thank you.

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00:07:11.399 --> 00:07:14.459
All right great thanks for that introduction.

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00:07:14.459 --> 00:07:18.418
Just make sure everyone can you hear me okay and see my slide. Okay.

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00:07:20.069 --> 00:07:23.639
Yes, uh, you can go into good. Yep.

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00:07:23.663 --> 00:07:36.084
Okay, well, thanks for inviting me to speak today and that was a great introduction. so, as Ingrid mentioned, I'm an ecologist at City University of New York.

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A lot of the research that we do is aimed at just broadly trying to understand how forest systems and carbon sequestration in these ecosystems respond to various aspects of environmental change, including urbanization and climate change.

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And so what I figured I would do today is just 1st start out at a really high level,

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kind of like,

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00:07:57.264 --> 00:07:58.644
what are probably,

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what are trees doing from us from a climate and carbon cycling perspective

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00:08:03.053 --> 00:08:08.543
provide some sort of tangible examples of how this relates to maybe our,

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00:08:08.603 --> 00:08:09.533
our communities,

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00:08:09.774 --> 00:08:16.973
and then talk a little bit about some of the work that we've been doing across Westchester to better understand how canopy cover,

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00:08:16.973 --> 00:08:26.663
how our forests are changing over time and across space and maybe put forth some ideas for how we can start to think about solutions to declining canopy cover.

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00:08:28.434 --> 00:08:42.923
So first, we're all probably pretty familiar with the fact that trees and forests provide a wide range of ecosystem services that are really valid valuable. Right? So, they're really important for maintaining habitat and biodiversity.

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00:08:43.163 --> 00:08:45.953
Uh, they're really important for recreation and aesthetics. Um.

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00:08:46.259 --> 00:08:56.693
They really useful roles dampening noise pollution and they're also, of course, really important helping to maintain water and air quality.

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They can do this by slowing soil erosion, which helps to maintain clarity of streams and help to maintain water quality.

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00:09:06.173 --> 00:09:18.264
They can filter out pollutants from the atmosphere, which plays an important role for air quality. And then also, through transpiring through just taking water up out of the soil and putting it into the atmosphere.

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They can play a really critical role in regulating water flowing in our streams and helping to sort of create, sort of more, even keel stream flow.

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00:09:28.134 --> 00:09:43.043
If you noticed, in a lot of urban areas, where there's a lot of impervious surfaces when we get heavy precipitation event. our, our streams can swell quite quickly. This happens to a much smaller extent when we have more vegetated, more forested landscapes.

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00:09:43.259 --> 00:09:53.668
And then the thing that I'm going to focus on most today is the importance of trees in our forest and helping to regulate climate at both global and local scales.

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00:09:54.504 --> 00:10:03.533
so there are 2 main ways that trees regulate our climate. the 1st is probably the 1 that we're most familiar with, and that's through carbon sequestration.

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So, of course, our trees through photosynthesis, remove a whole lot of carbon dioxide from the atmosphere. And then they store it in in their biomass.

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00:10:13.884 --> 00:10:20.903
And just like, for a perspective, globally, forest offset about a quarter of all carbon dioxide emissions from fossil fuels.

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00:10:20.903 --> 00:10:35.783
I'll come back to that in a minute, and our 1st are also really important in in controlling local climate through thermal regulation, which means, they're, they're helping to sort of manage surface energy dynamics near the earth's surface.

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00:10:35.783 --> 00:10:43.403
They do this through a variety of mechanisms. 1st shading right if we have trees along our streets, our streets are cooler.

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00:10:43.823 --> 00:10:51.533
We all probably this in a very enjoyable way, hot, summer days, but they also do this through kind of like, invisible mechanisms.

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So, there's this term evaporative cooling, which is just the movement of water from soil through trees and through the leaves to the atmosphere. Um.

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00:11:00.509 --> 00:11:13.583
That process takes water from a liquid state and evaporated into a vapor state and in doing so that that transition in the states of water actually consumed heat and then cools off the air around it.

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00:11:13.614 --> 00:11:18.323
This is a lot of ways analogous to when we sweat when we're hot.

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00:11:18.803 --> 00:11:30.203

And if it's a hot summer day, and you have some sweat pulling up on your arm, and the breeze blows across and you feel that cooling sensation, that cooling sensation is the evaporation of that water off of your skin.

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00:11:30.323 --> 00:11:38.183
And so I often sort of think of trees on our landscapes as sort of like the sweat glands of our landscape, helping to cool things off.

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00:11:38.489 --> 00:11:53.033
And the other way that trees can play an important role in cooling things off locally is through albido reduction. And that's just essentially saying that trees absorb less incoming, solar radiation.

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than

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00:11:54.719 --> 00:12:06.389
Black surfaces, so, roads rooftops might and so in doing that, they are just reducing the amount of heat that's absorbed by the earth's surface and helping to keep things. Cool.

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00:12:06.389 --> 00:12:11.609
Okay, so, so as I mentioned, um.

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Through carbon sequestration forests are playing a really important role in slowing rates of climate change. So forests, just forest ecosystems are offsetting about 25% of all of our fossil fuel emissions to the atmosphere each year.

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00:12:24.774 --> 00:12:32.994
If we include other terrestrial ecosystems, like, grasslands and things like that, the total number comes to about 4th of all of the carbon dioxide emissions.

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00:12:32.994 --> 00:12:44.332
That humans put into the atmosphere each year globally from burning fossil fuels, gets absorbed and sequestered in our different vegetative terrestrial ecosystems. And then really what's driving.

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00:12:44.364 --> 00:12:58.403
This is on 1 hand, there's carbon dioxide being taken up from the atmosphere through photosynthesis and then some percentage of that winds up going back into that atmosphere through respiration. Just like we exhale when we Excel.

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00:12:58.403 --> 00:13:13.134
We're exhale and carbon dioxide trees and other organisms in the forest they also exhale carbon dioxide and so it's the difference between carbon uptake through photosynthesis and carbon loss through respiration that's ultimately driving how much carbon

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00:13:13.283 --> 00:13:22.703
our ecosystem sequester and both of these terms can be quite sensitive to climate and other environmental conditions and this is 1 of the reasons why a lot of scientist,

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00:13:22.703 --> 00:13:29.183
including myself have a lot of interest in studying how these ecosystems are responding to different aspects of environmental change.

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00:13:30.719 --> 00:13:43.438
and so that is sort of like a, these are key components of the, the types of research that that I do. and these are some of the topics that I'll also try and touch on, uh, today during my presentation.

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00:13:44.124 --> 00:13:48.443
so how are trees actually going about increasing carbon sequestration?

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So sure they, they photosynthesize and then above ground they're using photosynthesis to, create sugars, which ultimately get used to create biomass, right to our trees grow above ground.

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00:14:01.073 --> 00:14:15.323
And, of course, that's a, a way that we're all quite familiar with how Forests store carbon but then below ground forests also store a lot of carbon in fact, in a lot of our forest ecosystems, half of the carbon that they store is in the soils.

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00:14:15.533 --> 00:14:28.703
And a main mechanism through, which this happens has to do with roots. And so trees will take a lot of the sugars that they produce through photosynthesis and they'll send it below ground to their root systems.

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00:14:29.573 --> 00:14:39.533
And the roots will release some of these carbon materials into the soil. They do this to kind of help lubricate the soil as their roots are moving through it.

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00:14:39.563 --> 00:14:52.703
They also use it to get out nutrients, all trees form this really interesting, symbiotic relationship with certain fungi in the soil. And this is I always think of it as 1 of the original bartering systems.

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00:14:52.703 --> 00:15:06.563
The fungus will give the tree nutrients, and then the tree gives the fungus the sugars that it needs and that's another big mechanism for how carbon makes its way into the soil and gets stored. And then, of course, over time.

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00:15:07.163 --> 00:15:13.974
Roots die and the carbon in those roots gets incorporated into soil carbon and so through changes in, above ground to growth.

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00:15:13.974 --> 00:15:24.114
And then these other mechanisms below ground this collectively is what's allowing trees and forest to increase carbon storage of our landscapes.

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00:15:26.364 --> 00:15:37.014
And so, historically, most of the places that scientists have gone to study carbon sequestration have looked at, sort of looked like kind of these 2 landscapes that I'm showing you in the top.

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00:15:37.014 --> 00:15:50.844
These are both landscapes from New York, the Adirondacks and the Catskills and so these landscapes, they're just these broad expanses of unbroken forest with the exception of some streams here and there.

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00:15:50.844 --> 00:16:04.943
But there's very little sign of human activity. Certainly no sign of development. And we've learned a whole lot about how forest ecosystems function, and how they respond to, to climate and other aspects of environmental change this way.

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00:16:05.844 --> 00:16:09.683
But more and more of our landscape is not looking so much,

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00:16:09.683 --> 00:16:10.254
like,

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00:16:10.433 --> 00:16:16.073
these images on top here and looking more and more like these images on the bottom where we have this,

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00:16:16.073 --> 00:16:17.394
these landscapes that are sort of,

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00:16:17.394 --> 00:16:19.764
this matrix of maybe agricultural land,

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00:16:19.764 --> 00:16:20.604
some development,

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00:16:20.604 --> 00:16:21.953
some patches of forest,

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00:16:22.224 --> 00:16:24.384
and then even at a more extreme and oh,

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00:16:24.833 --> 00:16:25.344
sorry.

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00:16:25.913 --> 00:16:32.124
and so a question that we have is - so we have these forest that

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00:16:32.369 --> 00:16:39.989
Are adjacent to land covers that aren't forest like, in this case, it's a, it's a pasture.

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00:16:40.974 --> 00:16:55.553
And so a question we've been asking a lot is, do these forest out in more pristine landscapes behave the same as forest in these more fragmented landscapes, which actually comprise a pretty large proportion of our landscape?

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00:16:55.913 --> 00:17:05.903
And then, of course, at the extreme end, we have little patches of forest, and just individual trees that scatter a lot of our communities. And so.

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00:17:06.239 --> 00:17:13.078
Scientists for a long time, just haven't really been too sure about what to do with that vegetation. Like it's there, but it's not

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00:17:13.104 --> 00:17:26.844

Really a forest, there are a bunch of individual trees or small patches of forest, and when we try to quantify how much carbons being sequestering these landscapes oftentimes, they get ignored. so, Here's a map of Massachusetts.

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This is an example from 1 study where they use different satellite, remote, sensing, and other things to quantify rates of carbon sequestration at a landscape scale.

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So this is not just forest as is, including and things like that. This term just stands for net primary production and that's essentially how much biomass is an ecosystem accumulated each year.

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00:17:51.324 --> 00:18:00.263
and 1 thing that you may notice here is that there are these large blocks of white and those large blocks are white are not necessarily places where there's nothing going on,

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00:18:00.263 --> 00:18:12.384
but they're urban and suburban landscapes and they oftentimes just get masked or excluded from all of our modeling efforts that are aimed at trying to understand carbon sequestration at landscape scales.

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00:18:12.624 --> 00:18:20.544
And so if we're trying to think about increasing carbon in our communities, and in our cities, these sorts of models are not very useful for us.

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00:18:20.544 --> 00:18:32.213
Because they just sort of flat out ignore them in the case of Massachusetts, this blocks out something like a quarter or a 3rd of the entire state. But a lot of these areas that are blocked out here.

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00:18:32.213 --> 00:18:42.834
Look like what I'm showing you down here, where there's actually a lot of vegetation we know that things are going on there and for a while, we just haven't had a good idea of what exactly that was.

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00:18:43.229 --> 00:18:54.538

and so I'm going to focus a little bit on the types of forest and canopy cover that were in those bottom 2 images because, um.

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1st fragmentation is this phenomenon That's quite pervasive globally and certainly here in New York and the U. S.

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so,

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for example,

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there's been some work that our group and others have done,

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00:19:06.653 --> 00:19:21.294
using satellite imagery to quantify how far a patch forest is from the nearest non forest land cover type and you get these really beautiful maps of global forest cover where the blues are patches of forest that are,

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00:19:21.294 --> 00:19:21.683
like.

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00:19:22.374 --> 00:19:36.564
Sort of like this 1st, few images that I showed you, they're really far away from development. They're far away from non forest land covers, we would kind of consider these are more pristine, intact forest ecosystems, and most of that is in the tropics. Right?

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00:19:36.564 --> 00:19:48.804
The Amazon and some parts of Southeast Asia here in the U. S. you can even from space you can sort of make out the Adirondacks here in northern New York. That's 1 of the last few places. Really

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00:19:48.804 --> 00:19:56.663
In in much of the country where we find these sort of interior forest ecosystems that are more than kilometer or so from an edge.

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00:19:56.969 --> 00:20:11.098
And so, from doing these sorts of analysis, what we find is that 25% of the world's forest, the world's temperate forest. So that's the area. The U. S, similar latitudes in Europe and Asia a quarter.

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00:20:11.513 --> 00:20:24.384
Of all that forest area is less than 30 meters of an edge. So about 100 feet from, from an edge, a really high proportion of our forest. Don't actually look like those beautiful pictures that I showed you on the previous slide.

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00:20:24.384 --> 00:20:34.584
But look more and more like what I showed you on the bottom here in New York about 20% of our forests are within 30 meters of an edge, and just to kinda put that into perspective.

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We've done some analysis for states across the northeastern quarter of the U. S showing the proportion of forest area that's within 30 meters of an edge. And you can see that distribution here.

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I have New York outlined in, in red some areas on the higher end of the spectrum are places like Iowa, Illinois places with a lot of a lot of farmland.

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00:20:55.943 --> 00:21:07.253
And then we use the orange and purple here, just to sort of distinguish forest that are adjacent to agricultural land from, forest that are adjacent to urban land cover. And you can see here in New York.

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00:21:07.253 --> 00:21:19.614
We're split about 50, 50 and so here's the distribution of forest here in New York. Right? So, of course, you can make out the Adirondacks and other large areas of forest.

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00:21:19.614 --> 00:21:23.604
The Catskills, Tug Hill plateau, Hudson Highland area down state.

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00:21:25.673 --> 00:21:40.044
And then if we zoom in a little bit, you can see what that fragmentation actually looks like. So, here I'm showing you this is Westchester County, and a little bit of Rockland county all of the purple indicates areas of forest that are adjacent to development.

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00:21:40.044 --> 00:21:47.124
The yellow indicates areas of forest that are adjacent to agriculture can be a pasture or some sort of vegetated meadow.

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00:21:50.933 --> 00:22:03.294
And so, the reason why I'm spending a little bit of time here, talking about fragmentation is because when we take this large intact forest, and we chop it up into smaller pieces. And there's a lot of edge of the forest adjacent to non forest

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00:22:03.294 --> 00:22:15.054
land covers and what we find is that the forest there tend to become hotter. The soils tend to get drier. The air gets drier. The trees get exposed to higher amounts of wind.

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00:22:15.263 --> 00:22:28.614
All of these things could potentially have negative impacts on tree growth, but at the same time, as you get closer to a forest edge, the trees have greater access to light and we learn in kindergarten that you give a plant more light it can grow faster.

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00:22:28.733 --> 00:22:41.874
So, this can potentially benefit tree growth, and there's also been some research that suggests that trees growing on the edge of a forest, have greater access nutrients than trees brought in the interior. And this can also help to stimulate tree growth.

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00:22:41.903 --> 00:22:56.304
And so it's really a niche at the end of the day, how all of these different changes and growing conditions of these floors interact with 1, another to, to ultimately influence how, how far as growth might respond to fragmentation.

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00:22:57.683 --> 00:23:10.763
And so, in addition to this fragmentation dynamic, a lot of our fragmented forests are in an urban and suburban landscapes, and these landscapes in addition to changes in growing conditions.

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00:23:10.763 --> 00:23:21.894
That might be had from fragmenting The landscape urban landscapes are also hotter and drier. There's greater exposure to pollution, and there may also be greater nutrient availability and so.

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00:23:22.229 --> 00:23:30.923
We've been interested in understanding how both fragmentation and urbanization alter tree growth and forest carbon sequestration dynamics.

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00:23:30.953 --> 00:23:43.493

in, forest and so broadly we kind of think about fragmentation urbanization as sort of creating both these risks and opportunities for forest growth. And the different types of ecosystem services that they provide.

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00:23:44.423 --> 00:23:48.473
and so I just want to talk a little bit about some of the research that we've done on this front.

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So, for a bunch of years, we collect the data from urban forest fragments in the Boston area and rural forest fragments in central Massachusetts and a research course called Harvard forest.

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00:24:02.423 --> 00:24:09.594
Just to give you an idea of kind of what these different landscapes look like. and so these next couple of graphs that.

160
00:24:10.048 --> 00:24:15.598
That I'm going to show you what you're looking at the thing about.

161
00:24:30.088 --> 00:24:35.548
It's like, we might have lost Andy for a moment, but hopefully he'll be right back on.

162
00:24:46.439 --> 00:24:57.659
Sort of our interior forest, the red line indicates forest near the edge and so yeah, we lost you for a few seconds there. So you might need to repeat what you said about this graph.

163
00:24:58.769 --> 00:25:04.378
Okay, sorry, let me I'm in a building with metal walls and so something.

164
00:25:04.378 --> 00:25:11.189
Times the WI, Fi, which comes from the hallway is not super strong. Is it? Okay now.

165
00:25:11.189 --> 00:25:14.578
Can you hear me okay now? I think so.

166
00:25:14.578 --> 00:25:24.624
Yeah, yeah, you're back. Okay. Okay thanks. All right. So, anyway, what I was saying is, the Y, axis here is just a metric for forest growth. It's 2 dimensional.

167
00:25:24.624 --> 00:25:39.443
So, if you just sort of viewing, like, looking down from a above at a forest and thinking about the amount of wood that the trees would put on each year, if that's what these units refer to and then these graphs, I'm going to show the blue line. Is the forest interior?

168
00:25:39.443 --> 00:25:47.513
The red line is near the edge and the green is sort of in the in between, and so I'll get to the X axis in a 2nd, but for now.

169
00:25:48.114 --> 00:25:57.294
What we find actually, is that, as you go from the interior of the forest to the edge of the floors, we get about a doubling in how much carbon the forest can sequester.

170
00:25:57.743 --> 00:26:06.653
So, I have this little schematic here to sort of simplify this, or near the edge the floors are taken off about twice as much carbon dioxide from the atmosphere than they are in the interior.

171
00:26:07.463 --> 00:26:12.953
But the other thing that we find that's been particularly interesting is that, as.

172
00:26:13.703 --> 00:26:24.594
A year or summer gets hotter and hotter, it seems that the trees near the edge of the forest are more adversely impacted by the heat and the trees in the interior.

173
00:26:25.223 --> 00:26:35.634
And so, here, the units that we're talking about, when we talk about heat stress are days in June and July, that are above 27 degrees Celsius, this may seem like sort of a random mix of numbers.

174
00:26:35.634 --> 00:26:49.344
But June and July is when most would production occurs in trees and 2007 degrees Celsius, as the average high temperature in July, the hottest time of year, where we were making these, these measurements. And so we sort of view.

175
00:26:51.503 --> 00:27:04.044
Daytime temperatures that are above this average high temperature as stressful conditions for the tree, and as the number of days, with those festival conditions, increase rates of forest growth in an urban fires.

176
00:27:04.044 --> 00:27:13.913
Whether you're in the interior of the forest, or the edge rates are forest growth decline, but they decline 3 times faster at the edge in the interior. So to simplify that.

177
00:27:14.009 --> 00:27:26.098
All this is to say that on 1 hand forest fragmentation seems to make forest grow faster during, like, cool and normal conditions, but under particularly hot conditions.

178
00:27:26.098 --> 00:27:30.269
The magnitude of that forest edge growth enhancement is greatly reduced.

179
00:27:30.269 --> 00:27:43.019
and so this sort of suggests that maybe our fragmented forest could be more vulnerable to changes in climate.

180
00:27:43.584 --> 00:27:50.064
What makes the story a little bit more interesting is that when we take a forest fragment in an urban area,

181
00:27:50.094 --> 00:27:55.884
and compare it to a similar type of forest fragment with the same species composition in a rural area,

182
00:27:56.124 --> 00:28:07.584
we find that the forest interior isn't particularly sensitive to heat in the same way that it is in our urban forest and while we do see an increase sensitivity to heat near the forest edge,

183
00:28:07.584 --> 00:28:10.044
you can see that declining growth as heat increases.

184
00:28:10.314 --> 00:28:17.394
it's that rate of declining growth in response to heat is quite a bit smaller than it is in in urban areas.

185
00:28:17.608 --> 00:28:18.118

186
00:28:19.314 --> 00:28:32.993

and so this is sort of suggesting to us that there are these really important interactions between fragmentation and urbanization that could be exacerbating how sensitive forest growth and carbon sequestration might be to heat stress.

187
00:28:33.239 --> 00:28:38.669
and then just to kind of give you an idea of what the sort of the landscape is like .

188
00:28:38.669 --> 00:28:48.628
There's 1, quick question I, uh, that relates to the graph we're just looking at. Maybe you could answer right now. we're asking about for days where it's.

189
00:28:48.653 --> 00:29:03.624
Greater than 27 degrees Celsius, versus forest growth, were the air temperature values for the same area or different areas related to the interior versus the edge of the forest. So we looked at, uh, data from the nearest weather station. So it's.

190
00:29:06.114 --> 00:29:17.124
It's sort of where, like, our long term weather records are collected. So it's not actually at the forest. It's sort of like the ambient conditions in that area probably within 10 miles.

191
00:29:17.423 --> 00:29:28.463
and then certainly the air temperature conditions at the forest edge, versus in the interior, we're going to see a strong gradient, but to kind of hold things constant. We just use nearby weather station data. Does that answer the question? Yeah.

192
00:29:28.794 --> 00:29:41.183
Thank you for clarifying. Yeah, sure. okay so, so what does this mean across our landscape? So, just to kind of highlight that a little bit, the area around Harvard forest.

193
00:29:41.183 --> 00:29:48.084
Here's zoomed in what that would look like the greenish blue is areas of forest that are sort of, our forest interior.

194
00:29:48.233 --> 00:29:56.423
The red is sort of our forest edge and while we see this really large enhancement of course, growth at Forest edges in both locations.

195
00:29:56.874 --> 00:30:09.503

Because some of our world landscapes have so little fragmentation this doesn't have a big impact on let's say the municipal level how much carbon are the forests are sequestering, but if we look at the other end of the spectrum.

196
00:30:09.503 --> 00:30:18.023
So, here's just the zoomed in area of Boston, 80% of the forest. So, almost all of the forest in our cities are being influenced by these edge dynamics.

197
00:30:19.554 --> 00:30:31.134
And what that indicates is that per unit area of forest, our urban forest, and the forest, probably, in our suburbs, in our communities are more productive than our world forest.

198
00:30:31.134 --> 00:30:37.523
And again, that's because as you get closer to a forest edge, the trees wind up growing considerably faster.

199
00:30:38.364 --> 00:30:38.874

200
00:30:38.903 --> 00:30:39.834
but there's,

201
00:30:39.864 --> 00:30:40.284
there's a,

202
00:30:40.314 --> 00:30:41.334
there's a bug here,

203
00:30:41.483 --> 00:30:42.084

204
00:30:42.114 --> 00:30:42.923
on 1 hand,

205
00:30:42.923 --> 00:30:43.223
these,

206
00:30:43.314 --> 00:30:46.074
these trees and these bars are growing faster in our cities,

207
00:30:46.253 --> 00:30:49.074
but because they're also more sensitive to heat,

208
00:30:49.463 --> 00:30:53.634
they might also be more likely to be negatively impacted by climate change.

209
00:30:53.909 --> 00:30:59.308
Okay, so coming back to New York, um.

210
00:30:59.604 --> 00:31:13.374
The next thing I wanted to talk a little bit about is just more broadly what canopy cover is so here's just a pretty standard land cover map of New York. The different greens are forest area. The yellows are agriculture.

211
00:31:13.403 --> 00:31:18.054
The reds are developed. So, you can see all the cities where they are, but.

212
00:31:19.104 --> 00:31:22.973
That's not all of the canopy cover, so we toggle back and forth between them.

213
00:31:22.973 --> 00:31:36.054
So, what I'm showing you here in the greens is forest cover, and here's forest cover plus canopy cover from trees in our yards along our streets, scattered in agricultural fields.

214
00:31:37.134 --> 00:31:43.673
And so it's these trees in addition to our forest that make a really important contribution to total canopy cover.

215
00:31:44.423 --> 00:31:58.824
In fact, across New York state point 3 Million Hectares so nearly a 1 Million acres of additional canopy cover can be attributed to just the trees that we planted in our yards in our community. So I just want to use these statistics that just highlight.

216
00:31:58.824 --> 00:32:11.963
How important those sorts of paintings can be and then just to kind of zoom in and give you a better sense for what this looks like at a finer spatial resolution. Here's Rockland County, Westchester, New York City, adjacent areas of New Jersey.

217
00:32:11.963 --> 00:32:20.544
Here's what it looks like if we just consider forest cover, that's the green, the reds, and the pinks are developed area. And now, if we look at where there's canopy cover.

218
00:32:21.358 --> 00:32:36.058
It looks quite different, right? So toggle back and forth between those. And you can see just knowing where our forest are, especially in more developed landscapes way underestimates the total amount of canopy covered that we have.

219
00:32:36.713 --> 00:32:46.614
And it's this canopy cover, that's outside of our forest that can actually be really important, and a really important opportunities for new carbon sequestration.

220
00:32:46.614 --> 00:32:47.003
So,

221
00:32:47.034 --> 00:32:49.284
as just a quick example of that,

222
00:32:49.314 --> 00:33:03.864
Here's maybe a an example of a residential area in sort of a low density suburban community and our typical way of thinking about what carbon sequestration looks like here is we would just block out that entire community

223
00:33:03.864 --> 00:33:18.324
because it's not a forest and maybe we don't know what to do with assigning tree some carbon sequestration value and this comes back to this figure that I showed you earlier but some of our work has shown that these trees can actually be really

224
00:33:18.324 --> 00:33:18.864
important.

225
00:33:18.894 --> 00:33:25.943
And I apologize for all the work in Massachusetts before I came down to New York, that's where I was living and studying. And that's where we did a lot of this sort of work.

226
00:33:25.973 --> 00:33:35.483

but just to kind of give you an example of what this looks like the numbers, the relationships would look exactly the same in New York in this graph.

227
00:33:35.759 --> 00:33:43.253
The green is the amount of carbon being stored in the forest the gray is the amount of carbon being put back into the atmosphere from development.

228
00:33:43.253 --> 00:33:52.493
So, when we cut down patches of forest to put a housing development in, oftentimes, those trees are chipped or burned and that carbon returns to the atmosphere quite quickly.

229
00:33:53.423 --> 00:33:53.814
And so,

230
00:33:53.814 --> 00:33:56.213
in our rapidly developing suburban counties,

231
00:33:56.213 --> 00:34:08.753
you can see that emissions to the atmosphere from forest loss are almost as large as the amount of carbon being taken up by all the forest that remain on that landscape in that county.

232
00:34:09.324 --> 00:34:09.804
Um.

233
00:34:10.199 --> 00:34:15.179
But what we've been finding is that because these, um.

234
00:34:15.563 --> 00:34:26.094
These sorts of assumptions. Omit these trees here. We're really underestimating how much carbon is being sequestered in our in our communities to get to give you an example of what that looks like.

235
00:34:26.574 --> 00:34:30.713
Here's some data from inventory analysis,

236
00:34:30.744 --> 00:34:41.963
showing growth rates of oak trees and then here's what those growth rates look like in the same types of tree species in urban areas.

237
00:34:41.963 --> 00:34:56.844

Right? So, what we find is that the trees in our yards can grow twice as fast, or even faster than the same species in the forest. And then some other work that's been done. Looked at this a little bit of a different way, where they looked at trees of different sizes.

238
00:34:57.083 --> 00:35:09.264
And what they found is that trees up to almost 2 feet in diameter, grow a lot faster each year than their forest counterparts of a similar species.

239
00:35:09.503 --> 00:35:20.664
  the caveat here though, is a lot of our street trees tend to die a lot younger than in our forests. So I sort of think of our street trees as kind of rockstars of the tree world. Well, they kind of, um.

240
00:35:22.858 --> 00:35:26.909
Oh, can you guys hear me? I just got a text message from Laura.

241
00:35:26.909 --> 00:35:34.409
Can you hear me? I can hear you. Fine. Okay. All right. Maybe that was from the last cut out. Okay. Sorry.   so.

242
00:35:34.704 --> 00:35:42.653
Anyway, so, street trees are kind of like the rock stars of the tree where they sort of live fast and die young but there's a lot of room there.

243
00:35:42.653 --> 00:35:51.384
If we improve management of our trees, we can maybe sustain these higher growth rates for longer and keep these trees from dying and manage them as an important carbon sink.

244
00:35:51.653 --> 00:35:51.923
So,

245
00:35:51.923 --> 00:35:55.673
if we take this sort of information about how the trees along our streets,

246
00:35:55.704 --> 00:35:58.523
and in our in our neighborhoods and our yards,

247
00:35:58.523 --> 00:36:13.463

how much faster they grow than a forest tree and we apply it to this sort of landscape this sort of community what we find is that because these trees are growing so fast they can actually offset

248
00:36:13.494 --> 00:36:19.583
a lot of the declines and carbon sequestration that we might expect to occur from loss of forest.

249
00:36:19.583 --> 00:36:26.724
They won't do it entirely, but it has the capacity to offset a lot of declines and carbon sequestration associated with development.

250
00:36:26.724 --> 00:36:41.393
So, I put these green bars here, this is just indicating a very course estimate at the high end of what the trees in our communities might be sequestering really To just highlight that. There's a lot of potential here to do more with carbon sequestration.

251
00:36:41.699 --> 00:36:54.809
Okay, so the last piece that I wanted to talk about with sort of connecting trees and forest to climate is sort of the thermal regulation idea locally. and so.

252
00:36:54.809 --> 00:37:05.909
Here, I'm showing an example of the urban heat island effect, which basically indicates that, uh, more developed urbanized areas are considerably hotter than rural areas that have a lot of vegetation.

253
00:37:05.909 --> 00:37:17.458
  and this is really important, because it can exacerbate the intensity of our heat waves and related public health impact. The heat wave in Europe in 2003 was a really stark example of that. Um.

254
00:37:18.054 --> 00:37:25.764
And it's also not just a public health consideration, but it also can directly contribute to increase carbon emissions.

255
00:37:25.914 --> 00:37:40.853
So, if you were to look at all the electricity consumption across the US each year, just the amount of increased cooling costs that we have to offset this urban heat island effect accounts for up to 10% of all of our electricity demands.

256
00:37:40.853 --> 00:37:52.074

Right? So our efforts to cool things off, just because we replaced vegetation with buildings directly increases, or, I guess indirectly increases carbon emissions because we have to cool our homes more.

257
00:37:52.619 --> 00:37:59.219
And it can also exacerbate pollution issues like chemical smoke or ozone pollution.

258
00:38:01.259 --> 00:38:12.443
And then there's, I expected to be important implications between this urban heat island effect and climate change. So Here's sort of an older map of how the climate in our region is expected to change.

259
00:38:13.134 --> 00:38:26.903
I use it because the units are in Fahrenheit and it does a really good job of highlighting the point. And a lot of these patterns are still expected to be the same. Right? So, if we look at the number of days, above 90 degrees, those are expected to increase dramatically in in our region.

260
00:38:27.210 --> 00:38:40.469
And that essentially equates to sort of the Tri state area here in southern New York, having a summer climate that looks more like the South Eastern U. S. by the end of the century.

261
00:38:40.469 --> 00:38:48.539
And there's also been work that suggests that certainly in our part of the world, the northeastern U. S.

262
00:38:48.539 --> 00:38:55.409
Climate change is going to also result in about a 30% increase in the magnitude of the urban heat island effect.

263
00:38:55.409 --> 00:39:03.719
And so I just wanted to quickly walk through, like, really what causes the urban heat island effect. I think it's useful in

264
00:39:03.835 --> 00:39:13.164
Thinking about how we can use, trees to mitigate it. And so I'm going to show some numbers here that are really just relative terms. Don't quote me on the exact numbers.

265
00:39:13.164 --> 00:39:24.744

But really what drivers that are going into heat island effect is the changes in what happens to incoming solar radiation. so that's ultimately the source of energy at the surface.

266
00:39:25.614 --> 00:39:31.855
And then in cities, we also have a little bit of additional heat from combustion. So.

267
00:39:32.190 --> 00:39:35.489
Of that energy that comes into these systems about.

268
00:39:35.489 --> 00:39:49.500
14 or 15% just gets reflected back up into space by contrast only 3% or so gets reflected back into space and cities. Right? So that's, uh, 5 times more getting reflected into space in.

269
00:39:49.500 --> 00:40:01.735
Of how the vegetative landscape compared to the city, in addition to that is this latent heat component. This is just evapotranspiration. So it's coming back to the idea of trees being the sweat glands of the land surface.

270
00:40:02.065 --> 00:40:12.775
That term is more than twice as high in a heavily vegetated landscape versus a city. Sensible heat, so the temperature that you can feel. Um.

271
00:40:13.079 --> 00:40:25.170
69% of the incoming energy gets converted to that, but in a city, it's quite a bit higher. And at the end of the day what this means is that our cities are storing 5 times more heat than our vegetated landscapes are.

272
00:40:25.735 --> 00:40:32.215
We had 1 other quick question, whether you could return to the definition for the albedo effect. Yeah, sure. Right.

273
00:40:32.215 --> 00:40:46.434
So, I'll just refers to the amount of white that gets reflected or the amount of white that's getting absorbed and so a higher. It just means that more of the light that's hitting an object is getting reflected back into space.

274
00:40:46.585 --> 00:40:56.784
So, like, snow has an close to 1 whereas blacktop has an closer to like, 5 or 10. so it's just a term used to.

275
00:40:57.150 --> 00:41:01.590
Refer to the amount of energy from light that's getting absorbed by an object.

276
00:41:02.610 --> 00:41:06.300
Thank you. Yep. Yeah. Thanks for stopping me.

277
00:41:06.804 --> 00:41:21.414
So, I'm just adding my little caveat here to just to give you an idea of what this actually looks like. Here's 1 of our research sites. This is actually where I am today here's a thermal imaging camera of this, and the, the greens and yellow and blues.

278
00:41:21.414 --> 00:41:34.585
Are cooler temperatures the reds and oranges are hotter temperatures and I like this picture because it highlights that it's not just like vegetation or no vegetation, but different types of vegetation and how we manage that vegetation plays an important role in regulating temperature. Right?

279
00:41:34.585 --> 00:41:48.385
So, we can see our forest here is quite a bit cooler than the grass land in the foreground and that's quite a bit cooler than this path that we have mode. And this path that's mode is probably similar to a lot of our logs. Right? And you can see that showing up quite hot here.

280
00:41:48.744 --> 00:41:53.574
You can also see the hot outline of a dead tree in our forest.

281
00:41:54.985 --> 00:42:07.344
At a larger landscape scale Here's New York City and showing percent canopy cover on the right here is the land surface temperature. This is like the temperature view. We're going to touch the ground. It's not air temperature, but they're closely correlated.

282
00:42:07.795 --> 00:42:16.045
You can see the these blues, the cooler areas all correspond to where there's a lot of vegetation. So these are all the parks in New York City.

283
00:42:16.164 --> 00:42:23.755
And I, I like this image because I think it really highlights how important vegetation is and trees in particular are in cooling things off.

284

00:42:25.914 --> 00:42:37.315
And then, so there's like, real monetary advantages to increasing their canopy cover and there was an unfortunate, uh, example of this from Worcester, Massachusetts, and I think we can learn a lot from.

285
00:42:38.005 --> 00:42:52.074
And so, in western Massachusetts about 151,415 years ago, they had an outbreak of the Asian, long term Beetle. Here's an image of what part of that city looked like before the outbreak. And then to manage the Asian law from beta, which is an invasive species.

286
00:42:52.074 --> 00:42:55.614
They quarantined it by cutting down all of the trees in some of these neighborhoods.

287
00:42:57.804 --> 00:43:02.994
And so what this resulted in is was a huge declining canopy cover so this particular community,

288
00:43:02.994 --> 00:43:05.454
before the outbreak had almost 40% canopy cover,

289
00:43:05.454 --> 00:43:19.405
and then there's this estimate of how much energy was used for cooling in the summer and then after the outbreak and the quarantine efforts that got dropped down to a little over 7%,

290
00:43:19.405 --> 00:43:20.034
canopy cover,

291
00:43:20.034 --> 00:43:22.735
and a pretty large increase in energy.

292
00:43:22.735 --> 00:43:34.074
That was needed to cool These homes. In fact, there was a 40% increase in energy consumption, and also carbon emissions that were required just for cooling as a function of this declining canopy cover.

293
00:43:34.074 --> 00:43:44.005
And I really liked this example because I think it highlights in a very real world way How important trees can be and not just cooling things off, but also indirectly reducing our carbon emissions.

294
00:43:46.585 --> 00:44:00.414

Okay, so that gives us the next 10 minutes to finish up here. I just want to talk about how we sort of take a lot of this information about what our trees and what our forests are doing on our landscape and apply it to try

295
00:44:00.414 --> 00:44:02.605
And solve some of these real-world problems,

296
00:44:02.784 --> 00:44:03.114
and so,

297
00:44:03.114 --> 00:44:05.065
as Ingrid mentioned at the start,

298
00:44:05.065 --> 00:44:06.114
we a few years ago,

299
00:44:06.114 --> 00:44:14.094
we got a grant through the Hudson River program and this is a collaborative project from between CUNY, Westchester county government,

300
00:44:14.125 --> 00:44:18.144
nonprofit organizations, and the Hudson River Estuary program.

301
00:44:18.144 --> 00:44:25.614
And our objective here was to sort of map current land use changes, and forest cover and canopy cover.

302
00:44:26.335 --> 00:44:40.315
Assess the successes of community tree planting programs, highlight important areas for conservation and restoration and try and provide guidance for others to be able to replicate this analysis.

303
00:44:40.315 --> 00:44:52.405
So we use Westchester County as sort of our testing ground, but what we were developing was a protocol that could be used anywhere. And a big key component of this was to do all this using freely available datasets.

304
00:44:52.525 --> 00:44:58.465
So that no one had to expend a large amount of money to redo these sorts of efforts.

305
00:44:59.664 --> 00:45:14.545

And so a lot of this relied on using satellite imagery and products that are pretty easy to use. And so this is essentially collecting images from about 2000 kilometers above Earth. One of the products that we use is from the National land cover database.

306
00:45:15.360 --> 00:45:23.429
Which gives us land cover and canopy cover information at a 30 meter spatial resolution. So, about 100 feet on the side.

307
00:45:24.625 --> 00:45:37.164
And they even have this great interactive website where you can go to their website and zoom in on a certain part of the country and create these maps for yourselves of land cover or canopy

308
00:45:37.164 --> 00:45:38.965
Cover, things along those lines much like,

309
00:45:38.965 --> 00:45:39.534
what I'm going to show

310
00:45:39.534 --> 00:45:40.795
you in the next few slides.

311
00:45:41.784 --> 00:45:55.974
okay, and so what have we been learning? So, these products become available every 5 years we're in the process of updating this to include data through 2019-2020. I'm going to show you statistics from 2016, because that's what we've compiled so far.

312
00:45:55.974 --> 00:45:56.844
but these maps, um.

313
00:46:00.900 --> 00:46:04.619
Yeah, there's the you said.

314
00:46:04.619 --> 00:46:08.909
And the greens are forest.

315
00:46:17.429 --> 00:46:20.789
It seems like we lost Andy again for a second

316
00:46:26.070 --> 00:46:35.070

Once over the last 15 years, we just lost you again for a second you might need to back up, like, 30 seconds to what was sorry what was the last thing you said?

317
00:46:36.744 --> 00:46:47.215
I think he had just started this slide actually. Okay, sorry about that. so I was just saying, so, here's here's a map of land cover across Westchester as of 2016.

318
00:46:47.215 --> 00:46:52.945
we're currently working on the data through 2021, but we don't have that compiled yet.

319
00:46:53.605 --> 00:47:03.025
So just show you through 2016, the reds and pinks are areas of development, the greens are areas of forest and yellows are other herbaceous land covers and pastures and things like that.

320
00:47:03.025 --> 00:47:12.684
So, in as of 2016, the county was nearly 50% developed and that represents a 26.2 square kilometer increase in development from 2001 to 2016.

321
00:47:24.445 --> 00:47:35.664
Most of the rest of the land cover types in Westchester is forest and you can see from these numbers that essentially it was forest that was getting lost to make room for new development.

322
00:47:35.844 --> 00:47:41.784
so we can easily identify what our source of loss is, which is probably not a surprise to anyone here.

323
00:47:42.954 --> 00:47:51.625
We can also look at how much of the landscape is an impervious surface, or, like, a rooftop or a road. When we find that a little over 13% of the county is in impervious surface.

324
00:47:51.625 --> 00:48:05.485
and then we can also look at not just forest cover, but overall treat canopy cover again, this includes trees along our streets and in our yards in our communities and about 53% of the county is canopy cover.

325
00:48:05.514 --> 00:48:16.344

You notice that is an increase of 5% from what's just Forest, but we're losing canopy cover pretty quickly about 20 square kilometers just between 2011 in 2016.

326
00:48:19.019 --> 00:48:26.099
there was a quick question on the slide about how you define barren land.

327
00:48:26.514 --> 00:48:40.344
Oh, so that is defined by the National Land Cover database. So they come up with these different categories, but basically, it's oftentimes just exposed soil. That doesn't have any vegetation on it.

328
00:48:40.375 --> 00:48:46.074
And there's almost none of that in Westchester. It's a category. That is much more common throughout the Western U. S.

329
00:48:46.289 --> 00:48:52.050
But they, they have a uniform product for the entire country. So it shows up in in our region as well.

330
00:48:52.050 --> 00:49:06.389
Thanks so what these numbers indicate is that more than 10% of all the tree canopy covered in Westchester is actually from the trees in our communities along our streets and in our yards and not just from forest.

331
00:49:07.914 --> 00:49:20.125
And so, like, I was showing you those data for New York City, we can do the same sorts of analysis across Westchester County, or any other municipality, on the left here. I'm showing you percent canopy cover how it varies across the county.

332
00:49:20.125 --> 00:49:33.534
So, of course, down your Yonkers, and the more heavily developed, southern part of the county canopy cover is lower, it's much higher in the northern part of the county you can even make out Ward pound ridge reservation, which is a large county park here.

333
00:49:33.534 --> 00:49:47.125
Because it just shows up as this blob of green, and we can compare that to land surface temperature. So the hottest areas are the most heavily developed, and the areas that are denuded of canopy cover in the southern part of the county, and it gets cooler for the North.

334
00:49:47.125 --> 00:49:53.934

And even in the temperature, you can make out where that park is, because it's like this little bubble of, um.

335
00:49:54.210 --> 00:50:05.425
Coolness, I guess, and so some of these differences have to do with Latitude, but we're really talking about 20 or 30 miles. So it's not big enough to account for these large differences in temperature.

336
00:50:05.724 --> 00:50:11.695
  most of the difference is because of vegetation cover or tree cover and so, um.

337
00:50:13.945 --> 00:50:28.494
All this, we can use this sort of information to just really kind of highlight the importance of increasing canopy cover, for mitigating, urban heat island effect, and reducing energy consumption for cooling. And when we look at this

338
00:50:28.800 --> 00:50:43.764
at a municipality by municipality approach here. Uh, each 1 of these dots is 1 of the 40 some odd municipalities of Westchester and what we can see is this really strong correlation between canopy cover and temperature.

339
00:50:43.795 --> 00:50:49.795
So, the communities with the most canopy cover are the coolest those with the lowest canopy cover are the hottest.

340
00:50:50.094 --> 00:51:01.315
I should mention that we're using land surface temperature here, because that's what these satellites measure and again, it's not the same exact thing as air temperature. It's the temperature of the surface, if you were to touch it.

341
00:51:01.735 --> 00:51:10.675
So, a difference in 67 degrees in surface temperature may only be a difference of, like, let's say, 3 or 4 degrees in air temperature.

342
00:51:12.864 --> 00:51:26.875
  okay, and so we have these really strong correlations between tree cover and local temperature here. I'm showing you the distribution of canopy cover, split out between forest and what's in our communities.

343
00:51:26.875 --> 00:51:32.844
The dark green is forested areas, the light green are all the trees that are outside of forest.

344
00:51:33.059 --> 00:51:47.670
and then, so again, each one of these dots is a municipality, and I'm showing the percent forest cover on the X axis and percent canopy cover on the Y, axis and I do this to highlight, um.

345
00:51:48.264 --> 00:51:58.284
What part of a municipality's canopy cover is driven by there just being forest versus driven by trees in residential areas, and along streets.

346
00:51:58.585 --> 00:52:01.914
And so as we move further up from this blue line,

347
00:52:02.065 --> 00:52:08.724
a higher and higher proportion of the total canopy cover is being driven by the trees in our yards,

348
00:52:08.724 --> 00:52:12.204
and in our communities and as we get closer to that line,

349
00:52:12.204 --> 00:52:18.264
it should be more and more by forest right so all these places above 50% canopy cover most of their canopy covers from forest,

350
00:52:18.264 --> 00:52:19.855
but the story is much different.

351
00:52:20.670 --> 00:52:32.670
For communities with less canopy cover. In fact, we find that, it's these communities that have less than 20% forest covered that have this huge range in canopy cover. Right? It goes from

352
00:52:32.670 --> 00:52:39.210
10% all the way up to almost 60%, even though all these communities have very little forest cover.

353
00:52:40.195 --> 00:52:52.614
And there's been some research that suggests we really want to try and get our communities to having more than 40% canopy cover to maximize the cooling benefits of trees. And so there's really important equity implications of this.

354
00:52:52.614 --> 00:53:05.184

Because what we find is that, of course, the communities with less canopy cover, even though they all have very little forest cover here. Those are hotter than the ones with more canopy cover.

355
00:53:05.184 --> 00:53:16.795
And this may suggest that there are these feedbacks between socio economics and canopy cover. And indeed what we find is that here on the right, areas with a lot of forest cover, those are sort of medium income.

356
00:53:16.824 --> 00:53:23.815
But when we think about the more high density communities that have less forest cover,

357
00:53:23.815 --> 00:53:29.844
the higher income communities tend to have more trees and cooler temperatures than the lower income communities,

358
00:53:29.844 --> 00:53:44.485
and these lower income communities are also less likely to have access to air conditioning or the money to pay for the cooling bills and so this is something that's really important to think about as we think about how to, how we might be able to use trees and canopy cover to ameliorate some issues

359
00:53:44.485 --> 00:53:45.565
related to equity.

360
00:53:46.349 --> 00:53:51.269
Okay, so the last thing I want to finish up with is, so

361
00:53:51.269 --> 00:53:58.885
Here's all this information. Hopefully I convince you that trees are important. I imagine you came to this webinar because you already think trees are important.

362
00:53:59.184 --> 00:54:13.195
  but what can we do to maximize the time and benefit of trees and so the 1st thing I would say is maintain what you have everywhere almost everywhere and certainly in Westchester and other parts of New York state We're losing canopy cover.

363
00:54:13.195 --> 00:54:23.514
So we want to minimize the amount of forest that we're losing and forest what we have, we want to do our best to maintain and improve tree health especially the health of trees in our yards, and along our streets.

364
00:54:24.355 --> 00:54:35.965
and so again, here's that land cover map of Westchester. I should probably just remove the barren land since it shows up in black. You don't see it anywhere in the county largely because it doesn't really exist here. Um.

365
00:54:36.534 --> 00:54:47.994
But now, when we look at different municipalities and Westchester, we can start to see which of the ones that are losing canopy, cover the fastest right? And most of them are in the northern part of the county, all the ones down here.

366
00:54:48.175 --> 00:54:58.434
They've lost a lot of their kind of be covered, what's left is already protected and that's not the story in the northern part of the county where forest cover might be more vulnerable. Um.

367
00:54:59.010 --> 00:55:11.065
And so, what we did is we tried to develop just a pretty simple model to help predict where our forest making most vulnerable to loss from, from development.

368
00:55:11.094 --> 00:55:23.425
And so, what we did is we took the forest that remain on the landscape, and we categorize it based on its protection status whether or not, it's on a steep slope That might be too steep to develop.

369
00:55:23.724 --> 00:55:26.844
And whether or not, it's on a

370
00:55:27.119 --> 00:55:36.179
Parcel that can be subdivided. Right and so a parcel that has forest and can be subdivided that would be our forest of highest risk of development.

371
00:55:36.864 --> 00:55:46.554
And here's what those data indicate for the breakdown of forest, of the forest that's left in Westchester. So about 20% is protected. These are our low risk categories.

372
00:55:46.554 --> 00:55:57.235
There's about another 15% or so that either can't be subdivided or can't be subdivided and its on a steep slope.

373
00:55:57.235 --> 00:56:08.333
And then at the highest, and this, this is the forest, that's not on a steep slope, and is on a parcel size that can be subdivided. and so about 40% of the forest that remain in

374
00:56:08.333 --> 00:56:15.204
Westchester are in this little model on a high risk of of vulnerability for loss to development.

375
00:56:17.155 --> 00:56:24.894
And just gave you an idea of how well, the simple model performs Here's a little part of Westchester and what it looked like, in 2010.

376
00:56:24.894 --> 00:56:34.795
the red is indicating the area that we've indicated as being at a high risk of development the yellow is at a lower risk of development and then if we fast forward to

377
00:56:37.500 --> 00:56:51.054
Uh, 2021, there was just recently development there and you can see the boundaries of that development, uh, almost perfectly aligned with what we indicated was at high risk. we're still looking at other parts of the county to see how well this performs.

378
00:56:51.054 --> 00:57:02.125
But I think it could be really useful tool, a really simple way to think about where our land is at greatest risk. and then, of course, this has important implications for temperature. Here's our land surface temperature again.

379
00:57:02.125 --> 00:57:11.125
And you can see in 2010 before it was developed, it was this cool patch because it was forest and now we can indicate exactly where that development occurred because that land got much hotter.

380
00:57:16.164 --> 00:57:28.434
And then, so I often get asked what species should I find to species matter? And I say, well, species may matter. and here's just 1 example from 1 study that looks at.

381
00:57:28.710 --> 00:57:33.954
Some of the different topics that we were talking about today, and how they perform relative to 1 another.

382

00:57:33.954 --> 00:57:43.974
So there's carbon sequestration, there's avoided carbon emissions, related to cooling and avoided carbon emissions from heating.

383
00:57:44.275 --> 00:57:52.164
And so the different species are eastern white pine and the blue London plane tree and then 2 trees that we definitely should not

384
00:57:52.440 --> 00:57:56.940
Plant,   a cherry and Callery pear.

385
00:57:56.940 --> 00:58:04.769
And so right off the bat, I just want you to ignore those because we should not be in those species in our area. And.

386
00:58:04.769 --> 00:58:13.525
So, the Eastern, white pine and the London plane tree, they can both perform well,   white pine.

387
00:58:14.155 --> 00:58:26.994
I think this is a little bit of an underestimate of how much carbon they suggest that they can grow quite fast at given the right type of environment.   but the London plane tree, they can get to be huge. We probably have all seen large London plane trees. They do really well in urban environments.

388
00:58:27.235 --> 00:58:34.885
  so all this is to say that different species may matter, but I think there's probably more important things that we would want to consider.

389
00:58:35.130 --> 00:58:46.530
Uh, like, site conditions, how we manage these trees and how we take care of these trees. Those things may be even more important than just the species that we choose to plant.

390
00:58:47.034 --> 00:58:57.025
  and so I also want to point out that there are a lot of other really good species to plant. So this 1 example is just to really highlight some differences that may exist between species.

391
00:58:57.715 --> 00:59:08.364
And so this should not be used as a as a strict guide, and then just to finish up some things we might want to think about using as a guide are planting the right tree in the right location.

392
00:59:08.425 --> 00:59:22.255
so we all are eager to plant the trees that also sequester the most amount of carbon, but it's important to think about where we're planting that tree and okay. We'll sequester a whole lot of carbon, right? These are some of the trees that we have here on the left. Okay. Maples to the trees. They'll get to be large.

393
00:59:22.255 --> 00:59:36.114
They'll store a lot of carbon, but if you plant it near a power line, probably in 30 or 40 years, that tree is going to have to get cut down because it's threatening a powerline. And so I would urge you to think about where you're planting a tree.

394
00:59:36.204 --> 00:59:44.335
And what's the most appropriate tree if there's a power line right away plant a tree that just isn't going to get very tall it'll still provide important ecosystem services.

395
00:59:44.514 --> 00:59:51.923
And you won't have to worry about it being a threat to the, to the grid, or just at risk for getting cut down because it's too close to a powerline.

396
00:59:52.289 --> 00:59:58.019
and then the last thing, is

397
00:59:58.019 --> 01:00:01.619
What policies work.

398
01:00:02.155 --> 01:00:12.744
And so we look at data sets across Westchester, we try to compile a database of communities that had some sort of policy or program related to trees.

399
01:00:12.894 --> 01:00:19.164
So those were different types of tree ordinances that maybe place restrictions on cutting trees down.

400
01:00:19.530 --> 01:00:27.025
Communities that had some sort of a tree planting program and communities, where you had to get some sort of a permit to remove a tree.

401
01:00:27.295 --> 01:00:38.965

And then, we compared the communities that had no program to those that do have a program and looked at how canopy cover has changed in those communities over time. And so, what we found is the thing

402
01:00:38.994 --> 01:00:50.545
That seems to be most effective is a tree planting program. If you're doing things to incentivize planting trees, that will have the biggest impact on canopy cover.

403
01:00:50.574 --> 01:01:00.414
I also want to point out that every community we looked at is losing canopy cover but those with a tree planting program were losing it at a slower rate than the other communities.

404
01:01:01.255 --> 01:01:10.405
There's still a lot of nuances in here and not all of these programs are the same. And so we're limited with how much we can infer from this.

405
01:01:10.525 --> 01:01:25.284
And it's possible that some of these communities with a tree ordinance put one in place, because they were losing a lot of trees and so you're, you're stuck trying to distinguish the chicken from the egg thing. But what seems to be most compelling is that tree planting programs seem to seem to work.

406
01:01:25.559 --> 01:01:34.980
And then also, you know, we can put in these efforts to plant trees, lots of policies that

407
01:01:34.980 --> 01:01:38.034
Create tree planting incentives they're really sexy.

408
01:01:38.275 --> 01:01:50.994
What seems to be less sexy is going through all the hard work of maintaining trees and implementing programs to figure out what the help these trees are, and what you already have on your landscape.

409
01:01:51.204 --> 01:01:55.014
And so I would encourage using a variety of different tools,

410
01:01:55.014 --> 01:02:05.155
whether it's people going out and taking surveys using some easily easy to use remote sensing products or smartphone based apps like this healthy trees,

411
01:02:05.155 --> 01:02:05.965
healthy cities app,

412
01:02:05.994 --> 01:02:07.014
which is free to use.

413
01:02:07.195 --> 01:02:11.125
We use it where I live in Pleasantville as a way to inventory trees.

414
01:02:11.155 --> 01:02:23.425
All of these things are really important in helping communities to figure out what their approach should be for increasing canopy cover and just as important understanding if your policies are even working.

415
01:02:24.775 --> 01:02:35.275
And so, here's just an example of in Pleasantville where we are all the trees that we've mapped already. We have highschool interns doing this every summer. We have our 2nd round starting in just a couple of weeks.

416
01:02:35.489 --> 01:02:45.480
And so I always end with this slide, and I know will do questions at the end. And so, sorry, if I was a few minutes over. But yeah, thank you for, for inviting me.

417
01:02:48.085 --> 01:03:01.014
Thank you so much Andy. I'm gonna go ahead and pass the ball to Millie. Uh, so she can present and I would ask, there are a couple of questions that have come in through the Q and a box.

418
01:03:01.045 --> 01:03:04.795
  if you have additional questions about Andy's presentation, please

419
01:03:05.070 --> 01:03:12.539
Please go ahead and enter them and we will get to questions at the end of the webinar. So Millie go ahead.

420
01:03:13.769 --> 01:03:19.829
Thank you that looks good, but we can't hear you.

421
01:03:30.989 --> 01:03:36.179
Uh, there we go. Okay. Super sorry about that.

422

01:03:36.179 --> 01:03:41.880
No problem thanks so much. Everyone thanks, Andy. That was as always a

423
01:03:41.965 --> 01:03:54.264
Great presentation. My name is Millie Magraw, I work with Westchester County in the Department of environmental planning, and I'm just going to touch a little bit

424
01:03:54.295 --> 01:04:05.545
We don't have a ton of time, but so I'm just gonna touch a little bit on planting Westchester and, what that is and so the purpose of the planting Westchester – well, so, before I do that

425
01:04:05.545 --> 01:04:13.855
Let me just say that Planting Westchester was originally started initially to focus just on trees and it was partially driven by, um.

426
01:04:14.340 --> 01:04:19.409
All the great, uh, research that Andy is doing and so.

427
01:04:19.675 --> 01:04:26.275
One of our main things that we talk about in planting Westchester is trees and I'll show you a little bit about what we're doing with that.

428
01:04:26.304 --> 01:04:26.784
But so,

429
01:04:26.784 --> 01:04:34.074
the purpose of the planting Westchester initiative is to encourage and empower Westchester County residents,

430
01:04:34.074 --> 01:04:34.974
municipalities,

431
01:04:34.974 --> 01:04:35.454
schools,

432
01:04:35.454 --> 01:04:40.224
businesses and other organizations to help promote climate solutions,

433
01:04:40.494 --> 01:04:43.045
restoration of natural resources and,

434
01:04:43.045 --> 01:04:43.375

435
01:04:43.585 --> 01:04:44.155
local food,

436
01:04:44.155 --> 01:04:44.875
security,

437
01:04:45.114 --> 01:04:45.505
through,

438
01:04:45.505 --> 01:04:50.155
growing and maintaining healthy trees and or other plants.

439
01:04:50.184 --> 01:04:52.914
And each of the 9 topic committees listed here,

440
01:04:53.125 --> 01:05:02.244
fall into 1 of those areas and underlying the project are the core principles that Andy touched upon to inclusive,

441
01:05:02.244 --> 01:05:04.135
socially equitable decision,

442
01:05:04.135 --> 01:05:05.844
making community participation,

443
01:05:05.844 --> 01:05:09.264
communication and relationship

444
01:05:09.630 --> 01:05:24.085
Building, and so what I'm gonna do now is, I'm just going to show you, uh, the planting Westchester website is going to be launching within the next couple of weeks. We don't have all of our photos in and there are like, a couple of typos and stuff in

445
01:05:24.085 --> 01:05:37.525
It too. But I'm just going to show you all Just like for a minute or so, kind of give you an idea as to what it's going to look like. And I'll just focus on the tree areas so that you can see all the cool things.

446
01:05:37.800 --> 01:05:42.780
That are there and how

447
01:05:42.780 --> 01:05:46.829
You know, you'll be able to benefit from it.

448
01:05:46.829 --> 01:05:53.550
so I'm hoping.

449
01:05:54.929 --> 01:05:58.559
You can see my screen. Is that true?

450
01:05:58.559 --> 01:06:02.369
Yes, that was good for the planting Westchester.

451
01:06:02.369 --> 01:06:06.929
Yes. Okay. Great. Okay. So this is, um.

452
01:06:06.929 --> 01:06:11.849
The trees screen and so you can see here on the left.

453
01:06:11.849 --> 01:06:22.885
We, go to species in Westchester street trees, species, urban reforestation species, planting techniques.

454
01:06:22.885 --> 01:06:32.155
So, you know how to do bare root, burlap, trees and pots, using structural soil. There's a whole section on

455
01:06:32.454 --> 01:06:34.914
Municipal resources in terms of funding,

456
01:06:34.914 --> 01:06:48.655
and I'm going to go into more detail about that, maintenance, and it's just sort of filled with very carefully curated resources for everyone to use

457
01:06:48.655 --> 01:06:49.855
And so they can

458
01:06:50.159 --> 01:06:55.590

Learn, you know, the best ways of

459
01:06:55.590 --> 01:06:58.679
Of managing growing and

460
01:06:58.679 --> 01:07:04.199
Maintaining trees, so, that should be coming up soon.

461
01:07:04.199 --> 01:07:15.719
And I will, you know, as soon as it does, I will let, Ingrid know. So, if she can send out an email with the link to that

462
01:07:15.719 --> 01:07:21.300
For all of you, so that you can use it and learn from it.

463
01:07:21.300 --> 01:07:26.820
So now just to talk a little bit about

464
01:07:26.820 --> 01:07:40.050
You know, managing your community's trees and, you know, this really fits in with what Andy was talking about and just the importance of being really deliberative about doing this. And, you know, there.

465
01:07:40.050 --> 01:07:46.619
There are, the following are kind of some of the most important ways to best, manage your community’s trees and.

466
01:07:46.619 --> 01:07:55.559
You know, establishing a tree board that's compromised of both local residents, municipal staff, treat professionals.

467
01:07:55.559 --> 01:08:08.309
Is really key, and the board typically helps to formulate the community's tree policies and advises the elected officials and staff on those policies. the board may help with

468
01:08:08.364 --> 01:08:15.474
the actual management of the trees administrative work, they may help with advocacy and promotion.

469
01:08:15.835 --> 01:08:29.935

they may help by developing a list of acceptable, preferably native trees to plant that are good for that particular community. And then, maybe, and, you know, maybe the most important ones- The development of

470
01:08:30.270 --> 01:08:41.579
Of a tree management plan and tree ordinance if those are needed. so, you know, Andy talked a little bit about a tree management plan. So, you know, what is it? It's really.

471
01:08:41.579 --> 01:08:43.765
A tree management plan outlines the,

472
01:08:43.795 --> 01:08:47.574
the long term goals for the management of trees in the community,

473
01:08:48.175 --> 01:08:49.765
the associated budget,

474
01:08:49.854 --> 01:08:53.694
and the strategies that are needed to help realize that vision,

475
01:08:53.994 --> 01:08:57.414
and the plans are going to vary widely by community.

476
01:08:58.255 --> 01:09:04.944
But one of the things that isn't going to really vary by community, is that in order to create a comprehensive plan.

477
01:09:05.340 --> 01:09:12.270
You really need to know what you're working with. And so, you know, Andy talked a little bit about tree inventories.

478
01:09:12.270 --> 01:09:22.800
And you, you really will need to do that. you're going to need to know, like, what is your tree canopy and, you know, what kinds of species do you have? Do you have any

479
01:09:24.444 --> 01:09:33.475
You know, like beech trees that are going to come to the beech leaf disease and that's going to be a problem. Where are your trees located? What's their general health?

480
01:09:33.505 --> 01:09:42.354

what kind of maintenance or management needs are required. so, in order to understand all that, you're going to need to do a tree inventory.

481
01:09:43.824 --> 01:09:56.364
There are a couple different types there's the top down and those work really well, for those communities looking to quantify their total tree canopy cover and how that canopy cover has changed over time.

482
01:09:57.234 --> 01:10:11.064
This approach is great, but it doesn't often provide the sort of the information regarding, you know, the tree size, the species, the health and stuff like that. And so then there's also the bottom-up inventory. Um.

483
01:10:12.479 --> 01:10:19.289
Andy mentioned one and these types of inventories are ideal for those communities that are looking for.

484
01:10:19.734 --> 01:10:29.185
Information about the size of the tree, the species, the health of the trees this approach requires really, you know, much more of a boots on the ground approach.

485
01:10:29.515 --> 01:10:36.385
and so it's time consuming and you know, if you're not using volunteers, it can be expensive.

486
01:10:36.685 --> 01:10:50.454
Some communities just limit this type of inventory to a particular neighborhood, or to trees, you know, just on public land, or just street trees or, you know, however, they want to limit it to what works for them. Um.

487
01:10:51.324 --> 01:11:05.545
Another thing that's good for a community to do is to become a tree city. and that makes the community eligible to receive funding through the Arbor Day foundation and that, you know, if you get funding, then you're able to buy trees and you're able to plant more trees.

488
01:11:05.784 --> 01:11:16.404
So that's a good thing. and in order for a municipality to become a tree city, they have to meet 1 of 4. they have to meet the following 4 criteria. They have to have a tree board.

489
01:11:16.435 --> 01:11:30.324

They have to have a tree ordinance, and we'll discuss that more, they have to have a tree existing tree program with a bunch of at least 2 dollars that's being spent per capita. a lot of communities feel like oh, God, I can't do that.

490
01:11:30.324 --> 01:11:39.744
That's way too much money, but actually they sort of look at what they're currently spending on their tree maintenance and stuff. They're probably already spending that. So it shouldn't be.

491
01:11:40.170 --> 01:11:50.159
a heavy lift, and then finally they just have to observe Arbor day and make a proclamation and that sort of helps with education.

492
01:11:50.159 --> 01:12:00.569
And so other ways of getting money, to facilitate treat planting so other tree funding in addition to the Arbor Day Foundation.

493
01:12:00.569 --> 01:12:06.600
there are several state programs that are offered through the DEC

494
01:12:06.600 --> 01:12:18.420
And then, in addition to that, the New York state urban forestry council has a great website that I will later put in the Q and a, uh, or the chat.

495
01:12:18.420 --> 01:12:32.699
And that the New York urban forester Council, uh, lists up to date grant opportunities at state, federal level state and federal levels as well as through Arbor day. And so that's a really great website.

496
01:12:32.699 --> 01:12:39.270
And then finally, if some property in your community is owned by land trust.

497
01:12:39.270 --> 01:12:49.949
In some instances, the land trust may also provide funding. I know that just recently happened in my community. There's some of it's in the Westchester land trust and

498
01:12:49.949 --> 01:12:54.930
They funded 30 trees for them, which is great. Um.

499
01:12:54.930 --> 01:12:58.829

And then, you know, lastly, a tree ordinance.

500
01:12:58.829 --> 01:13:05.189
  is really an important thing to do as well and so,

501
01:13:05.189 --> 01:13:16.859
You know, tree ordinances, it's, it's an essential tool and it provides a legal authority that communities can use to help protect their existing trees.

502
01:13:16.859 --> 01:13:24.630
And so, you know, what you can do is you can establish

503
01:13:26.364 --> 01:13:28.975
Policies around rules around tree removal,

504
01:13:29.725 --> 01:13:32.965
pruning and permitting processes and,

505
01:13:32.965 --> 01:13:33.265

506
01:13:33.295 --> 01:13:33.505
uh,

507
01:13:33.505 --> 01:13:39.984
parameters for legal versus illegal tree removal on private property by individuals,

508
01:13:39.984 --> 01:13:42.744
utility companies and others.

509
01:13:43.135 --> 01:13:43.795

510
01:13:44.274 --> 01:13:45.564
and so,

511
01:13:45.744 --> 01:13:46.074
you know,

512

01:13:46.074 --> 01:13:48.085
one of the things with a tree ordinance,

513
01:13:48.085 --> 01:13:53.425
you need to identify a tree program manager usually like a municipal forester,

514
01:13:53.425 --> 01:13:58.255
or someone who's responsible for the administration of the ordinance.

515
01:13:58.704 --> 01:13:59.335
Um.

516
01:14:00.899 --> 01:14:12.984
It's a really good idea to have a tree removal replacement component of the tree ordinance such that the removal of non hazardous trees brings with it tree replacement requirements.

517
01:14:12.984 --> 01:14:21.954
And so one of the things you want to consider when developing that is the height and size and type of tree that's being taken down.

518
01:14:22.319 --> 01:14:29.880
You know, do you want to have it be that you have to replace it with 2 trees during, depending upon the size?

519
01:14:29.880 --> 01:14:33.060
In some instances.

520
01:14:33.060 --> 01:14:38.784
They're not going to be able to replace the tree that's being taken down for whatever reasons.

521
01:14:38.784 --> 01:14:48.265
And so you may want to establish a tree fund as part of the tree ordinance that's based, you know, again, on the size, dbh - that it's diameter at breast height.

522
01:14:49.800 --> 01:15:01.619
And so, you know, the amount of money that the, that the individuals put into the fund would be based on the size of the tree, the dbh of the tree. And then you can use that fund to.

523

01:15:01.975 --> 01:15:16.164
Fund future plans, you also need to be able to work out enforcement. This is always tricky and it's going to vary by community. Of course, it's critical though, to make sure you figure this out because like, what's the point of having a tree ordinance

524
01:15:16.164 --> 01:15:20.784
If you can't enforce it, so you have to be able to figure out how

525
01:15:21.180 --> 01:15:25.289
You know, what's a reasonable way of enforcing it.

526
01:15:25.289 --> 01:15:34.979
You need to have an appeal process, just because you'll need an appeal process. And then, lastly, the town of Greenburgh has a really good

527
01:15:34.979 --> 01:15:44.489
Tree ordinance that they passed about a year ago, and I'll put that in the chat as well. The link to that. It's I recommend taking a look at it.

528
01:15:44.489 --> 01:15:56.399
You know, each community, in terms of developing a tree ordinance is going to have different needs and you're gonna have to take into consider different things. So, like, in my community, which is in southern Westchester.

529
01:15:56.399 --> 01:16:00.510
We have an outdated tree ordinance that requires.

530
01:16:00.510 --> 01:16:12.779
Only those residents who live on more than an acre to get a permit to remove a tree. I mean, it's southern Westchester. There aren't a lot of properties that are larger than an acre. Um.

531
01:16:12.779 --> 01:16:25.949
And so, you know, like 1 person, 1, property owner, just a few weeks ago, lives on 3 quarters of an acre and they took down about 30 trees. So, you know, so you really need to kind of, like, think about.

532
01:16:27.000 --> 01:16:30.270
Where you live, if you're living in upstate New York, you know.

533
01:16:30.270 --> 01:16:42.239

It's, it's a lot different than if you're living in southern Westchester. the DEC has a really good website on tree ordinances and what to consider and we'll post that

534
01:16:42.239 --> 01:16:47.369
As well, and then finally, you know.

535
01:16:47.369 --> 01:16:59.130
There are lots of benefits of trees and Andy went through and described a ton of them at the beginning of out of his presentation and throughout it. In fact, um.

536
01:16:59.130 --> 01:17:12.689
And so, you know, it is really important to figure out ways of educating the public about the benefits of trees. And, so you need to kind of think about the different sectors of your community and.

537
01:17:12.689 --> 01:17:21.234
Which ones of those benefits will matter the most to them and then tailor your educational outreach to each of those sectors.

538
01:17:21.595 --> 01:17:29.064
  keep in mind your municipal staff and leaders may also need to be educated. Some of the.

539
01:17:29.425 --> 01:17:35.725
Education things that I like, are, like, you know, tree planting drives, notable tree contests.

540
01:17:35.755 --> 01:17:44.484
I mean, they're all listed here, local and online articles, community, newsletters, think about community newsletters and, like, homeowners associations.

541
01:17:44.880 --> 01:17:48.390
Houses of worship, schools.

542
01:17:48.390 --> 01:18:01.614
  any clubs, those are types of places to put, you know, kind of good informational stuff to, uh, to educate people because that's also always an important thing to do.

543
01:18:01.645 --> 01:18:06.175
Because lots of people don't understand the importance of trees. Um.

544
01:18:06.510 --> 01:18:18.930
And then finally, within planting Westchester phase 2 is going to be working on the county's GIS system and.

545
01:18:18.930 --> 01:18:29.489
Putting in place, a ton of information, but the one thing I do want to mention that will be put into place when we get the, additional data.

546
01:18:29.489 --> 01:18:33.420
From Dr. Reinmann

547
01:18:33.864 --> 01:18:39.114
Is, uh, we're going to be able to put all of his data on the county's system.

548
01:18:39.114 --> 01:18:48.595
And so I'm just going to show you sort of a current GIS system that the county recently developed for the hazard mitigation plan,

549
01:18:48.835 --> 01:18:54.505
just to kind of give you an idea as to what types of things the county is capable of doing.

550
01:18:54.744 --> 01:18:59.965
So, this was just developed for 2022 and so, you know, it talks about all of like these

551
01:19:02.039 --> 01:19:08.250
All of this information, but then over here under mitigation strategy.

552
01:19:08.250 --> 01:19:11.340
It has here I'll go to none

553
01:19:11.340 --> 01:19:18.630
It has a map of Westchester County, and then you can click on any jurisdiction.

554
01:19:18.630 --> 01:19:23.729
  I'll click on Dobbs Ferry, because it's on the water and then.

555
01:19:23.729 --> 01:19:27.479

It will go through and list, sort of all the information.

556
01:19:27.479 --> 01:19:37.555
About that jurisdiction and what their hazard mitigation strategy is and this is the type of thing that I am envisioning that we will be able to do,

557
01:19:37.765 --> 01:19:38.364

558
01:19:38.484 --> 01:19:43.914
pretty soon with the data that Dr Reinmann is going to be providing us and working with him.

559
01:19:44.185 --> 01:19:52.345
and so all of this, too will be available and, you know, it will include things like, the canopy cover.

560
01:19:52.619 --> 01:19:56.880
Uh, it will include areas that have had tree plantings.

561
01:19:56.880 --> 01:20:00.090
and priorities.

562
01:20:00.090 --> 01:20:04.380
Areas for conservation and so.

563
01:20:04.380 --> 01:20:13.920
You know, hopefully that will be out soon and I'll let, Ingrid know about that as well. And you guys can all be emailed with that. So.

564
01:20:13.920 --> 01:20:25.829
I tried to consolidate this, as quickly as possible so that there is time for a Q and a, thank you all so much.

565
01:20:25.829 --> 01:20:30.149
And, that is the end of my presentation.

566
01:20:32.069 --> 01:20:40.800
Thank you, Millie. That was wonderful. That was a really helpful overview of a lot of tools and strategies and, we're.

567

01:20:40.800 --> 01:20:51.810
Looking forward to Andy's data being available. we've actually funded a couple of estuary grant projects for natural resource inventories and, um.

568
01:20:51.810 --> 01:21:00.810
  overlay zoning that would be interested in using this information, in the coming months. So,

569
01:21:00.810 --> 01:21:05.159
I thought it was, uh, you know, it's

570
01:21:05.159 --> 01:21:15.779
Concerning to hear that the decline in canopy cover that's been documented in the county. and I have to say, you know, we looked at.

571
01:21:15.864 --> 01:21:22.854
Larger forest trends over the last 5 years in our recent state of the Hudson report,

572
01:21:22.914 --> 01:21:29.604
and also found that on a regional level there has been a small decline in forest cover,

573
01:21:29.904 --> 01:21:30.564

574
01:21:30.595 --> 01:21:31.375
recently.

575
01:21:31.375 --> 01:21:44.395
So, until recently, forest cover had come slowly been expanding, and it has started to contract a bit. so it's, it's not just Westchester. and that was looking at, forest cover, not canopy cover.

576
01:21:44.395 --> 01:21:53.784
But, I was curious about your finding that the tree planting program was sort of the most effective indicator of

577
01:21:54.060 --> 01:22:00.810
A Strategy to reduce canopy cover loss and what I'm wondering if you have.

578

01:22:00.810 --> 01:22:15.805
Additional thoughts about why that might be, if there are other factors related to having a treat planting program, or, uh, you know, to what extent those programs are, are really, having a big impact on the ground

579
01:22:15.835 --> 01:22:17.994
That would be helping to offset some of these losses.

580
01:22:19.800 --> 01:22:31.109
Yeah, so I don't have a ton of insight into why they work. One of the, the difficulties we have is every municipality that has one of these programs. They look

581
01:22:31.109 --> 01:22:36.685
Different from one another so it's hard to find like the thing that is working across all of them.

582
01:22:37.104 --> 01:22:50.545
so, in Pleasantville, we, we have one that's pretty good where the village will pay for half of the cost of the wholesale cost of the tree itself. And then the village will come and plant the tree for you.

583
01:22:50.545 --> 01:23:02.215
So, for like, 100 bucks, you can have a tree planted in your yard. And the optimist in me likes to think that people cut a tree down because they have to. And so whether or not, there's a policy keeping you from doing that.

584
01:23:02.215 --> 01:23:14.515
You know, if there's like a need, people will cut it down, but incentivizing people to add a tree May get people to plant trees that wouldn't have otherwise and that's like me being an optimist. I don't have the data to support that.

585
01:23:14.515 --> 01:23:24.774
But that might be a reason why those sorts of efforts work and again I'm sorry Millie, go ahead. No, no, no, I just wanted to piggyback on that because,

586
01:23:25.979 --> 01:23:29.489
In other communities that I'm aware of, they have.

587
01:23:29.489 --> 01:23:40.470

Tree planting programs where the municipality will pay for the full cost of the tree planted all free and no one uses it. And it's an educational thing. No one knows about it.

588
01:23:40.470 --> 01:23:43.770
So, I think that they go hand in hand.

589
01:23:45.175 --> 01:23:58.194
Yeah, the education outreach piece is key like, pleasant. It's a small village and people make use of it, but there's a lot of people that have no idea that, that the village will do that. Even people that would be highly amenable. So, planting trees don't know about it.

590
01:23:58.890 --> 01:24:04.050
Right. That's yeah that's fascinating.

591
01:24:04.050 --> 01:24:16.020
Yeah, I guess related to that, I actually served on a local board and my municipality that oversee tree law. So we were frequently in a position of having to make recommendations.

592
01:24:16.020 --> 01:24:29.460
Related to tree removal or replacement and so there was a question in the, uh, about which varieties are more beneficial, to plant a tree varieties in, in terms of canopy cover. I know you.

593
01:24:29.460 --> 01:24:38.489
Sort of started getting it at Andy. I was also curious, Millie, whether this new website will have a lot of guidance related to that. And, um.

594
01:24:38.489 --> 01:24:43.409
That could be beneficial, not just for communities in Westchester to refer to, but potentially.

595
01:24:43.409 --> 01:24:47.220
Beyond Westchester.

596
01:24:47.635 --> 01:25:02.484
Yes, yes, there will be a whole section sort of devoted to ways to increase tree canopy cover and also, you know, as I mentioned earlier maintaining what currently.

597
01:25:02.850 --> 01:25:12.689

Exists as well, one of the main, uh, a large component, too of planting. Westchester is sort of a

598
01:25:12.689 --> 01:25:18.000
emphasis on native trees as well, just.

599
01:25:18.000 --> 01:25:21.600
You know, they last the longest, and have Eco benefits.

600
01:25:21.600 --> 01:25:26.369
As well, so benefits that they offer as well.

601
01:25:29.729 --> 01:25:39.930
Thanks. Yeah, I think so. So, the answer is, yes, you're, you know, that There'll be guidance about beneficial species to plant.

602
01:25:39.930 --> 01:25:50.039
And Andy, is that a future direction for your work? Is that something you're looking at? I was just actually having conversation over dinner with folks about this last night.

603
01:25:50.039 --> 01:25:57.239
You know what a beneficial tree is depends on what you want to get out of the tree right? Like, so.

604
01:25:57.685 --> 01:26:12.625
Probably, we ask our trees to store carbon. We ask them to call up our communities. We ask them to help ameliorate issues with air quality. And that might not always be the same treat and we want that tree to be resilient to future climate change. And so I think.

605
01:26:13.194 --> 01:26:21.534
We really need to think a lot about where we're putting a tree and what we wanted to do in that location and then think about what is the best tree.

606
01:26:22.045 --> 01:26:35.784
And so, like 1 of my 5 year sort of horizon research goals is to kind of develop these, like, tree planting topologies, where you can, like, score trees based on their strengths and those different attributes.

607
01:26:35.784 --> 01:26:50.664
And we find that some trees actually release compounds that themselves are totally benign, but can react with tailpipe pollutants to create smog

and the atmosphere. And so we need to think about where we're planning to entry what we want the tree to do.

608
01:26:50.694 --> 01:26:53.154
And there's not like any one right answer.

609
01:26:55.914 --> 01:27:05.154
That's far more, research and detail and Andy, you'll have to give me that information. So we can put it on Westchester site, you know, --as soon as we get it.

610
01:27:07.404 --> 01:27:12.864
Yeah, there is you know, sort of on the site as it exists currently

611
01:27:12.895 --> 01:27:25.795
  you know, there was like a street tree planting section and a resource station section and so that is sort of addressed a little bit for the right type of tree in those locations. And it, it does really differ.

612
01:27:26.130 --> 01:27:33.359
Yeah, and there is a whole other section with planting Westchester about planting by water and so there's a lot of trees.

613
01:27:33.359 --> 01:27:39.840
You know, and it depends on the water if it salt water, you know, if it's on an or river or whatever. So that's.

614
01:27:39.840 --> 01:27:43.020
There's a whole section devoted to those types of trees, too.

615
01:27:43.020 --> 01:27:49.020
Yeah, there's a question getting at the value of

616
01:27:49.020 --> 01:27:53.069
Trees in terms of storm, water management and

617
01:27:53.069 --> 01:27:56.369
  that trees are

618
01:27:56.369 --> 01:28:06.630
  you know, helping to hold in soil under increasingly heavy storms and flooding. is that also a consideration that you've looked at?

619
01:28:07.739 --> 01:28:17.159
Yes, yeah, very much. I mean, particularly in planting by water and dealing with erosion types of issues. but yeah.

620
01:28:17.159 --> 01:28:23.789
Yeah, I would like, ideally, at some point soon, I would love to add like a green infrastructure section.

621
01:28:23.789 --> 01:28:27.329
To the program cause it's so important.

622
01:28:28.015 --> 01:28:39.595
Definitely, and I appreciate and Andy has answered a lot of questions in the Q and a, maybe I'll ask one final question because we're almost at the end.

623
01:28:39.625 --> 01:28:54.564
  whether you have suggestions for how to overcome resistance from DPWs to having street trees, because of the, perhaps the inconvenience they pose for snow, clearing sidewalk, maintenance, et cetera.

624
01:28:54.984 --> 01:28:55.524
Um.

625
01:28:55.770 --> 01:28:59.819
I assume this is may be an issue in many communities.

626
01:29:02.579 --> 01:29:07.739
I think that that's really about education and.

627
01:29:07.739 --> 01:29:19.770
Talking to them about their concerns and addressing their concerns with them and helping them realize that in the long run, it's going to be better for the entire community.

628
01:29:21.000 --> 01:29:28.050
Yeah, I mean, I think I think it is a big issue. What I'm discovering in some communities is that yeah, when you do that.

629
01:29:28.050 --> 01:29:34.170
they are open to learning, but it depends on the makeup of the elected officials.

630
01:29:34.170 --> 01:29:37.770
And if it's something that they stand behind, and it really is.

631
01:29:37.770 --> 01:29:41.699
The more people in the community have those conversations.

632
01:29:41.699 --> 01:29:45.300
With their elected officials, and with the DPW, the

633
01:29:45.300 --> 01:29:51.270
Better off, you're going to get the more likely it is. You're going to get them to change their minds.

634
01:29:52.380 --> 01:30:00.744
So, I'll just, like, also again, reiterate the importance of the education.

635
01:30:00.744 --> 01:30:10.255
They're very quick to come through and cut down trees and often prune trees inappropriately that then sets the stage for them to fall over in the future because they kind of become lopsided.

636
01:30:11.005 --> 01:30:23.095
But I think it's, it's easy forest to see the problems with trees when they fall down and take out a powerline. And the benefits of them are a little bit more subtle, like keeping things. Cool. And reducing our electricity costs.

637
01:30:23.095 --> 01:30:30.175
And I think they're reducing the electricity costs because of its monetary component is something that probably resonates with everybody.

638
01:30:30.954 --> 01:30:45.805
And so I think the more we can do on an outreach front to give trees, I guess, like a more fair and balanced assessment in the public eye. For what they do, and then come back to putting the right trees in the right places. Right?

639
01:30:45.805 --> 01:30:58.135
Like trees become problems because we have the wrong tree in the wrong place and we can, we can have our trees and our electricity at the same time. And our snow plowing at the same time, if we just are mindful of all these different things.

640
01:30:58.500 --> 01:31:01.920
Thanks that's
641
01:31:01.920 --> 01:31:02.694
So important,

642
01:31:02.725 --> 01:31:03.175

643
01:31:03.414 --> 01:31:03.595
well,

644
01:31:03.595 --> 01:31:05.875
thank you both so much for joining us,

645
01:31:06.024 --> 01:31:06.324

646
01:31:06.324 --> 01:31:09.505
for those of you who had questions

647
01:31:09.595 --> 01:31:09.864
uh,

648
01:31:10.015 --> 01:31:11.784
and would like to follow up with,

649
01:31:12.055 --> 01:31:12.295
uh,

650
01:31:12.324 --> 01:31:12.685
Dr,

651
01:31:12.685 --> 01:31:15.145
Reinmann or Millie Magraw

652
01:31:15.234 --> 01:31:20.005
we will share their contact information in our follow up with you after the webinar,

653
01:31:20.185 --> 01:31:20.484

654
01:31:20.484 --> 01:31:21.595
we hope that the.

655
01:31:21.925 --> 01:31:35.814
Link to the recording should be available within a few days, and we'll send an email out, then, anybody needing training credits for today's webinar you should receive an email from Webex in the next few minutes confirming your attendance.

656
01:31:36.175 --> 01:31:46.975
And, uh, we'll hope you, you'll join us again for another conservation and land use webinar. so I'll, we'll, uh, we'll share links to the different resources that were mentioned today.

657
01:31:46.975 --> 01:31:53.244
And we will also follow up later on once the planting Westchester website is up and running.

658
01:31:53.550 --> 01:31:58.198
To share that resource so thank you. Thank you so much.

659
01:31:58.198 --> 01:32:02.189
Thank you for the invite. Thank you. Everybody. Bye. Bye.

660
01:32:02.189 --> 01:32:04.708
Have a good afternoon. Thanks. Bye.