Attendees

Sophie Waterman, CRC
Rebecca Hammer, Chair
Julie Mawhorter, USFS
Katie Brownson, USFS
Terry Lasher, VDOF
Patti Webb, DNREC
Kesha Braunskill, DE
Taryn Davidson, DE
Cassie Davis, NYDEC
Lydia Brinkley
Matt Keefer, PA

Rebecca Lauver
Kalaia Tripeaux
Nicole Faraguna
Anne Hairston-Strang, MD
Iris Allen, MD DNR
Nancy Sonti
Sally Claggett, USFS
Paul Emmart, MD
Robert Corletta
Kasey Yturralde

Rosey Santerre, WV DOF
Matt Poirot, VA DOF
Caitlin Verdu
Kesha Braunskill, DE
Taryn Davidson, DE
Cassie Davis, NYDEC
Lydia Brinkley
Rosey Santerre, WV DOF
Frank Rodgers, WV
Ryan Davis, PA

Welcome and Introductions, *Rebecca Hanmer, Chair*

Urban Forests of the BOS-WASH Megalopolis

Vincent D'Amico and Tara Tammell gave presentations on urban forests within the Boston Washington Megalopolis.

A FRAMEwork for Research and Monitoring, *Vince D'Amico, USFS*

Vince came to the meeting to talk about the FRAME which is a network of long-term research sites that have been created to host collaborative research in small forests. The overarching goal of the FRAME is to help answer questions about the modern forests (forests as they are today). There is an emphasis on preservation and remediation after invasion of invasive species. The FRAME is focused on temperate deciduous forests in the Boston-Washington Megalopolis. Vince then ran through some of the history of forests in the megalopolis noting that most of the area was forested prior to colonization. The forests then started to get removed. About 150 years ago two important things happened: reforestation and an increase in impervious surface. Forestation started to happen on farmland, as farmland was moving west. Due to farms moving we see forests being grown in a relatively patchy way on relatively small areas.

A vast majority of the temperate deciduous forests in the megalopolis are under 20 hectares. These small forests are crucial as they allow people who live in densely populated areas to experience a natural area. Some of these forests have large proximity footprints, meaning they are the closest patch of forest

for a relatively large area. These forested areas are not at threat of being taken away as people tend to want to protect these pockets of nature.

= FRAME looks at 62 different forests throughout the megalopolis and one forest in NC. Each forest has a 3.5 hectare plot that is technically the FRAME site. What they do for each site is set a grid out on the forest plots starting at one edge of the plot. Then a random selection of sampling points occurs. At each of these active points data is collected (land variables, tree canopy, understory, soil chemistry, woody plants, arthropods, mollusks, reptiles and amphibians, birds, ETC). This data allows for the FRAME to build different layers of information.

They have found that most of the tree canopy in the forests are of native species, while most of the understory is nonnative. This shows us where the work needs to be done, and that understories need vegetation restoration. Lastly Vince looked at some of the conditions that impact what grows in the understory. There is a strong negative correlation with the number of nonnative plants and amount of leaf litter at the active points. The more leaf litter there was at a site the less likely there was to be a lot of nonnative plant stems.

Management to Maintain Biodiversity, *Tara Trammell, USFS*

Tara gave a presentation on how urban conditions influence plant communities and how this in turn influences internal ecosystem functions of these small forests. Looking at these influences will help answer management questions and how we might bolster or improve the diversity and function of these forests. We know that these small forests are located in densely populated areas and are impacted by both biotic and abiotic conditions. Some of those conditions include the urban heat island effect, greater concentrations of CO_2, and greater nitrogen deposition. Cities also pose as points of entry to invasive and nonnative plants that can cause shifts in the ecosystem.

Tara's lab looked at forests on an urbanization gradient. Urbanization was determined by the percentage of impervious surfaces surrounding each forest patch. We might expect that more urbanization would lead to more nonnative species, but in fact there was not a correlation. Understanding that they are not correlated tells us a lot about plant communities and how resilient they can be.

Tara then went on to talk about the difference between the canopy and understory. The tree canopy is mostly native, as Vince mentioned in his presentation, and that most trees in urban areas are native. It was found that tree richness increased with the urbanization gradient, but this study did not find a relationship with invasion. Both nonnative and native trees increased with urbanization. This shows that native species can thrive in urban forests.

Tara then moved on to talk about the understory. Understory diversity increases with both invasion and urbanization so we can see that there were more species found with more invasion within a specific site and more urbanization surrounding that site. Tara's lab then looked at sites that are rural with and without invasion and urban with and without invasion. They wanted to access the function of the two ecosystems (rural vs urban, invaded vs non invaded).

Tara's lab then looked at the leaf litter inputs (production) vs the leaf litter decay rates (decomposition). Uninvaded forests have greater leaf litter than rural invaded forests, and urban invaded has more leaf litter compared to rural invaded. This can be explained by the fact that the rural invaded sites had lower production and high rates of decay than the other site types. Rural invaded sites also have lower total

soil C compared to other sites. Native species richness increased with urbanization, so urban forests may offset invasion impacts and can store more carbon.

Tara then talked about an active management experiment done by one of Tara's PHD students. The goal was to eliminate the plant invaders in the understory and restore the native plants. The student chose three forests with low, medium, and high invasion intensity. There was a mechanical removal of all nonnative invasive plants in the forest understory in the 20 × 20 m plots the student was working in. There were several treatments that the student looked out to see what would help the most for the forest. There was a control, just a removal, a removal and use of native seed mix, and removal + seed mix + carbon rich soil amendment (mulched stems). The main takeaway was that if nothing is done the invasive species remained the most abundant, and the native species became less abundant. When it came to the treatments the forests saw an increase in native species richness and increases in the floristic quality index. The responses were varied and dependent on each forest and how much invasion was occurring there.

Discussion on the Urban Forests of the BOS-WASH Megalopolis

Sally Claggett USFS: When looking at the "most people live near small forests" graph does that size include the non-forested areas of Central Park?

Vince D'Amico: No, the analysis that we did was to fit the definition of forest. Which means the forest had to be larger than a hectare and it had to be a naturally wooded area.

Anne Hairston Strang MD: Are you parsing out public versus private are you making that distinction here?

Vince D'Amico: No.

Anne Hairston Strang MD: What is the role of public transportation? Big cities like NYC have public transportation which provides access, via public transportation, to places like central park in a way that you may not have to some other types of resources in other places.

Vince D'Amico: That is an excellent point! There are so many things that both enhance or interfere with your ability to be in one of these forest natural areas and people aren't like rainfall, it's not like a natural watershed. People have all kinds of enhanced ability to move to go from one place to another.

Sally Claggett, USFS: how does FRAME data compare to what urban FIA collects?

Nancy Sonti: Urban FIA collects plot data across all land uses (similar to i-Tree Eco) so there are a few forested plots in each city, but most plots are non-forest land uses. Also, FRAME includes lots of other ecological info like wildlife and understory veg. So, they are complementary datasets to understand all trees in the city.

Anne Hairston-Strang MD: Why there would be slower decay in the urban environment when you've got more CO2 and you've got higher temperatures?

Tara Trammell: Sometimes there are more heavy metals, which can actually slow microbial activity in the soil. There are also studies that have looked at decomposition by comparing the quality of the leaf material coming into the forest soil, and so, even with the same species when they looked at urban and rural, those urban leaves have more compounds in them that make them tougher to withstand some of

the harsher conditions that can be present in urban areas, and so the the type of leaf quality decay can be slower.

Judy Okay: It seems like what you're getting is regeneration of what's there in your urban forest but you're not getting recruitment of new species that the evenness is not increasing or…?

Tara Trammel: Yes, we didn't see a lot of patterns.

Anne Hairston-Strang MD: Do you feel like there's any differences and soil and site conditions between your low and your high invasion sites and it's more of a product of its context and land use history?

Tara Trammell: We tried to hold some of that similar but it's hard to do so in these forests. So, yes some of what we found might be legacies but what's difficult to tease apart, for example, our low invasion site is also a site that had a more recent canopy closure.

Frank Rodgers, Cacapon Inst, WV: Is this concept developed from scratch?

Vince D'Amico: Greg Shriver who's an ornithologist and I kind of put this framework together to answer questions about forest habitat and birds in more urbanized areas and from there we found a lot of interest that people had in adding other organisms to it. Then once Tara came on board it we really had somebody who was an expert in analyzing and dealing with the soil data.

Outcome Attainability Team Update, *Sally Claggett, USFS*

Sally gave an update on riparian forest buffers. We are way below our target goals, so the Chesapeake Bay program leadership decided that we needed to have a high level workshop in the spring of 2022. Sally then talked about the draft workshop agenda, which feedback is wanted. This riparian forest buffer workshop is going to be taken to the Management Board, where it will be asked for them to sponsor this workshop.

The beginning of the workshop will give a little retrospective and then we're going to hear from each State. Each state will report on their buffer plans. Sally noted that we need to get more people involved, particularly the water quality folks, as this topic is important for many. Sally hopes that the presenter is not a forester so we can include more people in the conversation. Sally noted that the workshop could bring in someone from the EPA that can go into detail about how federal dollars can go towards forest buffers. There is a lot of work to be done on this workshop and the hope is to have it in March or April, no date is set yet.

Discussion

Patti Webb: Having each state speak about their plans is great… but we have to keep in mind we're going to need to focus on the people that are going to be able to speak on a state level for that.

Nicole Faraguna: Semantics matter, and so this to me sounds like it's a strategic discussion more than a workshop. I think if you're interested in bringing people to the table, who are those decision makers, we might want to frame it from that perspective. Will there be decision makers from the Federal agency level as well? So when we talk about those federal dollars and how they're allocated and if we have recommendations or questions will there be people who will be able to answer those questions as well.

Sally Claggett USFS: Yes, there will be federal involvement

Cassie Davis, NYSDEC: who's the audience for this work group going to be?

Sally Claggett, USFS: the audience will be the higher level folks who need to make things happen.

Matt Keefer: Thinking about the audiences and the expectations: what are the expectations and what are the expected outcomes? I'm thinking and looking at the proposed agenda here rather than the outcome attainability process, so maybe we should further define what the bay program expects. Looking further down at the breakouts we should better define some outcomes to be a little bit more clear. For example, some specific recommendations or ways to highlight or elevate the conversation action items to either the management board or people like Nicole in the other states and jurisdictions.

Sally Claggett, USFS : We do have a little bit more refined agenda, but we have also been getting a lot of thoughts that have not been incorporated yet, so I will do my best to incorporate your excellent thoughts. I do think that as far as outcomes there are some specific things that we're looking for both in the third presentations but also overall and from the breakout groups. We will definitely want to get that kind of detail in an agenda format, and I know we're expecting Sherry Witt to help us quite a bit with that. She's very good at this type of work, she's our best facilitator.

Rebecca Hanmer: I also want to add to the issue of connections that we need to be making that we've talked about but haven't really made yet, for example: The role of riparian forest buffers in climate resiliency coming up more strongly and also, we've talked for a while about trying to get a handle on emergency response or flood management. These are just examples of connections.

Update on 2020 Progress Data, *Katie Brownson, USFS*

The new version of CAST is going to be coming out, likely in January, and when the new version comes out, the numbers are going to change. This is because we did get that extension of the credit duration and the lifespan to 15 years. We could be gaining in the realm of several hundred acres of BMPs. Katie walked through the agriculture riparian forest buffers numbers, this data included the stream side with exclusion fencing and the forest buffers for cropland (but not the narrow forest buffers). We are still seeing negative progress in some States according to CAST, which just highlights the continued issue that we're seeing with verification driving some of our numbers down. Some states are getting pretty close to their WIP goals and other States still have a long way to go with very ambitious goals there for 2025.

Next agricultural tree planting was discussed. Pennsylvania has already reached their WIP goal for agricultural tree planting!

Katie ran through the next slides quickly as we were short on time. She extended the welcome to dig in and let her know if you have any questions about the numbers and noted that she can kind of go through them in more detail, for your state.

Katie noted that Urban riparian forest buffers have some ambitious goals for some of the States that are not on track to reach by 2025.

Katie noted that we did see a drop in urban forest planting in Maryland in 2020. This could have been a potential verification issue.

For forest harvesting we did see a kind of a blip in 2019 for Maryland where there weren't any acres of forest harvesting reported, but that seems to have been fixed in the 2020 data.

Katie then moved into talking about forest buffer outcome, which is more complicated. We had to modify our methodology for calculating progress on this due to that verification issue. We don't want to be reporting negative miles because we want to actually get at the number of new miles being added every year. We have to get two years of custom no expiration scenarios run in CAST.. We have a 2020 no expiration scenario and a 2019 no expiration scenario. We then calculate the difference between those to calculate the miles added, and these numbers aren't going to match exactly with what you reported in your state's official progress. We're not concerned about the lack of matching, but if there's something that seems dramatically off, you should let Katie know, so we can look into it.

The other thing we've been trying to do this year is update the average widths for buffers. Maryland and New York have provided updated averages. It is really important that it is an average value, and for it to count as a buffer it needs to be a minimum of 35 feet. So the average should be quite a bit above that and the credit assumes 100 foot average. If we're starting to see that we're getting below that, we should have a broader conversation. Based on the average widths from 2017 and the updated widths from Maryland and New York, we added 162.5 miles in 2020. So the good news is that it is about double what we did the year before, using the same method. The bad news is that that's nowhere near 900 miles or the much larger number of miles that need to be added every year to meet the goals in the WIPs.

Discussion:

Judy Okay: There were years where the credit program was not operable and various states over longevity and I would like to see those years have an asterisk by them on your reporting, because that is not the fault of anyone, except the federal government and the States. This is not an issue from forestry people.

Katie Brownson, USFS: This is something we can think about

Matt Keefer: Could we add an image or some kind of graphic that explains why we sometimes talk about acres and sometimes talk about miles.

Terry Lasher: We should also add something about a level of funding that corresponds to this because I think what we'll find is that the amount of money that is contributed to cost share programs correlates pretty strongly to whether or not a state got close to a 900 mile per year target. It would just be an interesting piece to add. I could be wrong, but it kind of seems like riparian buffer establishment practices are tightly tied to the amount of funding that is contributed.

Frank Rodgers, Cacapon Inst, WV: Just to follow on what Matt said about these numbers are very large, it would be important to get across how many miles are there, total and of that, how many are buffered now versus not buffered so that this 2500 miles a year number gets into perspective.

Katie Brownson, USFS: I think we'll be able to do that, once we get the new final land use data and which is actually the next topic on the agenda. I think that final version two is coming out in late February, so we might be able to have some of that ready if we do the workshop and late April, for example, or later. Just to have an idea of you know how much do we actually even have left to buffer and how close are we

to that goal of having 70% of the riparian area forested. We haven't really looked at that in a while because we haven't had updated data.

Bay-wide Forestry Assessment, *Katie Brownson, USFS*

While we did not have time to talk about this project in the meeting Katie sent a follow up email on the topic:

We are starting some initial brainstorming on our goals and process for conducting a bay wide assessment of forests and tree canopy using the new land use and land use change data (final "version 2" data expected late February 2022). The overall goal will likely be to summarize the current state of forests/TC, how forests/TC have changed, and potential implications for water quality, other ecosystem services, and management/policy. The USFS will take the lead with coordinating and writing but **we are looking for representatives from each state to participate, at least in an advisory capacity. Please let Katie know if you are interested in participating**. This would likely involve meeting no more than 1 time/month (starting early next year) and providing feedback on organization, text and analyses.