Response to reviewer comments

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# GENERAL COMMENTS

Acknowledge people

***The following text has been added to the top of the “methods”: “Growing Shade developed out of a collaboration between the Metropolitan Council, The Nature Conservancy, and Tree Trust. We thank members of the advisory group for initial consultations and thank all individuals who provided feedback during the development phase of this project.”***

Link to temperature is not clear

***A section on “temperature” has been added to the reports.***

# KAREN REVIEW

Consider including the rest of the state

***Data was processed for the entire state of Minnesota, as well as Pierce and St.Croix counties in Wisconsin (part of the Minneapolis-St.Paul-Bloomington statistical area). Using smaller geographies (block groups rather than tracts) was an essential improvement which made this possible. However, I found several other gaps in data (i.e., river and lake geometry) which would need to be resolved, as well as several key questions which would need to be answered before I would be comfortable publishing data for the rest of the state.***

***Here are the considerations:***

***1) Adding the entirety of the state slows the application substantially; there are ways to address this but it will likely take several months before we have an answer (see response to Marya’s comment about application performance).***

***2) Agricultural or forested lands dominate the majority of greater MN. These land uses have different purposes/challenges/sustainability goals than land that is largely residential or facing growing development pressure, and this application is not well suited to address those other issues. We could focus on areas that meet a certain population density threshold within the key statistical areas (Twin Cities, St. Cloud, Mankato, Rochester, La Crosse, Duluth, Grand Forks, maybe the micropolitan areas too – Brainerd, Bemidji, Faribault, etc. )***

# UST REVIEW

Colors, etc

# MARYA REVIEW

Consider slimming “Other Resources” to just “Resources”

***The tab name has been shortened to “Resources.” The title of the page has been changed to a longer version, “External Resources” to better differentiate the types of resources shown on this tab (because the “home” and “mapping tool” tabs within this tool are resources as well).***

Using the section links at the top of the Resources page, when I click on “Methods” it jumps to “External Resources” instead of to “Methods”

***Formatting has been updated on the resources tab, there are no longer section links. The spacing between sections has also been reduced to make it easier for users to browse and find relevant topics and/or subtopics.***

Please add new resource categories:

***New resource categories have been added. Minor rearranging and condensing of categories have also occurred.***

I wonder if the narrative opening for the Resources page could be more succinct. Here’s an idea: “Growing Shade is a unique tool that highlights stories and offers users the ability to consider how they prioritize this important work of growing and maintaining our urban tree canopy. This tool is under active development, so please check back or contact us for more details. (Provide contact info). There are many additional tools and resources that may be useful to you.  We’ve compiled the list below as a starting point. Finally, when planning and prioritizing urban forestry work, tools and data cannot substitute for stakeholder engagement to understand community-specific concerns or opportunities. The on-the-ground knowledge of residents and the expertise of local practitioners are valuable sources of information.”

***The opening text of the “resources” tab has been updated using a modification of the suggested language.***

I also have some thoughts on other aspects of the tool if that’s ok:

* The site takes some time to load. Are there ways to make it faster or is there just so much content?

***Extraneous content has been removed from the application and back-end processing has been optimized. These processes have improved the speed of the application.***

***More importantly, the MetCouncil’s subscription to a professional version of Shinyapps.io (the hosting server for the application) is not current, and once that is remedied there may be other options available to further increase the speed and tune the*** [***app for performance***](https://www.rstudio.com/resources/rstudioconf-2018/scaling-shiny/)***. Additionally, we could consider connecting this web application to the Council’s servers – this would take some of the load off the shinyapps.io server. One of our team members is exploring this option (although no answers will be available for several months).***

* On the Home page, there’s a lot of space between sections as you scroll. Can that be tightened up at all?

***Content on the Home page has been completed, and the formatting should be improved.***

* On the Home page, the tabs just below the title (Welcome, Using the tool, etc) is in pretty small font. Can that be enlarged a little and/or bolded?

***This is a setting that cannot be changed from the ArcGIS StoryMap interface.***

* I think the point you make on the Other Resources page that data cannot substitute for community engagement is SO important. Can you also include that language (or something like it) at the bottom of the Welcome section?

***This sentence has been added to the bottom of the welcome screen: “Stakeholder engagement remains essential to understand community-specific concerns and opportunities for enhancing, preserving, and maintaining the tree canopy.”***

* In the “Using the tool” section, you outline the two parts of the tool: “Learn and listen” and the “Mapping tool” but then the next white section is just called “Learn” – do you want it to be “Learn and listen” for consistency?

***Thank you for pointing out the lack of consistency – the text has been simplified to be “stories” throughout the home page.***

* In the “Learn” section, I love that you outline the stories that will be highlighted below. I wonder if you can be clear that this section is about stories even more by adding “through stories” at the end of the first sentence.

***Done, thank you for the suggestion.***

# KRYSTEN REVIEW

**Structure / IA Overall**

Unfortunately, I think the StoryMap embedded in the Shiny tool is somehow less than the sum of its parts.

***Thank you for your concern about the layout choices, and it may be helpful to have some context. The inclusion of stories is a key component that our stakeholders want, and are looking for. Several iterations of formats were tested, and our stakeholders had a clear preference for the StoryMap layout. For this reason, we have a strong preference to use the StoryMap layout.***

***Additionally, user feedback, questions, and patterns of use which have come from other stand-alone StoryMaps and ShinyApps inform our decision to embed the StoryMap inside the ShinyApp for this project.***

1. ***Climate Vulnerability Assessment tools – which have separate mapping and narrative components – are not being used to their full potential by users. Questions and comments from users expose the fact that users miss parts of the tool because they have not taken the time to read the narrative (for instance overlaying tree canopy with temperatures), while others miss the utility of viewing and considering hyper-local temperatures because they have not explored the mapping tool. By including the narrative and mapping tool within the same application, we hope to make the full capabilities and components of this project abundantly obvious to users.***
2. ***Census 2020 Application – which is a stand alone ShinyApp – has a “bounce rate” higher than what I’d like. This indicates that some users are accessing the landing page (text only) and not interacting with the application further. By having an interactive StoryMap be the “landing page” of this Growing Shade Project rather than a text-heavy and non-interactive component, we hope to increase the time which users spend interacting with the tool.***

***Please find our responses to specific comments below:***

* Visually, the “frame” that the Shiny app holds around the visuals of the StoryMap takes me out of the immersive high-impact visuals that are the strength of that platform. There is also too much white space in some places and the toggling of the text on the right/left makes scrolling and scanning the content much harder.

***The iframe container for the StoryMap has been adjusted, and the images now fill the entire width of the screen.***

* Functionally, I see only two areas where the StoryMap is adding features
  + Navigation bar across the top
  + Three slider maps (two of which don’t require/solicit interactivity, the last/third of canopy + heat is in the tool)

**Thank you for pointing out the use of the slider maps. Specific to the land surface temperature (heat) and tree canopy overlay, we prefer to keep the connection between to two very obvious. Indeed, information about tree canopy does lie within the extreme heat tool, but two key advancements are being made by separating it here**

**- users can’t find the tree canopy; based on trainings, etc**

**- the tree canopy is 2015 vintage in the tool, here we are using 2021 (eab has significantly changed things, etc)**

* Storytelling, there is too much ground being covered here – I wasn’t sure if there are other text changes planned, but I have a document with edits available if you’d like. Will mention one thing: Please consider “Priority/ies” instead of “prioritization”. It’s a use/utilization thing – why use a 10-cent word when 5 will do?
* **Something about “tree canopy prioritization” already being a forestry word**

No issues with the \*structure of the Shiny app; it is aligned with our general approach at this time. Though I would rename the “Other Resources” tab to “Resources & Methods”.

**StoryMap**

* As-is, the StoryMap is a potpourri of instruction, issues, examples – it just doesn’t “build” as an explanatory/coherent piece. Its framing this in our eyes (deliverables of a project) versus user-centered way.
* Really, I would pull almost all of this content – especially the case studies – out of this tool and bring them into a web page, along with project background. Instead, focus the first tab of the Shiny app on How to Use, by hosting the video and user guide there/upfront. This is the heftiest suggestion.

* If you stick with StoryMap embed:
  + Remove the image and title from the Shiny app; just start with the StoryMap, and add the title/image section there. This will smooth out the information hierarchy.  
    ***The cover design of the StoryMap has been updated from the “minimal” to the “side-by-side” layout. Unfortunately, the cover page cannot be completely removed from StoryMap content, although we hope the new layout has an improved flow.***
  + In addition, strongly suggest a parallel structure to use across examples/stories. Maybe a “slide show” format on each, or something that allows both the images and text to shine. Right now it looks more like a web page, which is why I think it should just be one.

***Thank you for pushing us to harness the full power of the StoryMap platform.***

* + Remove “Using the tool” and “Learn” sections. There isn’t enough detail or demo-value here to be helpful. Retain & move some of the text to neighboring sections.
    - Optional: if you can’t live with removing this completely, consider adding a section AT THE END, that pulls in the user guide video directly, links to the user guide.

***The “Using the tool” section has been shortened and combined with the “Welcome” section. We hope this provides enough information to orient users to the two key deliverables of this project (stories and custom mapping) which were strongly advocated for by our advisory group.***

***See the comment below for information on the summary map (previously the “learn” section).***

* + - The “Learn” section is particularly tough; I completely missed the legend the first time (oddly at bottom left corner!) There is also no information on what the different concepts in the Prioritization Layer are at that point, so I cannot make sense of it.

***Thank you for pointing out that we had not fully introduced the intersections of the tree canopy with these four key priority layers (environmental justice, climate change, conservation, and public health). We have moved this summary map (previously titled “learn”) to the “taking action” section at the end of the StoryMap. We agree that the new location makes the information more understandable since the context has been provided.***

***Additionally, we have completed the ‘Taking Action’ section, which contains a high-level overview of the Mapping Tool.***

***Finally, we added a “FAQ” tab, which also references the video and text user guide. We hope the redundancy in linking to the user guides improves how users will be able to interact with this project.***

Some specific suggestions… 

* + Frogtown Green/all case studies. I understand why this labeled “Equity” at the top (character limits of these titles) but it comes across disconnected unless/until you read through the content here, which not everyone will do. Consider, “Priority: Equity” or some similar schema that better connects these.

* + The slider maps between Saint Paul neighborhoods requires a lot from a user – you have to open the legends to understand what you’re seeing and the formatting of the legend units is lacking (in GIS). Also slightly confusing because the tree data is at block? Block groups? And the demographic data at census tract level, so the “slider” motion is not a 1:1, which is its strength. Lastly, there isn’t much reason to “interact” here, the tool tip should be removed.  
    ***Thank you for reminding us that this slider map was not yet complete. The data has been updated to show block groups, and the popups have been configured (popups are off for neighborhoods, but on for the tree canopy cover and race to allow users to view more detail about those two variables).***
  + There is a compelling paragraph that essentially unpacks/summarizes the connection to equity; it ticks through several data points the correlate with low tree canopy (low income, residents of color, etc.) I suggest four static maps of those characteristics + a tree canopy; perhaps really zoomed into Frogtown or city-wide with a highlight on Frogtown, all combined into one image and have that paragraph as a scrolling text / sidecar. This will \***highlight**\* the connection to equity, something that I can easily miss/scroll past now.

* + At the very least, writing a clearer caption here could help. Rather than “*Swipe to see the relationship between tree canopy and race.”*just tell people (again) what that relationship is, “In Saint Paul’s communities of color (shown right), the tree canopy is often thin/thinner (shown left).” More descriptive, less instructive – the latter should be intuitive. Try to format the legend units/text, and do not use acronyms like “BIPOC” – spell it out.

***Done.***

* + The “Using the Mapping Tool” paragraph and image feel tacked on here. A section, as described above, that has the video, and maybe a “slide” on each of the priority layers and how to explore those in the tool with full-sized images would be more effective. I can’t even read the text in this image.

***We have relocated this paragraph and image to the now completed “Taking action” section. Our initial intention was to use the Frogtown story to introduce users to the concepts present in the mapping tool (namely how different interacting issues are aggregated into priority layers). However, we now believe the restructuring allows for an easier reading experience. On the image caption, we added the text “click to zoom” to help users understand how to make the image bigger.***

* Lower Phalen Creek Project (& throughout StoryMap) -  text on left. Do not toggle!
  + This is where I’m really missing visual impact. I cannot read the text in the diagram.  
    ***The number of images used in this story have been reduced, and now all images fit on the right hand side of the screen. The text “click to zoom” has been added to the diagram (which comes from our story subject, Keeli Siyaka).***
* Washington Conservation District
  + Again, sliders could be large, static side-by-sides.
  + Cannot read the small diagrams, even when I click on them.
  + Linked text should be formatted to denote that (beyond an outline). We use same technique as on the website (blue, bolder + underline)

* Brooklyn Center Community Schools
  + The tree canopy + heat map feels tacked on here; only connecting with a single sentence about the playground temp. This section could be reworked to connect with the “Climate Change” priority?

***We have more clearly connected the paragraph about temperature with the map by including the words “interact with map below.” The full paragraph is as follow:***

***“Planting trees also helps empower students to improve their communities. For instance, adding greenspace and shade trees can help lower summer air temperatures by up to 10 degrees. The differences between surface temperatures can be even more extreme; differences of up to 40 degrees exist across the Twin Cities region (interact with map below).”***

* Tree Trust
  + Again, small images with illegible text.

***We have asked our story subject, Karen Zumach, for recommendations about a better image. We agree that this is not the best diagram to convey the multiple benefits from trees. Either using a recommended image or by creating our own, this image will be replaced before January 20.***

* + The lede is buried here; lots of interest in EAB and other pest data at scale; could we better highlight this?

***Thank you for the interest in EAB and pest data – we agree that it highlights several interesting components about management, maintenance, and equity. We do anticipate the messaging of the pest component to change slightly to navigate a changed political landscape related to pest management, and will follow the recommendation of our story subject, expert forester, and co-project lead extraordinaire (Karen Zumach)!***

* Taking Action
  + I wouldn’t describe this in terms of “deliverables of a project” (!!) I think this section needs some work – actions beyond making a custom report from our tool. What other TA is available? More levers of change or remove section.

***Thank you for pointing out the lack of consistency in language – the text has been changed to refer to “key components”. This language (“components”) is also used in the welcome section.***

***Further, the “taking action” section has been completed. After reading the “taking action” section, users should be able to confidently interact with the “mapping tool” tab.***

**Mapping Tool**

* Suggest renaming this tap; “Build a Tree Canopy Report” or some such. It’s more than mapping!  
  ***Thank you for the suggestion for more precise language. We have received other comments to shorten tab names, and feel that “mapping tool” is both accurate and concise. The name “mapping tool” also aligns more closely with the language used by our advisory group and foresters with whom we have consulted.***
* Strongly suggest including the descriptions of the Prioritization be included right in the tool, not just in the “info” pop-up.

***Several options have been explored to address this comment. Currently, we have landed on a) streamlining the popup, b) taking a more didactic approach to explaining the priority layers inside the StoryMap’s “taking action” section, and c) including this information inside a “FAQ” tab. We hope that users will find the addition of these elements useful to their understanding of the priority layers.***

***Unfortunately, the most elegant solutions are not accessible for users who may use either screen readers (hovering action on tooltips does not work) or keyboard-navigation (“action links” for popups are not compatible with radio button options). Please do note that the current “question mark” popup is compatible with screen readers and keyboard navigation. We will continue to monitor development of potential solutions which could be implemented into this shiny framework at a later time.***

* In the priority pop-up, use a symbol – not the word “included” and sort by the option that has the longest list. This is hard to read as-is.

***The priority pop-up has been streamlined to only include a description of each priority layer preset. Detailed information about which variables are included inside each preset can be found inside the Methods tab. Re-arranging this information better aligns the layout of our tool with the precedence set by other prioritization tools (using detailed methodology inside separate section), and helps facilitate a streamlined user experience.***

* The Custom Report section could benefit from some help/hierarchy of info; the select a tract/map vs select city or neighborhood is a little clunky; maybe not much can be done here. Under “neighborhoods” … clarify that only Minneapolis and Saint Paul neighborhoods are included.

***The geographic areas have been re-ordered from largest to smallest geographic areas. Further, the instructions to select from a dropdown menu or select an area from the map have been repositioned to more logical areas (as the dropdown titles themselves). We have clarified that only Minneapolis and St. Paul neighborhoods are included.***

* However, I think two buttons are totally lost/floating here, and one should come at the \***bottom**\* of the report, so you understand that THIS is what you’re downloading. Also, the data download; what I think has worked really well is the html-tagged table that Liz baked into Metro Rent Trends… you see what you’re going to get/data before you download it (+ its web accessible). I would make the Download Data its own tab within the Shiny App, include that table + download option there. If you want to include a link to that over here, great!

***The download data buttons have been moved to the bottom of the report. While we appreciate the suggestion to include a data table inside the application itself, doing so significantly adds to the data processing time. Further, the data download needs to be responsive to user input (the priority variables among others), and we feel that disconnecting the data from the customization options could confuse users.***

* Growing Shade report

* + Remove all (errant) colons!

***Done***

* + I understand there was a debate about this in the census app; but I think the box-whisker plot is just tough/overkill. Hard to interpret (y’all wrote a explanatory info pop-up, so you do understand that?) Can we please please rethink this (everywhere)?  A simple numeric ranking alongside a chart of actual values would be much quicker to understand – too much erroneous info compared to the essential piece (I think users want to know the actual value; THEN the context.)

Diagram

Description automatically generated

***Thank you for the suggestion to***

* Here again, so confused. Drop this chart, go with table you have but also label the priority + data points. Include a clear explanation of what these score mean (don’t leave this in the info pop up).

Chart

Description automatically generated

* Equity section
  + Same comments I offered on slides a while back; no vertical text, I’d add 10-20% more to your Y axis for some breathing room (values creep very close to top); no acronyms, us the actual dollar values, don’t make folks do the math on thousands. Include sources with a year (ACS?). Remove A & B. Have axis lines.
    - “Share of tree canopy by median household income” as the header, for example.
  + Would really prefer to see % of specific race/ethnicity groups based on user selection versus group all POC together. We also have several income measures that folks may want to choose from versus median income. Equity can mean letting users drive more of this sub-analysis.
* Rename “threats” ? – that is what they are! But something more direct, “Pests, Biodiversity, Other”.. For a second I thought there was a SWOT analysis in the mix.

* Same Q about thinking about binning Low/Med/High priority values in the map and stepping those colors.

***Thank you for this suggestion to simplify the interpretation of the map, however we feel that binning the priority scores in the map oversimplifies the data and could lead to users making inaccurate conclusions. The distance between priority scores is meaningful and should be reflected in the full range of colors. The difference between a priority score of 8 and a priority score of 10 is just as meaningful and important (although both could be classified as “high priority”) as the difference between a priority score of 8 and 6 (although they might be classified as high and medium, respectively).***

***As an example, the variable of “race, % Indigenous” reveals several “high” priority areas and many “low” priority areas but few “medium” priority areas. Conversely, the “lifetime cancer risk from air toxics” variable is more evenly distributed with many “low,” “medium,” and “high” priority areas. If we were to bin these variables (and others) into low/medium/high categories, we would be forced to have the top 1/3 of data be “high”, the middle 1/3 be “medium” and the bottom 1/3 be “low” (by virtue of the mapping options available to us) – this would work okay for the air quality but work poorly for the race category.***

* MUST add a source/footnote to bottom of report in the app, something like “This data was provided by The Growing Shade project, a collaboration of XYZ. Data sources and methodology available at X. Data are current as of (timestamp).”

* At the bottom of map, I would include a dynamic caption (based on what is being shown) and a text + image that points out that little layer button and what is in there. Very easy to miss this.

* Lastly (WILL IT EVER END) Will the html report spit out something I can see before downloading? Will the content be accessible?

***The html report is fully accessible (alternative text is used for all images and figures). At this current moment, we cannot similarly make downloadable pdfs or word documents accessible in the same way.***

***We appreciated the suggestion of relocating the download data/report buttons to the end of the in-application report. The rearranging serves to inform users that the data contained within the in-application report is also what will be downloaded. We heard feedback from our advisory group that sharing analyses and reports was a desirable function missing from several tools, and the downloadable report (which can be printed, emailed, etc.) is our response to those concerns.***