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JUST WACO WATERS

*HOW SHOULD OUR COMMUNITIES
MEET FUTURE WATER CHALLENGES AND
PROMOTE CLIMATE RESILIENCE?*



Baylor University

Developing a community forum for the Waco/McLennan County community to understand their collective values on topics of water and the role it plays in their lives.

PITCIF Report
February 1, 2021

Mayborn
MUSEUM

CRASR
Center for Reservoir & Aquatic Systems Research

Just Waco Waters

Community Innovation Forum

PITCIF Report

Community Profile

The Waco/McLennan county population sits at 256,623 residents. Of this number, 79.9% are classified as White, 26.7% are Hispanic and 14.9% are African American. Urban population makes up 76.65% of the over quarter of a million residents and 23.35% live in rural areas. The county's per capita income is \$41,254 with 18.9% of the population living in poverty. The land area of the county is 1037.1 square miles and there are 23.1 square miles of water area within the greater Waco area and McLennan County.

Topic

The topic for *Just Waco Waters* was co-created by water experts and the community at large (see later sections of this report). After much collaboration, the topic *How Should Our Communities Meet Future Water Challenges and Promote Climate Resilience?* was chosen.

Societal Issues

Ethical - Waco and McLennan County benefitted from this public forum by receiving knowledge and “ownership” of our community's water issues. Through education, engagement, and technology-sharing the community learned that there are commonalities relevant to all cultures and that all voices are needed to add to the narrative of our community on this topic.

Our forum addressed the public interest technology subject area of environment, as it pertains to water in our community. However, issues of water and how it is allocated and managed in communities by definition touched on other subject areas such as justice and equity issues. Water in all communities is issued and managed by multiple stakeholders and user groups, including a myriad of human and non-human uses; these user groups often present conflicting demands in terms of both quantity and quality of water needed. The forum addressed community attitudes toward ethical distribution and access to water supplies.

Economic – Tourism in Waco has only recently become an issue to be addressed by more entities than merely the hotels and museums. Tourism businesses such as river side paddle boating, breweries, river tours, planners of triathlons, etc., have renewed interest in the “Waters of Waco” (Brazos River, the Bosque Rivers, and Lake Waco). The implications of our topic for businesses such as these are extremely relevant to the bottom line of their business plans and the continuation for the ripple-effect of tourism in our city.

Social – Our Community Forum, specifically designed and facilitated to educate our community on water issues, engaged in discussions, and generated tangible public benefits, advancing the public interest in applying technological resources that will support social justice, scientific research, and benefit our community by encouraging input from all communities in our city. Open to the general public, our target audience for this forum included city officials, representatives of community and cultural organizations, county and state water officials, and large and diverse groups of community constituents. With this audience, we hosted a diverse, representative group of citizens that gave their input on our socio-scientific questions and help shape the future of water issues in their community.

The Mayborn Museum was an ideal site for hosting a forum centered on water issues and provided a “neutral safe space” –a different dynamic than stakeholder meetings conducted by a governmental entity, or a scientific seminar hosted within the University.

Environmental – On a local to global scale, water is inextricably linked to critical social issues such as energy use, health and human development, poverty, food scarcity, and environmental degradation. But when it comes to water issues, different water users may place a higher or lower value on different aspects of water, and most community water bodies have multiple water user groups. For instance, Lake Waco is a major source of drinking water for our community and the City of Waco may be most interested in water quality as it relates to the ability to treat and provide safe drinking water. However, the reservoir was built for flood control, so the US Army Corps of Engineers may be most interested how to safely hold flood waters to prevent downstream impacts. The average citizen may be most interested in recreation on the lake and concerned about harmful algae blooms. Pecan farmers downstream may be more concerned about water quantity than water quality and want to make sure the dam is releasing enough water for them to have it at the time that they need to irrigate their crops. Our project sought to select a water topic of interest to the community and ensure as many different voices as possible are at the table.

Societal Question

The community was surveyed and asked to rank the following forum topic options. The third option was overwhelmingly chosen by our community as a topic they felt to be the most important water issue in our community.

- Protecting healthy wildlife habitats and aquatic environments while promoting economic development dependent on water in our community.
- Ensuring the consideration of the water needs and realities for small towns, rural and outlying areas in our community as well as the expansion of the Greater Waco Metropolitan area.
- **Responsible water management and community actions toward climate resilience and climate impacts on future water quality and availability.**
- Encouraging local government leaders and developers to include nature trails and other amenities to promote Eco-Tourism in our community, in addition to dining, shopping and entertainment opportunities that are now being developed

Target Audience

Our audience included all interested citizens in the greater Waco area including small towns and unincorporated areas in McLennan County. We invited participation by the general public and all those concerned with the management of water resources in our community. These included government entities (Army Corp of Engineers, City of Waco Water Department, Brazos River Authority, Texas Park and Wildlife Department), educational organizations (Baylor University, McLennan College, Prosper Waco), local businesses and industries (CenTex African American Chamber of Commerce, CenTex Hispanic Chamber of Commerce, Downtown Waco Inc., other tourist businesses – recreation companies, breweries, river tour companies, sporting group planners), and other community organizations (Master Naturalists and other environmentally focused volunteer organizations, Grass Roots, Caritas).

Experts (scientific and technical aspects)

Thirty-three experts from various sectors (summarized in the table below) were sent an initial survey to scope water issues in our community. Twenty-nine responses were received and resulted in the options identified in the societal questions section.

Sector	Organization	Number surveyed
Academia	Baylor University Water research center and Science Departments	9
Agriculture	World Hunger Relief Farm, Waco Downtown Farmer’s Market, Texas Agrilife Extension, Texas Farm Bureau	4
Government	City of Waco, US Army Corps of Engineers, Texas Parks and Wildlife Department, Texas Commission on Environmental Quality, Brazos River Authority	11
Business	Waco Paddle Company	1
Community Volunteers	Heart of Texas Master Naturalist- Water Specialists	4
Non-Profits	Zoo, Museum, Sustainability Board, Keep Waco Beautiful	4

Stakeholders

We identified our community stakeholders as all McLennan County residents, recreation business owners, environmental groups as well as other organizations who added input through surveys and interviews.

Forum Design Strategy

Our topic selection included two separate surveys, individual interviews and a forum design workshop to co-create our topic with our stakeholders, which include our water experts and professionals as well as community leaders and members. We developed ways to gather information

from our experts in the field and use those general topic headings to offer four topics to the general community to learn which one the community feels were most vital to their lives.

Forum Design Workshop

The Forum Design Workshop utilized our relationships with the water experts to develop a focus within the topic of *“Responsible water management and community actions toward climate resilience and climate impacts on future water quality and availability.”* The design workshop used the online format (Zoom) and included breakout sessions for small group discussions. (See Appendix A)

Forum Date, Platform and Format

The forum was scheduled for September 10, 2020, 4:00 – 6:00 pm and because of feedback in our surveys was developed into a synchronous format. Almost 39% of those surveyed showed that respondents would participate or most likely participate if given the option of an online real-time interaction with speakers and other participants (ex. Video chats, Zoom, etc.). We planned a virtual Zoom presentation by notable speaker, Vernon K. Walker with CREW climate group and virtual tabling event with information from stakeholder organizations.

Forum Content Development

Developing the content of the forum led to a title, *Just Waco Waters: How Should Our Communities Meet Future Water Challenges and Promote Climate Resilience?* which helped drive the program content. We contacted and secured our introductory speaker, Mayor of Waco, Kyle Deaver, for a live virtual welcome at the beginning of the program and our keynote speaker, Rev. Vernon K. Walker, with the community organization, C.R.E.W, for a live virtual presentation at the end of the program. Tabling presenters were enlisted to highlight their organizations to participants. A promotions plan was produced, and community partners were asked to help with outreach to their constituents to register for the forum as participants.

Formative Evaluation

Evaluation of the forum was ongoing during the formative stages. We surveyed specific stakeholders on forum design, forum content, forum deliberation methods, etc. This information was analyzed and discussed, and we adjusted where necessary.

Pivot with a capital "P". Projects worldwide were affected by the onset of COVID-19. What our project looked like in the planning stage in late March are very different that the forum we actually had in the middle of September. However, we noted several positive impacts of COVID –19 on our community forum as we evaluated it in its forming stages.

- We were given the opportunity to reimagine the entire project. To put our creativity out there along with adjusting our expectations on number of participants and how the forum would actually look. One way was to develop a synchronous format that would work to meet our goals for the project while regulations and guidelines for public safety were in place.

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- Our co-creation of our topic with our stakeholders was less intrusive on them, the virtual meetings were better attended, and communication more active which we believe led to a topic that truly reflected the water issues most important to our community members.
 - Because we no longer needed the fixtures of an in-person forum (tables, cloths, coffee, providing lunch for attendees), we were able to channel some of the funds into other areas that helped gather more information from our community than a single forum might have.
 - One of these areas was our asynchronous platform, justwacowaters.consider.it, which was instrumental in gathering those community voices who could not attend the virtual forum or did not hear about the project until after the forum took place.

Forum Facilitator Recruitment & Training

We recruited forum facilitators from museum staff and community partner connections. These facilitators were trained and certified for forum specifics through Baylor University's Public Deliberation Initiative. We conducted several technology checks and run throughs for our facilitators before the actual forum.

Forum Participant Recruitment

We enlisted targeted recruitment aiming for a diversified group of participants. We utilized museum community partners and their constituents for a more inclusion and diverse participant pool. Initial contact of participants was through email, social media platforms and personal invitations. (4-6 weeks prior to forum) Both community experts and community partner organizations provided contact lists from their constituents and pushed out information on their marketing platforms. With assistance from community partners, we sent reminders and conducted heavy recruitment for underrepresented audiences in our community. (1-2 weeks prior to forum)

Forum Event Design

Our team enlisted technical experts for program virtual design and set up. The forum was hosted on the Zoom platform. Participants were divided into groups and took part in small group breakout sessions for a time of more personal interaction with community members.

Forum Agenda

The forum agenda was set and sent out a few days prior to the forum so that all participants and speakers would have the information they needed. (see Appendix B)

Forum Budget

The budget for the fellowship award of \$7000 was amended several times in the course of the planning process. Monies that were originally set aside for physical aspects of a forum were diverted to technical costs for producing a virtual forum and developing our asynchronous platform on *consider.it*.

Forum Recruitment and Participation

We leaned heavily on the Mayborn Museum's relationships with our community partnerships to promote our forum and to help recruit the diversity that we were wanting especially in discussing the issue of water equity and disproportionate information on climate resilience issues. To help facilitate our forum we enlisted staff from the Mayborn Museum as well as from our community partners.

The Baylor University Public Deliberation Initiative (Kettering Foundation) helped train and certify our facilitators. For the virtual forum we used the bright blue virtual backgrounds to designate our facilitators so that in the breakout sessions participants could easily identify them. The PDI training will benefit us in future forums that the museum will host.

We were thrilled that all participants who registered came to the forum and added a great deal to all aspects of the forum. Of course, we had visions of a forum like those we have all seen before – much like the organizers of this Conference imagined as well – that participants would be seated at round tables with cloths and served coffee and lunch. So, what we thought turned into what we got – video

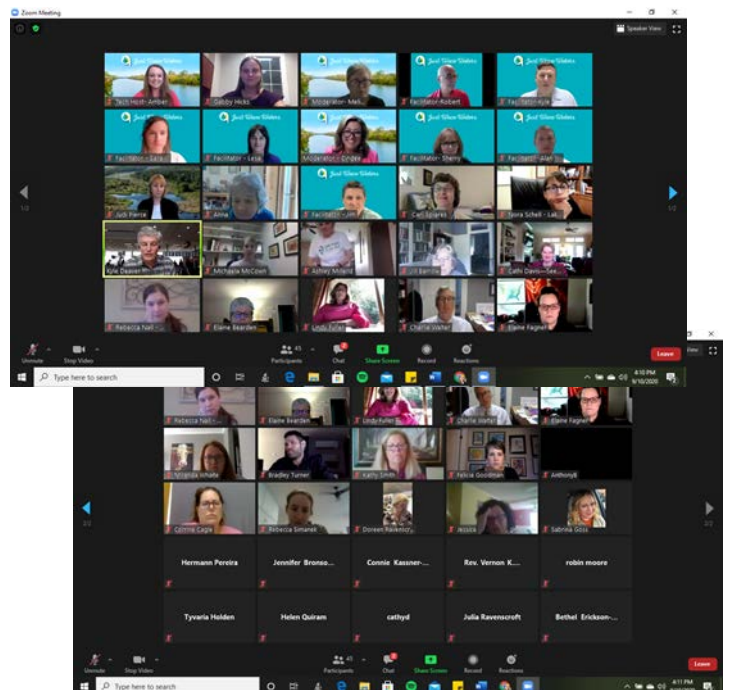
screens with small squares of faces (some with their video off) participating in discussions and dialogues about our community's climate resilience and water equity.

However, there were several goals for the forum that were still realized even in this adapted format:

- Interaction with diverse community members
- Break out discussion groups
- Learn how our community is reacting to water issues.
- Safe environment to share ideas and opinions.

We were still able to conduct small group discussion in virtual breakout rooms, participants learned how our community is now reacting to water issues, we were able to interact. with a diverse group of community members, and the virtual forum still provided a safe environment for participants to share their ideas and opinions.

What we thought....What we got



Forum Participant Guide

The forum participant guide was written and formatted so that participants could easily see the options that they would be discussing and reporting out on. (see Appendix C)

Quantitative Participation Results

Recruiting community members to participate in Just Waco Waters in the middle of a global pandemic was challenging. Participant numbers in the different phases of the project varied by design (we wanted more participants to take the community survey than to participate in the forum design meeting) and also likely reflected the time commitment required (5 minutes to complete the community survey versus a few hours on-line for the forum). The figure below summarizes overall participation; some individuals participated in multiple phases of the project, so the true number was somewhat less than 290. (see Appendix D, Figure 1)

The majority of participants self-identified as community members, partners, or volunteers. Additionally, participation by zip code in the project showed that Just Waco Waters achieved a fair representation of McLennan County demographics (data not shown). (see Appendix D, Figure 2)

Participant Surveys

Our post forum survey was used to collect demographic information from our participants as well as to gather some qualitative comments. One of the questions on the survey was **“What did you learn from participating in this forum?”** On this question we were trying to discern what information on the topics of water did the participant see as valuable. (see Appendix E, Figure 1)

Another question asked, **“What did you learn from other participants during this forum?”** This question was two-fold. First, we wanted the information on topics that were discussed in their breakout sessions and secondly, we wanted the participants to realize that they DID learn something from their fellow participants through discussion and dialogue. When asked this question, the top two responses were importance and impact of education and of local and community involvement. We WERE happy to see that participants also learned about water issues and community efforts as well as noticing the enthusiasm toward water issues and our collective concern. (see Appendix E, Figure 2)

When asked **“What did you value about your participation in this forum?”**, we were happy to see that one half of the participants valued the diverse community setting. Being exposed to new information and insight on our community’s conservation and community efforts was valued by almost one third of our group. This feedback is more about participation in the forum in the general sense. However, it gives us great feedback on the facilitation of the forum and what is valued by participants of forums on any subject. (see Appendix E, Figure 3)

Reports and notes from the breakout sessions revealed that without question the participants believe that Education is the key to community action regarding climate resilience and water equity in our community.

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- "People support what they understand"
 - "Ways we can prioritize and adapt as a society"
 - "Communicate programs already in place and available options"
 - "School and camps to educate children"
 - "Engage and create experiences with nature"

Data Analysis and Amplification

Facilitator notes and break out group comments were gathered and compiled into categories where the common threads of discussion could be seen. Analysis was focused on the options that were discussed in the breakout groups as well as the level of involvement by participants and the amount of freedom the participants felt in sharing their values and ideas.

An action plan ("next steps") document was created that provides the "results", outlining the participants' option choices along with their input on future plans for climate resilience actions in which the community should engage.

The information gathered at the forum was disseminated to target communities and audiences in these ways:

- Presentation for Sustainable Waco Conference on October 22, 2020 in which we reported on the forum, focusing on the community members' input and the water experts' involvement in the program.
- Online site *consider.it* is a live reflection of community water values and gives information on results from previous participants with the site.
- Final report will be submitted to Mayor's office and the Waco City Council.
- Link to final report will be emailed to all emails associated with this forum. Those who attended the forum as well as those who participated in other ways.
- Distributed through Mayborn Museum media platforms and community partner platforms.

Summative Evaluation

A Qualtrics survey was sent to participants immediately after forum to receive feedback on their thoughts of the logistics of the forum, the topic, as well as gathering demographic information on those who participated. The data we receive, and the evaluations will determine the action plan ("next steps") document.

Just Waco Waters on-line asynchronous forum participation and results

Feedback from our initial community survey indicated that people were more likely to participate in an asynchronous forum rather than a live on-line forum. To accommodate this, we worked with *consider.it* to create *justwacowater.consider.it*. On this site, users could interact with the same options and action for managing water in the future in our community that were used in the live Zoom forum. They could also interact with each other and enter new ideas about water and climate resilience. Following the live forum, videos from featured speakers and community organizations were added so that users who could not attend the synchronous forum could still participate. The forum was launched the first week of September and participation through the

middle of November was: 35 unique users, 92 points and comments made by users, and 357 opinions expressed.

Forum Tasks and Timeline

A smartsheet project management document was an ongoing source for goals, tasks, and measurable outcomes for the PITCIF project. Due dates and assignments are noted on the smartsheet along with attached information for each task.

<https://app.smartsheet.com/sheets/h692gvW4xFXr68hxVg7CwGGggqc3G9xc6hGVpfH1?view=grid>

Forum Partnerships Developed

Partner	Description	Role of Partner
Baylor Public Deliberation Initiative (PDI)	https://www.baylor.edu/pdi/	Train Forum Facilitators
Brazos River Authority	https://brazos.org/	Community Org Presenter at Forum
City of Waco Solid Waste Services	https://www.waco-texas.com/	Community Org Presenter at Forum
Cameron Park Zoo	https://www.cameronparkzoo.com/	Community Org Presenter at Forum
Heart of Texas Master Naturalists	https://txmn.tamu.edu/	Community Org Presenter at Forum
Lake Waco Wetlands	https://www.waco-texas.com/	Community Org Presenter at Forum
McLennan Community College Sustainability	https://www.mclennan.edu/index.html	Community Org Presenter at Forum
Keep Waco Beautiful	https://keepwacobeautiful.com/	Community Org Presenter at Forum

Forum Outreach Conducted

Activity	Audience	Number of Participants	Contact hours per participant
Forum Design Meeting	Stakeholders/experts	23	1
Justwacowaters.consider.it	Everyone in Waco	29	Estimate: 0.5 hr.
Stakeholders survey	Stakeholders/experts	25	Estimate: 0.25 hr.
Forum Evaluation	Forum Participants	27	Estimate: 0.20 hr.
Just Waco Waters Forum	Everyone in Waco	47	2
Community Survey	Everyone in Waco	144	Estimate: 0.10 hr.
Act Locally Waco Blog	Everyone in Waco	Unknown: 3,000 subscribers	Estimate: 0.10 hr.
Waco Trib Letter to the Editor	Everyone in Waco	Unknown:31,000 circulation	Estimate: 0.10 hr.

Appendix A: Forum Design Workshop Agenda

Forum Design Workshop Agenda July 17, 2020			
Phase	Timing	Details	Facilitator Notes
Welcome	5 minutes	<ul style="list-style-type: none"> Set guidance for how the technology will be used and share tips for effective virtual communication 	
Introduction & Overview of Project	10 minutes	<ul style="list-style-type: none"> Introduce the purpose of the forum and the goals of the workshop Participants introduce themselves and how they are involved in Waco Waters 	Goal: Make sure everyone to understand the project and is familiar with each other's work and how they fit into the larger landscape of Waco Waters.
Breakout Session 1	10 minutes	<ul style="list-style-type: none"> Critical Content Facilitator guides group in discussion 	Question 1: What water management and community actions are feasible for the Waco community to promote climate resilience?
Share Out	5 minutes	<ul style="list-style-type: none"> Facilitators share groups input from Question 1 	
Breakout Session 2	10 minutes	<ul style="list-style-type: none"> Community Action and Empowerment Facilitator guides group discussion 	Question 2: What are some specific, actionable things we can do to maximize the chances of the forum being used as a springboard for action, decision-making, or change in our community?
Share Out	5 minutes	<ul style="list-style-type: none"> Facilitators share groups input from Question 2 	
Wrap-Up and Next Steps	10 minutes	<ul style="list-style-type: none"> Decide on next steps, additional meetings, other people we should talk to (snowball) 	Describe concrete ways to keep the momentum going.

Appendix B: Forum Agenda

Just Waco Waters Community Forum Agenda			
September 10, 2020			
4:00-6:00 pm			
Phase	Timing	Details	Facilitator Notes
Pre-Forum	45 minutes before start	<ul style="list-style-type: none"> Facilitators meet to prepare and receive last minute instructions 	Last minute questions or comments from facilitators.
Pre-Forum	10 minutes before start	<ul style="list-style-type: none"> Participants are admitted into Zoom Use a real-time poll in Zoom 	Host will verbally welcome participants every 2-3 minutes.
Welcome	5 minutes	<ul style="list-style-type: none"> Welcome Set guidance for how the technology will be used and share tips for effective virtual communication 	Amber will share guidelines
Welcome from Waco Mayor	10 minutes	<ul style="list-style-type: none"> Address by Waco Mayor Kyle Deaver 	Cindee will introduce
Introduction of Forum	5 minutes	<ul style="list-style-type: none"> Introduce the purpose of the forum and the goals of the workshop 	Cindee Goal is to make sure everyone is familiar with the work and how they fit into the larger landscape of this dialogue.
Introduction of Content	5 minutes	<ul style="list-style-type: none"> Introduce topic and content for dialogue 	Melissa
Break Out Session 1	20 minutes	<ul style="list-style-type: none"> Short reflections from each person on how they have interacted with climate impact and resilience as part of their work or how they have interacted/supported climate impact projects as part of their work. Consider options for responsible and equitable water management and combined community actions toward climate resilience and climate impacts on future water quality and availability. <ol style="list-style-type: none"> Protect the Health and Safety of People and Communities Work with Nature to Create Sustainable Water Systems Make Practical Economic Decisions about Water Resources 	
Brief Break	10 minutes	<ul style="list-style-type: none"> 	Provide music and countdown for return
Return	5 minutes	<ul style="list-style-type: none"> Return to plenary group 	
Break Out Session 2	20 minutes	<ul style="list-style-type: none"> Engage in placemat activity Share a few different scenarios to prompt folks in the conversation to think about how various community entities could further support specific climate impact issue projects in Waco. Use a real-time poll in Zoom 	<i>(may delete his section)</i>

Break Out Session 2	20 minutes	<ul style="list-style-type: none"> Engage in placemat activity Share a few different scenarios to prompt folks in the conversation to think about how various community entities could further support specific climate impact issue projects in Waco. Use a real-time poll in Zoom 	<i>(may delete his section)</i>
Report Out	10 minutes	<ul style="list-style-type: none"> Designated group member reports: <ul style="list-style-type: none"> Option choice of their group One action that can be taken in the next two years 	
Wrap-Up	5 minutes	<ul style="list-style-type: none"> Decide on next steps, dissemination of forum information 	Describe concrete ways to keep the momentum going.
Keynote Speaker	15 minutes	<ul style="list-style-type: none"> Address by keynote speaker, Rev. Vernon Walker, C.R.E.W. 	Melissa will introduce
Tabling Event	10 minutes	<ul style="list-style-type: none"> Water experts/organizations water will present ways they are to provide education and equitable outcomes to climate impact. 	Presented in "lightening round" format.
Evaluation & Poll	5 minutes	<ul style="list-style-type: none"> Email survey in follow-up also provide in chat window Use a real-time poll in Zoom 	
End	5 minutes	<ul style="list-style-type: none"> Thank participants and tabling people. Inform audience where and when information will be disseminated 	
	118 minutes		

Appendix C: Forum Participant Guide

Just Waco Waters How Should Our Communities Meet Future Water Challenges and Promote Climate Resilience?

Background

Waco and the suburbs and rural areas in McLennan County, TX are home to about 250,000 people. Our tap water comes from water sources such as Lake Waco and the Trinity Aquifer. Visitors contribute to our tourist economy and may experience the Brazos River downtown. Manufacturing and agriculture are both strong economic sectors for Greater Waco and depend on water.

Future Challenges

Many organizations are involved in planning to make sure that all water users in our community have water. Population growth is expected to continue. Changes in the timing and intensity of precipitation events, flooding, droughts and extreme heat are likely to be a part of future climate conditions. We may experience changes in water quantity and quality, as well as declining water infrastructure (such as dams, pipes, and treatment facilities). Climate impacts are not fair and are not felt equally by all people. Children, older adults, low-income communities and some communities of color may be affected the most. The global COVID-19 pandemic has highlighted many issues of access and equality. There are no easy solutions to Waco's future water challenges. What can we do to prepare for the future?

Today

We will use this guide for a discussion about combined community actions and water. Our goal is to help promote understanding and respect for the different perspectives "at the table". It is not to educate, debate, or convince others of a specific position. Keep track of which options your group thinks would work best in our community, and any other solutions you come up with. After the discussion, your group will have 1 minute to share out your top three solutions.

Thank you for sharing your time and perspectives with us, and we hope you enjoy the forum!

Human Option: Protect the Health and Safety of People and Communities

Water can be considered a public good. We should provide water fairly to protect the well-being of people and communities. People should be protected from harm from floods, droughts, and extreme heat. Water should be used carefully and with little waste to ensure that everyone has enough water to meet their needs. But this focus on human needs could overlook longer-term problems that put our water future at risk. And this approach could restrict personal and corporate freedoms.

Examples of What Could Be Done

1 Plan for enough supply of water to meet human needs such as household and agricultural uses.

2 Use incentives to adjust water use. Examples include pricing water to "steer" with a lower price for meeting basic needs and price increases to discourage excessive use and waste.

3 Upgrade water systems such as water treatment plants, stormwater, flood control, and emergency water supply. Build roads and transit above predicted flood levels.

4 Pass ordinances (local laws) governing how residents and businesses can use water.

5 Use public education and outreach such as river cleanup, recycling education, rainwater harvesting, and tours so people can make better decisions and be engaged.

Some Possible Trade-Offs to Consider

Focusing on human needs could hurt the environment and wildlife, limit or decrease water quantity in rivers and impact the recreation economy including fishing, boating and hunting.

Pricing tiers could favor one group over another. Incentive systems allow the government to pick and choose winners and losers in the market.

This is costly and time intensive. It could change the landscape of some neighborhoods and may not protect us. It could interfere with private property rights and restrict personal and corporate freedoms.

Ordinances could encourage the spread of non-compliant housing or businesses outside of the ordinance area.

These programs are difficult to implement due to lack of time and resources in schools. People might not change how they act, even if they know better (like littering). Focusing on changing people's actions can overlook the need for systems change.

Nature's Option: Work with Nature to Create Sustainable Water Systems

Water is part of nature. We must create water systems that are sustainable for people and nature. Many of our water systems work against nature rather than with it and nature often gets short-changed. Human communities are dependent on a healthy environment, so we need to make it top priority. But this approach may involve changes that restrict personal choices and freedom and commit resources to environmental protection at the expense of more immediate community needs.

Examples of What Could Be Done

1 Provide incentives and recognition for replacing traditional landscapes like carpet grass lawns with native, low-water landscaping.

2 Recycle and reuse water to minimize the amount of water we need to take from nature.

3 Protect and restore natural areas for flood protection, water storage, and water filtration. Restrict development in environmentally sensitive areas.

4 Price water to reflect all its costs, including environmental impacts and ecological costs.

5 Ensure that enough water is kept in rivers and streams to support natural areas and wildlife.

Some Possible Trade-Offs to Consider

Uncertain effects on property values and this could affect local businesses that provide landscape maintenance services.

Water reuse can create safety concerns and an "ick" factor ("leak to tap") that is hard to overcome. Increased reuse could reduce wastewater flows to rivers and streams that depend on them for habitat.

Restrictions could interfere with private property rights. Development in desirable areas could be held up. It could require re-location of some community members who may not have resources to move elsewhere.

This could make it expensive for cities, farms and other water-intensive businesses to operate, making water a privilege rather than a basic right.

Where there is not enough water to go around, this could hurt human communities.

Business Option: Make Practical Economic Decisions about Water Resources

Water is a resource essential to our livelihoods and our quality of life. We should deliver water to where it is needed most and make water allocation decisions using markets so that water goes to its highest economic good. But treating water as a commodity may create problems in water availability and quality, possibly pricing certain uses like agriculture and environmental protection out of the market when others are willing to pay more.

Examples of What Could Be Done

1 Build ways to get water where it is needed most and to keep floods and other extreme weather events from causing economic damage.

2 Use markets to distribute water. Water traded on an open market will allow supply and demand to determine the cost of water and its best uses.

3 Invest in new technologies to optimize agricultural, industrial and municipal water use.

4 Develop unused water sources where water is needed.

5 Promote voluntary actions to reduce waste and pollution.

Some Possible Trade-Offs to Consider

Moving water around and building water containment structures is costly and difficult. This can risk ecological systems of water flows they naturally require.

Varied environmental conditions from climate change increase the risk of market interruptions. If purely economic interests dominate the system, they can cause inequitable access within our communities.

Creating new technologies is expensive and we do not always know how they would help or hurt human and ecological health.

This would allow development to continue, even in places where the resources don't exist to support it.

Relying on voluntary action is a slow and uncertain way to protecting water resources.

This framework was developed through participation in ECSTC ABTC Public Interest Technology Community Innovation Fellowship (PITCIF). Thanks to Waco and McLennan Co. stakeholders and members of the public who contributed through surveys and on-line meetings. "Let's Talk About Water" resources from the North American Association for Environmental Education (NAAEE) were used and can be found at <https://naaee.org/wetra/resources/lets-talk-about-water>.



Appendix D: Quantitative Participation Results

Figure 1:

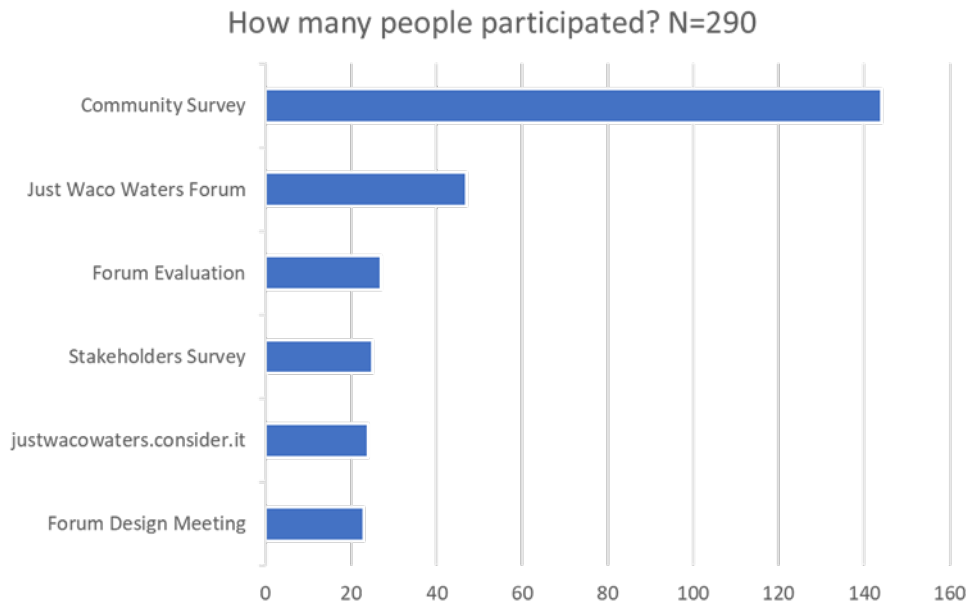
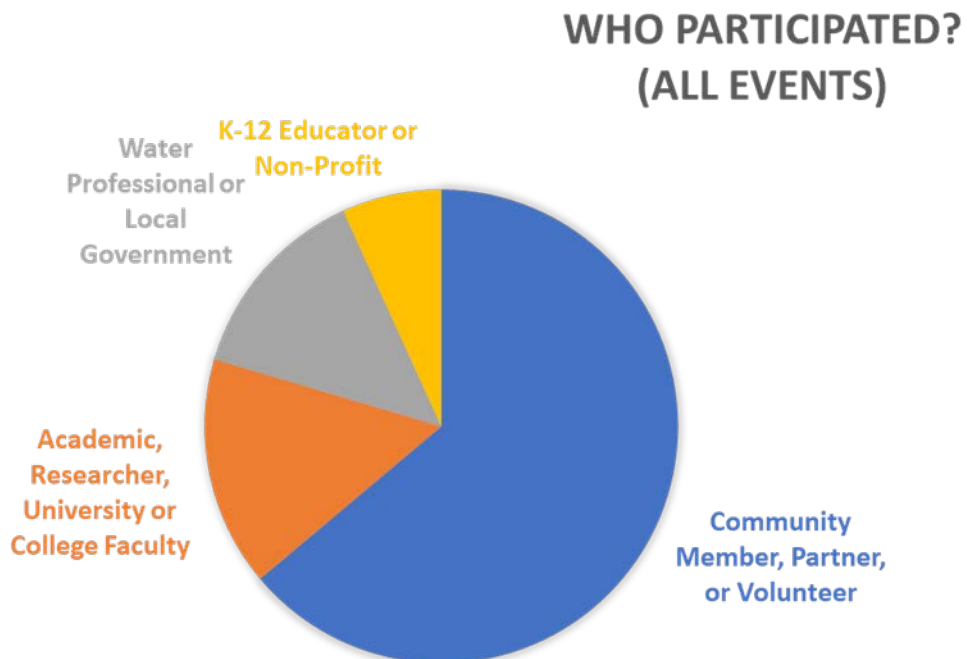


Figure 2:



Appendix E: Participant Surveys

Figure 1:



Figure 2:

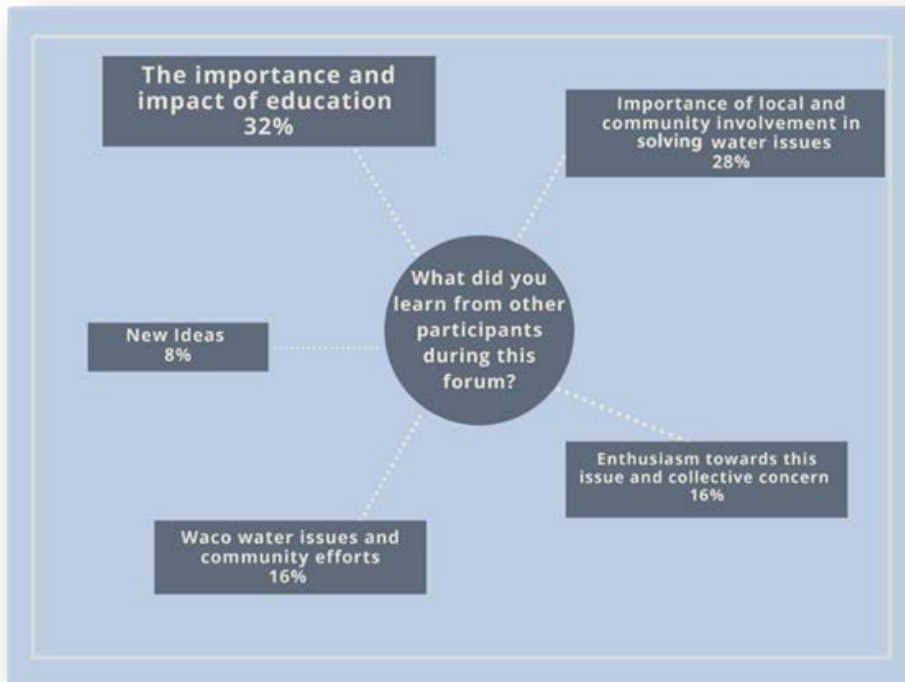
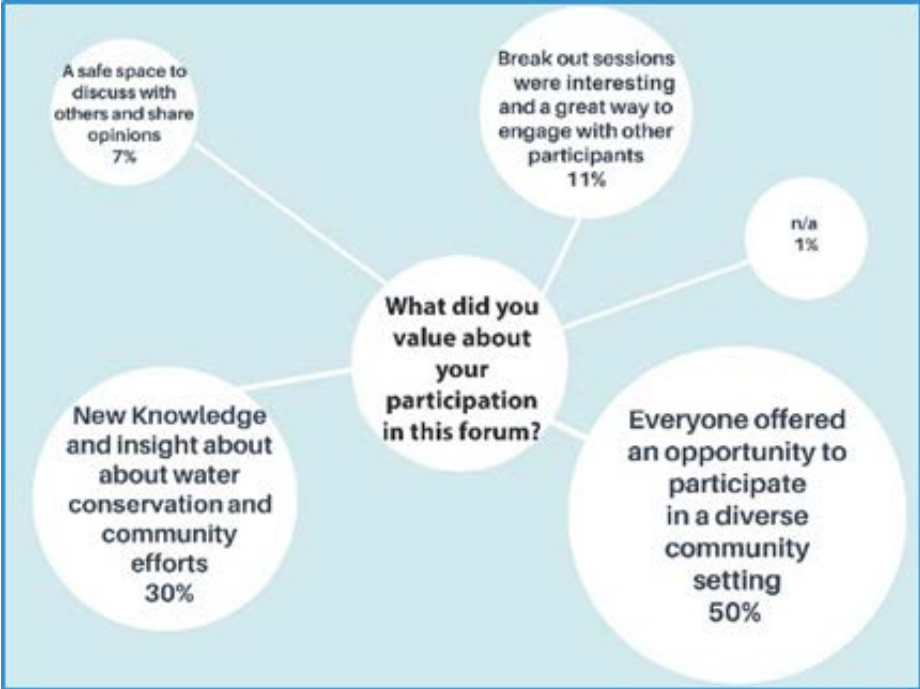


Figure 3:



Project Final Report:

The Tech Interactive & Xinampa Bio

2020 ECAST-ASTC Public Interest Technology Community Innovation Fellowship Program

1. Profile of your target community:

At the regional level, the greater California central coast is both abundant in resources that sustains a multibillion dollar agricultural industry and is surrounded by world class educational, technology, and research institutions. San Jose has a population of 1.03 million and Salinas has a population of 156,259. Within these two core project areas, there are diverse communities and voices. Residents have varying degrees of participation in and access to controlling outcomes associated with education, environmental justice, and health, with those that are of lower socio-economic status having the least control. For example, Salinas area is referred to as the "Salad Bowl of The World", but a 2016 report by the Monterey County Health Dept. placed the percentage of food-insecure people in that region at 34%, one of the highest in the state. The location of this less well-resourced agricultural hub adjacent to San Jose, also or "Silicon Valley" highlights the vast extremes in wealth, equity, and access that exist in our broader geographical region.

At the neighborhood level, the Mayfair region of East San Jose where our partnering youth organizations are located, the majority of our target audience (teens) are first and second generation immigrants. School enrollment is 99% Latinx with a 16% proficiency in math and 26% proficiency in reading and language arts. 76% of students are eligible for free or reduced meal plans. The demographics of teens in East Salinas, our other area of focus, is similar to those in Mayfair, but with the added lens that many students are the children of agricultural fieldworkers. East Salinas, identified as the Alisal neighborhood has an 88% Hispanic population, with 47% having no high school education. 57% of Salinas residents aged 5 years-old and up speak English less than "very well" compared to 17.4% for Monterey County and 14.4% percent in California. 37% of lower-income residents report being in "fair" or "poor" health compared to only 5.2% of middle- and upper-income residents. The population of Alisal is 24% youth, and as such a large demographic, they also carry large responsibilities.

At the household level, many youth in our target communities have family and work responsibilities. 50% of family households in Alisal are five or more people according to census data. There is an average of 21 people per household as multiple fieldworks families live in shared housing. In both the Mayfair and Alisal areas it is common for families to live in garages, and in rented living rooms. A family of six may occupy one bedroom.

2. Topic of your forum:

How to design culturally relevant and inclusive youth engagement around the important regional topics of agtech, biotech, and food systems for communities deeply impacted by these topics, but have limited voice in the conversation.

3. Societal Questions for your forum:

Who does and uses science in our society. Science and technology currently operate with a heavily colonial lens, how can it be designed in collaboration with and responsive to local populations and needs. How should we reframe and redefine what and who uses or intersects with science in their daily lives to acknowledge the science in cultural and indigenous knowledge and traditions. Additionally, what is the role of young people in these conversations?

Participation in science: Society needs new ways to get deep engagement from voices often missing from science fields and conversations. How can we invite more diverse communities to consider their individual role as creators and participants in biotech, agtech, and food systems. How might these local community discussions and perspectives highlight needed system changes and potential solutions? How can youth from all walks of life be engaged in a way that empowers them to feel like respected participants?

Governance and ownership of science and technology: How can we have more transparent and community facing bioscience that grows out of community collaborations to support community ownership of science, enterprise, and technology.

Equity and access to education. Biotech and agtech have become a powerful tool for innovation with far-reaching societal impacts, in particular in relation to food systems, but public knowledge and access to these topics and advances is still incredibly limited.

Inclusive learning approaches. Educational institutions and practitioners need better ways to invite and empower audiences not well served by traditional models and content to participate in these fields and help them shape the direction. What pedagogical approaches are best for new voices and current populations that are not already engaged?

4. Target Audience for the forum output:

- Youth Education and Programming Organizations:
 - Digital Nest (Salinas)
 - Bio Jam Camp (San Jose and Greater Bay Area)
 - Biotinkering Lab at The Tech (San Jose)
 - Xinampa Bio (Salinas)
 - Biodesign Challenge Teams (Salinas and San Jose)
- Community Gardens / Farms and Agricultural Support Organizations:
 - Veggielution Community Farm (San Jose)
 - Center for Land-based Learning at Natividad Creek Garden (Salinas)
 - Monterey County Office of Education Migrant Education Program (Greater Salinas Area)

5. Target Participants for the forum engagement:

Our core target audience for this forum was teens in the East San Jose and Salinas areas, which includes many youth who live in historically underfunded, immigrant, and English Second Language communities. We specifically wanted to engage youth whose communities have been excluded from conversations centered on

the future of biotechnology, agtech and food systems. To achieve this, we created printed and online tools in both English and Spanish to enable participation from both semi-rural public schools in Salinas as well as more urban youth from East San Jose in conversations with each other, community stakeholders, and adult experts.

6. Experts Consulted and/or engaged:

- Technical / Scientific Experts:
 - Kabir Peay - Stanford University, Professor, Dept. of Biology
 - Scott Evans - NASA/JPL, Staff Scientist, Navigation Systems
 - Lauren O'Connell - Stanford University, Professor, Dept. of Biology
 - Rolando Perez - Stanford University, Post-Doc, Dept. of Bioengineering
 - Molly Schumer - Stanford University, Professor, Dept. of Biology
 - Moi Exposito Alonso - Stanford University, Staff Scientist, Dept. of Plant Biology
 - Josue Gil-Silva - Stanford University, Undergrad, Dept. of Mechanical Engineering
 - Rodolfo Dirzo - Stanford University, Professor, Dept. of Biology

- Education & Learning Sciences Experts:
 - Bryan Brown - Stanford University, Professor, Graduate School of Education
 - Amanda Strawhacker - Tufts University, Associate Director, Dept. of Child Study & Human Development
 - Veena Vijayakumar - Biodesign Challenge, Program Director

7. Stakeholders Consulted and/or Engaged:

- Xinampa Bio, Greater Salinas Area
 - Omar Perez - Board President
 - Ana Ibarra - Board Member and Co-Founder
 - Rolando Perez - Co-Founder
- Bio Jam Youth Camp, San Jose and Greater Bay Area
 - Callie Chappell - Camp Director
- Digital Nest Youth Makerspace, Salinas
 - Franco Sanchez - Instructor, Career Specialist, Full Stack Software Development
 - Yesenia Molina - Salinas Site Manager
- Veggielution Community Farm, San Jose
 - Rosa Maria Gordillo Garfunkel - Environmental Education Manager
- Monterey County Office of Education, Migrant Education Division, Greater Salinas Area
 - Robin Cohen - Migrant Program Specialist, Migrant, Education Region XVI
 - Summer Prather-Smith - Senior Director Migrant, Education Region XVI
- Local Urban Gardeners/Center for Land-based Learning & Natividad Creek Community Garden, Salinas
 - Leticia Hernandez - FARMS Leadership Program Coordinator

8. Forum Design, Development, and Dissemination:

1. Agenda and Facilitation Design

Our topic and agenda were set through a process involving zoom interviews and iterative design reviews with various stakeholders and experts. These conversations and feedback points helped us identify the content areas most relevant to the communities in our region and informed our thinking about how to frame them within a larger experience. Our original idea was to focus on biotechnology, but we learned that it was important to have agricultural technology and food systems represented as well, given the daily relevance of these topics to our target audience, so those elements were integrated more.

In response to the COVID-19 pandemic, we decided on a forum format that was predominantly asynchronous, both for participants and facilitators. We landed on this after several conversations with our members of our target audience who told us repeatedly that an online, asynchronous format would be needed. These community stakeholders were themselves exploring how to best engage youth and the community given the public health crisis and offered their insights about what had been more successful for them. Their feedback highlighted that synchronous online events do not work with our target demographic of teens from across the rural-urban divide. Many individuals do not have access to computers or smartphones, and even when they have access, there are issues of finding space that is quiet to log into synchronous discussions as many live in multi family households. Additionally, some of the teens also work or have added sibling supervision responsibilities. For participants to be able to choose when to log into a conversation at a specific moment in which they have mental space, technology access, and physical space to do so is key for our participants. To address these factors, we chose to use asynchronous conversation models that included both a hands-on kit element as well as an online conversation portal.

To provide optional pathways for synchronous modes of interaction for participants who desired it, we did try out an additional experimental facilitation model of having two publicly-accessible “social hours” which were hosted on our online conversation portal (Miro Board). Hosts (Corinne and I) as well as the facilitators were visible and audible on live video streams during these sessions. Forum participants could log in to engage with facilitators, each other, and the asynchronous content in real time during these hour-long windows. The first social hour was facilitated by a group of teens while the second was facilitated by a group of diverse adults who were a combination of technical topic experts and community stakeholders.

2. Platform and Content Development

Physical Kits

We used physical “forum kits” (in both English and Spanish) as a novel pathway for teens to share their ideas on physical cards delivered and collected through trusted community organizations. Kits were distributed to local teens through existing community networks. These community connections were critical to our forum success and largely deepened preexisting relationships that had built trust slowly over time. This allowed us to reach our target audience of youth in the middle to high school age range from a diversity of backgrounds in the San Jose and Salinas communities, even given the constraints and challenges of the pandemic.

The kits were designed to engage participants with creative activities which encouraged participants to share their thoughts from their own cultural lens and lived experiences. The goal was for it to be playful, get teens started thinking about the topic areas, and have them create physical artifacts that could later be used to

contribute to the online asynchronous conversation. Most importantly, the contents centered science knowledge in the realm of their lived experiences and perspectives in a way that aimed to broaden ideas of what science knowledge is and who owns it. The kits contained multiple elements, including a fun hands-on engagement activity (a DIY millifluidic pH sensor), background information, stakeholder cards (including a blank card inviting them to add a stakeholder they identified), and discussion questions (see image below). Complete kit contents can be found on the [kits page](#) of the website.



Online Conversation Space

We created a project website (<https://bioplusfoodplustech.weebly.com/>) to welcome people and house the many different pieces of our experimental forum. We then built an interactive online conversation portal using the digital whiteboard tool [Miro](#) (image below shows a zoomed-out view of the full space). Conversations occurred largely asynchronously (other than during the facilitated social hours) on this digital platform to allow for feedback, share outs, and dialogue between youths in a variety of locations and with different lifestyles, households, communities, and values. The filled out cards from teens which we received back early were integrated into the digital conversation platform for added reflection by the online participants.



The questions we framed the Miro Board conversations around were ones that came into focus during our numerous stakeholder conversations. Community organizations who work with our youth demographic emphasized that we need to center youth opinions and community context in the conversations. That led us to ask of the teens whose voice needs to be present in engagements about Bio+Food+Tech and what formats they would suggest for learning about the material. Additionally, we heard that we need to make connections to other disciplines to make this content accessible and relevant, so a question about what are the best connecting pathways was added into the Miro Board. The dialog we intended to drive was one about reimagining learning frameworks for biotechnology and agtech in the context of an ecosystem that expands beyond school and which is conducted by overlapping and intersection community learning spaces and support organizations.

3. Participant Recruitment

We leveraged existing embedded community networks to reach our target audience of youth in the middle to high school age range from a diversity of background. We have identified key partner organizations in both San Jose and Salinas to work with - Digital Nest, Veggielution, Center for Land Based Learning, and the Monterey County Office of Education. These organizations helped us distribute physical “forum kits” to youth in their networks. The physical kits were a means of gaining trust and providing a shared engaging experience that could help to draw youth into participating in meaningful conversations around these challenging and often intimidating topics. The instructions in the kits directed youth to sign on to the website and engage in the Miro Board conversations after their pre-engagement with the hands-on kit parts. By leveraging various trusted and community embedded youth organizations and providing a kit that contains all materials required to participate, we believe we reached a diverse cohort of normally unheard youth voices.

4. Results and Outcomes

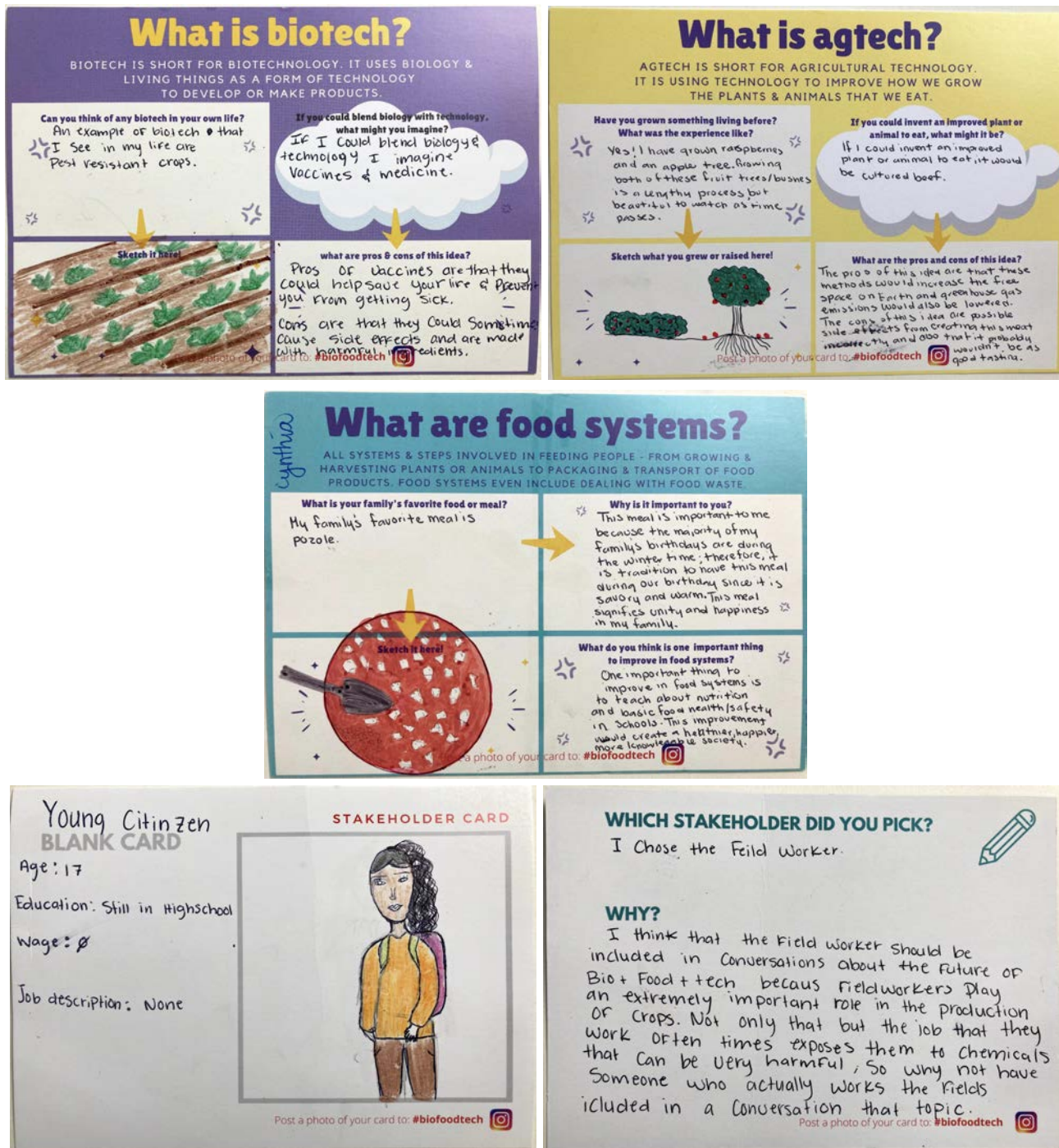
Overall Engagement

Below is a summary of the participants that we engaged in the various elements of our project.

	Teens	Adults	Total
Received an Activity Kit	60	N/A	60
Returned Completed Kit Cards	27	N/A	27
Engaged in the Miro Board Dialogue	26	12	38

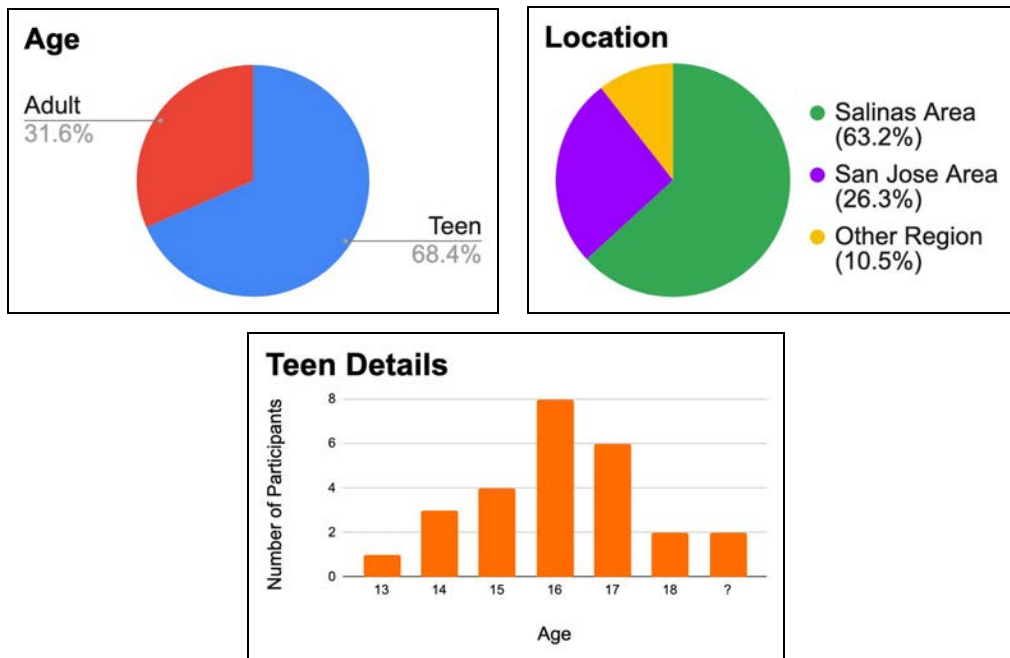
Physical Kit Participation

Of the 60 physical kits that we distributed to teens, our distribution hubs partners were able to collect completed activity cards from 27 participants. Some kits were completed by youth but not returned, so we do not know the exact number of engagements that fall into this category. A few examples of the completed cards collected by different distribution hubs can be seen below. Images of all returned kit activity cards can be found in [this](#) google drive folder.



Miro Board Participation

The core of our forum was the Miro Board conversation space designed for asynchronous sharing and discourse, largely among teens. Below is a snapshot of the 38 participants and facilitators who actively engaged in the online dialogue.

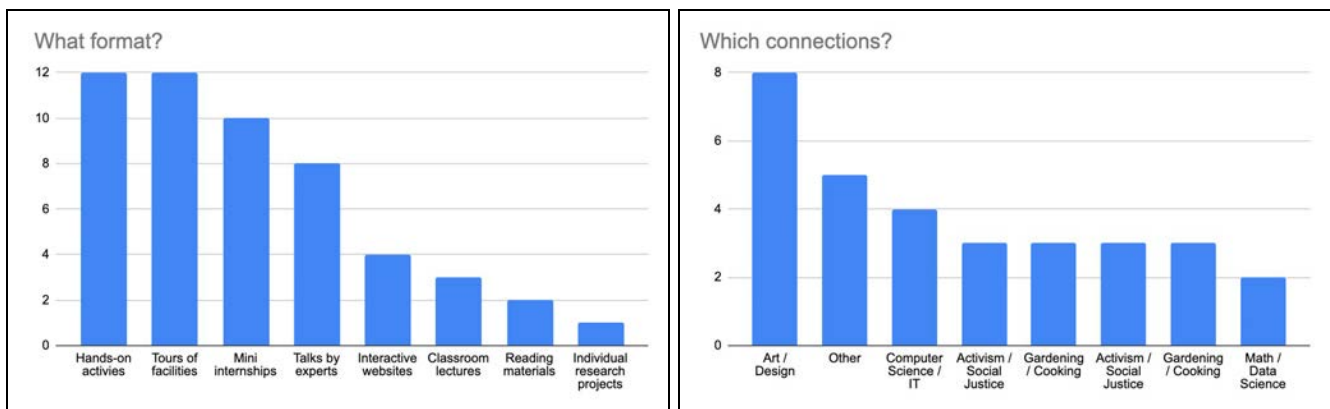
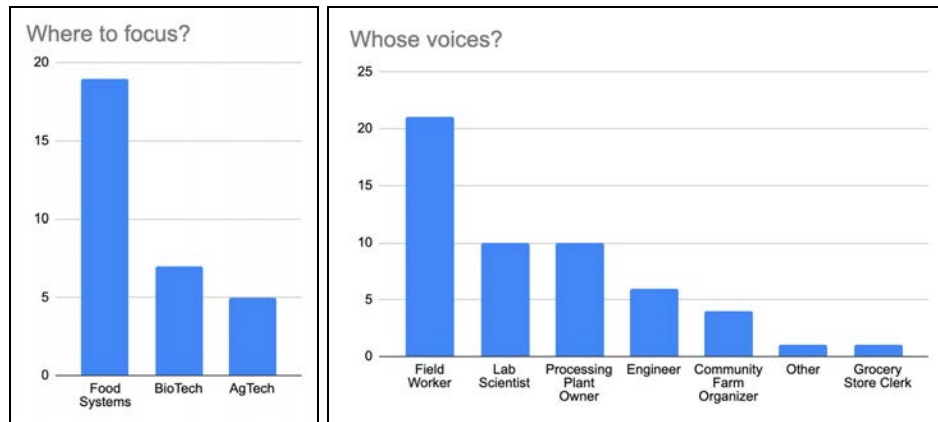


Bio+Food+Tech forum participants engaged with the topic and each other using a variety of mechanisms on the Miro Board such as sticker voting on slider bars and in buckets, digital sticky notes, thought bubble comments, image/link sharing, and emojis for additional expression. Examples of what these experimental asynchronous conversations looked like at a high level for two questions can be seen below. The entire filled out Miro Board (paths in both English and Spanish) can be found [here](#) in a format that allows for interactive exploration of all content and conversation artifacts in more depth.



Miro Board Conversation Results and Learnings

From the Miro board sticker voting sections, we were able to see trends emerge for teen preferences and opinions around some core areas of youth educational programming design related to the topics of agtech, biotech, and food systems. Those results are summarized in the graphs below.



Additionally, from the open-ended Miro board "Conversation Corners", we were able to identify some core themes from the teen contributions and dialogue that occurred via sticky notes and thought bubbles.

In thinking about future Bio+Food+Tech content and programming, teens...

- are most engaged by topics that are relevant to themselves, their families, or their communities
- are very curious about the people and processes involved in getting food to our tables
- are interested in science and technology with real-world relevance, useful applications, or innovation potential
- care deeply about human rights and social justice issues that are intertwined in these topics
- want learning to build trust and empower their communities as well as voices that are often not heard
- are motivated by a desire to consider environmental impacts and sustainability
- want to know more about the historical contexts and cultural connections
- are eager for content that can be tied to personal career explorations and skill growth

For learning approaches and styles, teens expressed...

- a desire for learning styles that are fun, interesting, and relevant to their lives
- a strong preference for formats that are interactive, involve hands-on engagement, or provide first-hand experiences (internships, tours, activities etc)
- excitement to hear from people with lived experiences, expertise, or unique insights.
- that finding ways to make learning visual can be very valuable and engaging

Outcomes

The results and learning are currently being shared with our target audiences of regional education organizations and have already provided actionable information around youth programming content and approaches. For example, BioJam Camp will be investing in building out teen internships and company tour opportunities, both of which were highlighted by participating teens as ways they would like to be engaged. Additionally, the regional Biodesign Challenge teen workshops (composed of Salinas Alisal High School Agriculture Club students) are focusing on making learning visual with hands-on kits and zoom “cooking show” collaborative explorations. These engagements will also include the millifluidic tool design experience included in our forum kit. Another outcome is the concrete youth educational programming collaborations that are now in the works between the Center for Land Based Learning FARMS program at Natividad Creek Park and Xinampa. The two organizations are developing bioengineering and biomaterial design programs that support and expand upon the programming conducted at the community planting beds. Additionally, Xinampa is getting a new teaching lab space at the Salinas Digital Nest and is in the process of developing youth programming in agtech and biotech areas. The content and lesson development will be informed by the learnings from this project.

9. Partnerships developed:

<i>Partner</i>	<i>Description</i>	<i>Role of partner</i>	<i>Future plans (if any)</i>
Digital Nest	Youth makerspace in Salinas	Kit distribution hub	Planned collaborative youth programming with Xinampa
Veggielution	Community farm in San Jose	Kit distribution hub	Possible future programming in collaboration with The Tech
Center for Land Based Learning	Community center for youth agricultural education	Kit distribution hub	Planned collaborative youth programming with Xinampa
Monterey County Office of Education	Education office supporting Central California	Kit distribution hub	Possible future programming in collaboration with Xinampa

10 . Outreach conducted:

<i>Activity</i>	<i>Audience</i>	<i>Number of Participants</i>	<i>Contact Hours per Participant</i>
Recruitment Meeting for Beta Testers	Teens (BioJam Camp)	10	30 min
Training and Logistics Conversations with Distribution Hub Coordinators	Adults (Local Partner Organizations)	4	2 hrs
Informational Onboarding Zoom Meeting	Teens (MCOE students)	5	1 hr
Teen Facilitator Training and Support	Teens (BioJam Camp)	5	1 hr
Expert Facilitator Training and Support	Adults (topic experts and local stakeholders)	10	1 hr

Appendix

A. Design Canvas

v6 - 2/10/21

<p>The Tech Interactive and Xinampa</p> <p>Key Partners</p> <p>PARTNERS</p> <ul style="list-style-type: none"> • Xinampa • The Tech • BioJam Camp <p>STAKEHOLDERS</p> <ul style="list-style-type: none"> • Digital Nest • Veggielution • Monterey County Office of Education (MCOE) • Center for Land-based Learning 	<p>Key Activities</p> <ul style="list-style-type: none"> • Audience interviews. • Iterative design process with experts and stakeholders. • Platform decisions & content creation (kits, web, Miro, eval) • Beta testing of kits and Miro Board with Bio Jam teens. • Kit distribution through partner hubs in Salinas & San Jose. • Waves of asynchronous dialogue on Miro Board forum. <p>Key Resources</p> <ul style="list-style-type: none"> • Regional community networks, connections to distribution hub partners (Xinampa) • Connection to content and topic experts (The Tech) • Relationships with local youth (Bio Jam, Digital Nest, MCOE Veggielution, Center for Land-based Learning) 	<p>Value Proposition</p> <p>NEED / PROBLEM TO SOLVE:</p> <ul style="list-style-type: none"> • More culturally relevant and inclusive youth engagement around the topics of agtech, biotech, and food systems. <p>VALUE ADD OF PROJECT:</p> <ul style="list-style-type: none"> • Identify and elevate community and cultural values about what topics in agtech and biotech are interesting / relevant to youth. • Collect youth community voices to inform educational contexts that can better broaden trust and participation in science. • Inform approaches being applied to youth agtech and biotech programming at local informal education spaces. <p>INNOVATION:</p> <ul style="list-style-type: none"> • Explore a possible new format of using physical kits to seed asynchronous dialogue online. 	<p>Audience Relationship</p> <p>IN SALINAS AREA:</p> <ul style="list-style-type: none"> • Digital Nest • Center for Land-based Learning • MCOE <p>IN SAN JOSE AREA:</p> <ul style="list-style-type: none"> • Veggielution • BioJam Camp <p>Audience Channel</p> <p>INPUTS:</p> <ul style="list-style-type: none"> • Zoom interviews • Iterative design reviews <p>OUTPUTS:</p> <ul style="list-style-type: none"> • Written summary of findings • Asynchronous dialogue products (Miro board) • Filled out kit activity cards 	<p>Audience Segments</p> <p>We narrowed in on community orgs that support youth-focused education.</p> <p>YOUTH EDUCATION & PROGRAMMING</p> <ul style="list-style-type: none"> • Digital Nest • BioJam Camp • Biotinkering Lab • Xinampa Bio <p>COMMUNITY FARMS & AGRICULTURE SUPPORT</p> <ul style="list-style-type: none"> • Veggielution • MCOE (Migrant Ed) • Center for Land-based Learning at Natividad Creek Garden
<p>Cost / Funding</p> <ul style="list-style-type: none"> • Stipends (interviews, beta-testers, forum participants & facilitators, distribution hubs) - \$3994 • Materials (kit supplies, printing) - \$1587 • Services (online platforms, graphic design, translation) - \$937 	<p>Output / Outcome / Evaluation</p> <ul style="list-style-type: none"> • Asynchronous dialogue products (Miro Board, fill out kit contents) • Written summary of findings on youth interests and perspectives • Synthesis and analysis of forum participants 			

Rachel Quimby, Public Programs Coordinator, EcoTarium
Stefanie Covino, Conservation Planner, City of Worcester

Cool It, Worcester!



1. Profile of Target Community:

Worcester, MA is the geographic center of Massachusetts, and the second largest city in New England, with a population of approximately 185,000 people. It's about 38 square miles, and lies about 40 miles west of Boston. Approximately 55% of its residents identify as white alone, 13% black alone, 22% Latino, and 8% Asian alone. One-fifth of the city's population is foreign-born. Although its poverty rate is lower than the national average, Worcester has one of the fastest growing poverty rates in the country. The majority of the city's census blocks are considered environmental justice areas, mostly for minority status and low-income residents. These areas also overlap with those most affected by the urban heat island effect, particularly the downtown region, where tree cover is minimal. The community we are most interested in engaging are residents of this area.

2. Forum Topic:

The *Cool it, Worcester!* project's topic was about mitigating the effects of the city's urban heat island. On a hot day, the surface temperatures of roofs and pavement can be over 50°F hotter than air temperatures, while shaded or non-paved surfaces remain much closer to air temperatures. Paved surfaces heat up during the day, then radiate heat after sunset, creating huge temperature gradients

within a city, the hottest of which are called urban heat islands. In Worcester, studies have shown that on highly impervious or low-shade areas, or those with tall buildings that trap heat, air temperatures can be 16°F hotter than other land cover types. For those living in these areas, these urban heat islands translate to adverse economic, environmental and health outcomes. Frequently heat islands overlap with environmental justice areas that are already disproportionately affected by income inequality and higher instances of health problems. This is the case in Worcester, MA. Increased temperatures raise the demand for electricity, creating sudden peaks that require the dirtiest fossil fuels coming online quickly. This leads to additional greenhouse gas emissions and their associated climate change and health concerns as well as more stress on the power grid that can lead to yet more power outages. The economic impact of high temperatures is no less, by increasing cooling costs and forcing residents and businesses to spend more just to maintain safe and comfortable spaces. High heat alone creates dangerous conditions for the elderly, who are more likely to suffer heat-related exhaustion, fatigue and mortality. The resulting decrease in air quality, especially for vulnerable populations including children, the elderly, and those with asthma or other respiratory conditions, can add an additional burden and lead to decreased health outcomes, as well as adding the financial stress of medical expenses.

3. Societal Questions:

We were most interested in discovering what mitigation strategies the residents of Worcester's most affected areas wanted the city to pursue. Rather than imposing only what the city sees as the right path forward, we thought it was important to hear from residents themselves in these EJ areas. Data regarding how residents weigh the ever-present balance between long-and short-term solutions, cost, and environmental impact is an essential part of the city's heat island mitigation strategy.

4. Target Audience for the Forum Output:

The target audience for the forum output is the City of Worcester. Worcester has been involved in many efforts to improve its sustainability and conservation efforts, including launching a [Green Worcester Plan](#), and the [Municipal Vulnerability Preparedness Plan](#), both of which have community workshop components, and public comment periods. The *Cool It, Worcester!* forum is a fast and targeted way to "take the temperature," so to speak, of the affected community's feelings and priorities vis-à-vis the urban heat island effect. The forum's outputs will serve as data for the city to consider as it prioritizes components of its sustainability plans. Ideally the city will take what it hears from residents and implement strategies that contribute to a cooler, more just, and sustainable Worcester.

5. Target Participants:

To understand the interests of residents in the areas most affected by Worcester's heat islands, we knew that the majority of participants needed to be people who live and work in these areas. Our target neighborhoods were two of the city's hottest and most chronically underserved: Green Island and Main South. Our target participants, by nature of the overlap of demographics and EJ areas, were mainly people of color and of low economic status living in these neighborhoods.

6-7. Experts/Stakeholders Consulted and/or Engaged:

There was a lot of overlap between experts and stakeholders for this project. We consulted many experts including Seth Tuler and Steve Macauley at Worcester Polytechnic Institute (WPI), who made the excellent interactive heat map of the city that we embedded into the forum site. Seth and Steve

have done extensive mapping and research on the urban heat island issue in Worcester and other cities, including Boston. Several other environmental science professors from Clark University and Holy Cross offered input. We also consulted with Deb Cary, from Mass Audubon, and leaders from local environmental groups including Worcester Tree Initiative, Walk-Bike Worcester, and the Blackstone River Project. Leaders and department heads from the city joined our pre-forum workshops: Linda Wincek-Moore from the City of Worcester's Senior Services Department, Meg Lyver from the Regional Transit Authority, and Luba Zhaurova, the city's Sustainability Project Manager, as well as the Central Mass Housing Alliance's Director of Education, Etel Haxhijaj, and the Health and Worcester's Health and Human Services Commissioner Dr. Mattie Castiel. Most of these experts are also stakeholders who live and work in Worcester, and have an interest, both personal and professional, in keeping the city cool. One person we consulted, Lorraine Laurie, wouldn't be considered an expert, per se, but, as the unofficial "mayor of Green Island," has worked as an advocate of that neighborhood, and is a major stakeholder.

8. Forum Design, Development and Dissemination:

1. Agenda and Facilitation Design:

As it did for the rest of the world, COVID-19 greatly changed our plans for the forum. We were originally going to host an in-person day at the EcoTarium, but realizing that wasn't a possibility, we decided to host two virtual stakeholder meetings, a virtual kickoff to the "going live" of the virtual forum, and a virtual forum that would remain accessible for several months.

The goal of our stakeholder meetings, and of the initial survey we sent to experts and stakeholders (see Fig 1), was to gather information from invested parties (professors, community advocates, employees of the health, transportation, environmental planning departments, directors from area environmental groups, etc.) on how they thought we should frame both the heat island problem and possible solutions at the forum. We also asked about recruitment strategies, ways to publicize the project, and other groups or organizations to include in the project. Some important partners on the project included professors from Worcester Polytechnic Institute, who have done enormous amounts of research heat mapping the city and creating reports; those maps were key to the project.

The kickoff event, which was recorded and posted to the forum site, featured brief speeches from the city's Health and Human Services Commissioner, our Sustainability Project Manager, and the Director of the Central Mass Housing Alliance (see Figs. 2-3). Speakers drew connections between the city's urban heat island, health, and prosperity, and encouraged participants to share opinions, and advocate for themselves and their communities.

Importantly, the kickoff event also included a demonstration of how to use the online forum platform Consider.It, led by Kevin Minitier, co-founder of Consider.It.

2. Platform and Content Development:

We settled on the online discussion platform Consider.It, as the place to host our forum. We launched coolitworcester.consider.it on September 16, 2020. Consider.It's flexibility, dialogic approach and entreaties for civility appealed to the project. It's a self-guided experience, but it's set up to encourage back-and-forth dialog and thoughtful consideration.

In terms of trying to frame the problem of urban heat islands, and provide possible solutions for participants to consider and rank, we looked to a heat island forum that had been done previously, called [Wicked Hot Boston](#). We wanted to pose the right questions to our participants and present them with mitigation options that reflected both what was necessary to address Worcester's urban heat islands, but also what was possible for our city. We decided that breaking up solutions in terms of 3 strategies (cool the city, ensure safety, update infrastructure), as Wicked Hot Boston did, and providing specific Worcester-based action items within those categories, was the best way to present mitigation options to participants, and would allow them to reflect on larger strategies, and also particular methods of achieving those goals (see Figs. 4-6). Stefanie, the city employee on our team, added two policy questions for folks to consider: one about tree retention and one about tax incentives to promote heat island mitigating construction projects. We also provided space for participants to share their own ideas, and propose and comment on each other's ideas, to try to facilitate the natural dialog of an in-person forum (see Fig. 7).

In an effort to reach a broad swath of Main South and Green Island residents, many of whom do not have reliable internet access, or may not have comfort with an interactive platform, we created a paper version of the Consider.It site, which included the same intro to urban heat islands, and then options to rank three main strategies, their more detailed components, the policy questions, and the option to add new ideas (see Fig. 8). These paper surveys were then given to Kevin at Consider.It, and he entered them into the online forum as new data from new participants, so the opinions of paper participants would appear just as online participants' did.

3. Participant Recruitment:

Participant recruitment took a few different forms. We created a flyer with basic information about the project, the details of the kickoff event, and the \$20 gift card for participating, and then used the flyer as our main recruitment tool (see Fig. 9). Along with encouraging all of our stakeholders to spread the word (and the flyer) to the people they work with, we posted on several community organizations' Facebook pages. We also reached out to churches--especially those holding Zoom services--who could easily share the website with congregants.

Recruiting participants to fill out the paper version of the forum was more direct. We worked with the Regional Environmental Council to staff a table at one of their SNAP benefits-friendly Saturday farmer's markets in the Main South area. There, we recruited participants from the line of masked market-goers waiting to enter. Participants were given a self-addressed stamped envelope with the paper forum inside. Our informal research found that talking to people face-to-face, and handing them the envelope led to an almost 90% rate of return on the paper version, as opposed to posting a note online that urged them to visit the website.

4. Results and Outcomes:

We had 48 unique participants in the forum (paper and online). We asked all participants to indicate if they lived in the neighborhoods of Main South, Green Island or "other," and 12 indicated either Main South or Green Island. We also asked participants to indicate their age, since age is a risk factor during extreme heat events, and preferences for heat island mitigation solutions may vary with age. Seven participants fell into the "65+" bracket, six were between 55-64, two were between 45-54, sixteen were between 35-44, fifteen were 25-34, and two fell into the 18-25 range.

Looking at the data from the Consider.It site (which includes data from the paper survey), on average, participants ranked “cool the city” and “ensure safety” more favorably than “update aging infrastructure.” The two top-ranked strategies were “plant street trees,” which is a relatively inexpensive option, and add “pocket parks,” which is expensive and time-consuming, but both strategies are eco-conscious options. In their comments about these options participants noted that trees not only provide shade, but also sequester carbon, absorb floodwater and beautify the city. Pocket park fans listed community building and outdoor enjoyment as another major benefit of those spaces as well.

The two lowest-ranked solutions were “bury power lines,” and “install smart grid system,” both of which fell under the larger umbrella of “update aging infrastructure.” These solutions are expensive and time-intensive, and likely not practical for a city like Worcester, whose residents seem to favor quicker, cheaper options, like “improved weatherization,” which ranked much higher.

The “ensuring safety” solution and its components generally ranked somewhere in the middle, with participants agreeing that safety measures would be helpful, but not truly a solution. One person noted in the comments section that, “Ensuring safety is a band aid until our natural environment can keep us safe.”

One marked contrast was between the policy questions, one regarding tree retention and replacement, and one regarding tax incentives: participants overwhelmingly agreed that the city should have some kind of policy to replace trees when they are cut down, and/or formalize ways to incentivize tree retention. They were much more mixed about a policy question that would consider incentivizing economic development projects based on whether the projects contribute to or mitigate the urban heat island effect. One person who agreed strongly with this policy mentioned holding the city to high standards, and another, who ranked it neutrally, mentioned the need to also consider a project’s net CO2 output, and not just its heat island mitigation potential. It’s possible that this proposal’s relatively low ranking reveals a tension for residents between economic and ecological development.

Popular write-in considerations from participants included proposals to use reflective/light materials on pavement and increase storm water infiltration, and to decrease reliance on fossil fuels in the first place.

While participants added eleven of their own ideas to reduce the urban heat island effect, they didn’t rank or comment on each other’s ideas as much as on the formally proposed ideas in the forum.

9. Partnerships Developed:

The City of Worcester and the EcoTarium work routinely with community partners, and while many of these partners participated in the forum (helped with recruitment, acted as sounding boards for forum content development, spoke at the kickoff event, etc.), I would say that no truly new partnerships were developed.

10. Outreach Conducted:

We hosted two pre-forum virtual workshops with community advocates, staff from environmental organizations, environmental science professors, and staff from various city departments including health, housing, transportation and senior services. The first workshop was attended by eight people, and the second was attended by sixteen. The attendees were largely experts in their fields.

APPENDIX and FIGURES

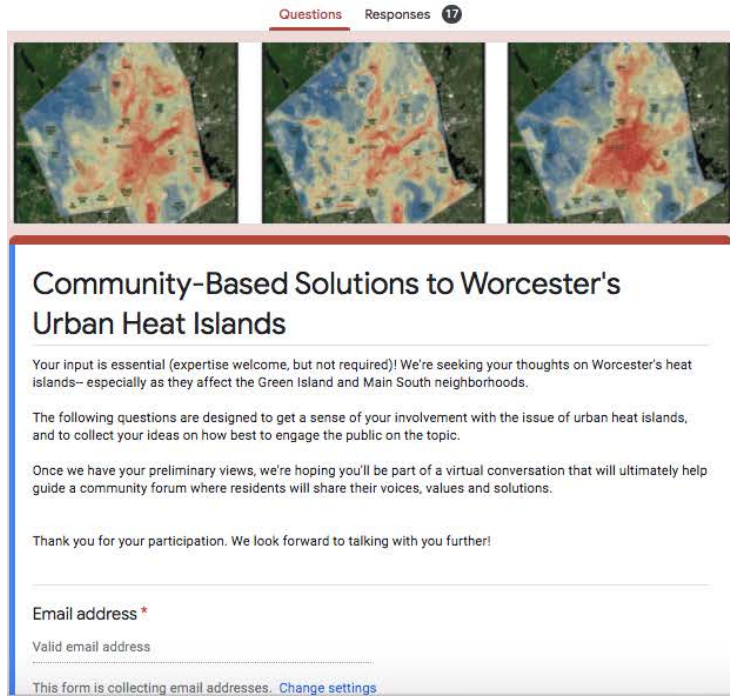


Figure 1 (above): Photo of initial online survey sent out to experts/stakeholders gauging their familiarity with Worcester's urban heat island, and their ideas on public engagement on the issue.

Figure 2 (below): Map of the City of Worcester (courtesy of WPI's Heat Watch Report) and relative ambient air temperatures. Graphic used on recruitment flyer and at kickoff event.

**What's a
heat island?**

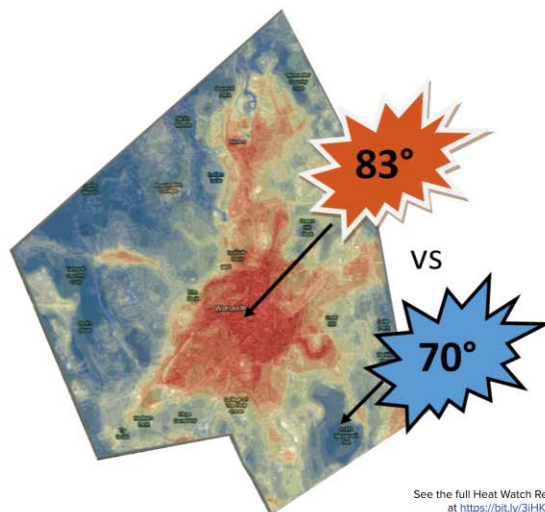


Figure 3 (below): Intro slide from our kickoff event

Agenda

Welcome & Introduction to *Cool it, Worcester!*

- Rachel Quimby, Public Programs Coordinator, EcoTarium
- Stefanie Covino, Conservation Planner, City of Worcester

Speakers

- Dr. Mattie Castiel, Health and Human Services Commissioner, City of Worcester
- Luba Zhaurova, Sustainability Project Manager, City of Worcester
- Chantel Bethea, President & Chief Executive Officer, Women In Action, Inc.
- Etel Haxhijaj, Director of Public Education & Advocacy, Central Massachusetts Housing Alliance

Consider.it Demo

- Kevin Minitier, Founder, Consider.it

Have a question? Type it into the question box and we'll either type a response or answer at the end.

Please note: this meeting is being recorded so that others can watch the demo later on. Thank you!

Figure 4 (below): Screenshot from the coolitworcester.consider.it forum site. This asks participants to prioritize three main strategies for mitigating Worcester’s heat island effect.

▼ **What should the city prioritize?**

Cooling our Neighborhoods: This solution would keep the city cool by bringing down outside air temperatures wherever the components are implemented. Components include planting trees, creating pocket parks, erecting shade structures, painting roofs white, and installing “green” roofs.

Updating Aging Infrastructure: This solution would replace outdated and inefficient electrical structures and equipment at individual and citywide levels. Components include improving weatherization, replacing old cooling systems, burying power lines, and installing a smart grid system.

Ensuring Safety: This solution would protect people’s health and wellbeing during heat waves by keeping them cool and prepared. Components include starting air conditioning assistance programs, conducting wellness checks, designating more community cooling shelters, and developing heat warning apps.

sort by **trending -** show opinion of: **everyone -**

Strategy	Added	Considerations	Priority Distribution	Opinions
Ensuring Safety	8/21/2020	4	High Priority	17
Cooling our Neighborhoods	8/21/2020	5	High Priority	15
Updating Aging Infrastructure	8/21/2020	2	Low Priority	17

Each of the solutions you've just considered has several components. Tell us what you think of them!

▼ Cooling our Neighborhoods

This solution would keep the city cool by bringing down outside air temperatures wherever the components are implemented. Components include planting trees, creating pocket parks, erecting shade structures, painting roofs white, and installing "green" roofs.

Proposals

sort by [trending](#)

Opinions

show opinion of: [everyone](#)



Plant/ Preserve Trees

Added: 9/9/2020 | 3 considerations | [add a consideration](#)



Pocket Parks

Added: 9/9/2020 | 4 considerations | [add a consideration](#)



Shade Structures

Added: 9/9/2020 | 3 considerations | [add a consideration](#)



White Roofs

Added: 9/9/2020 | 4 considerations | [add a consideration](#)



Figure 5 (above): Components of the “cooling our neighborhoods” strategy. Participants can click on individual components to learn more and to make comments.

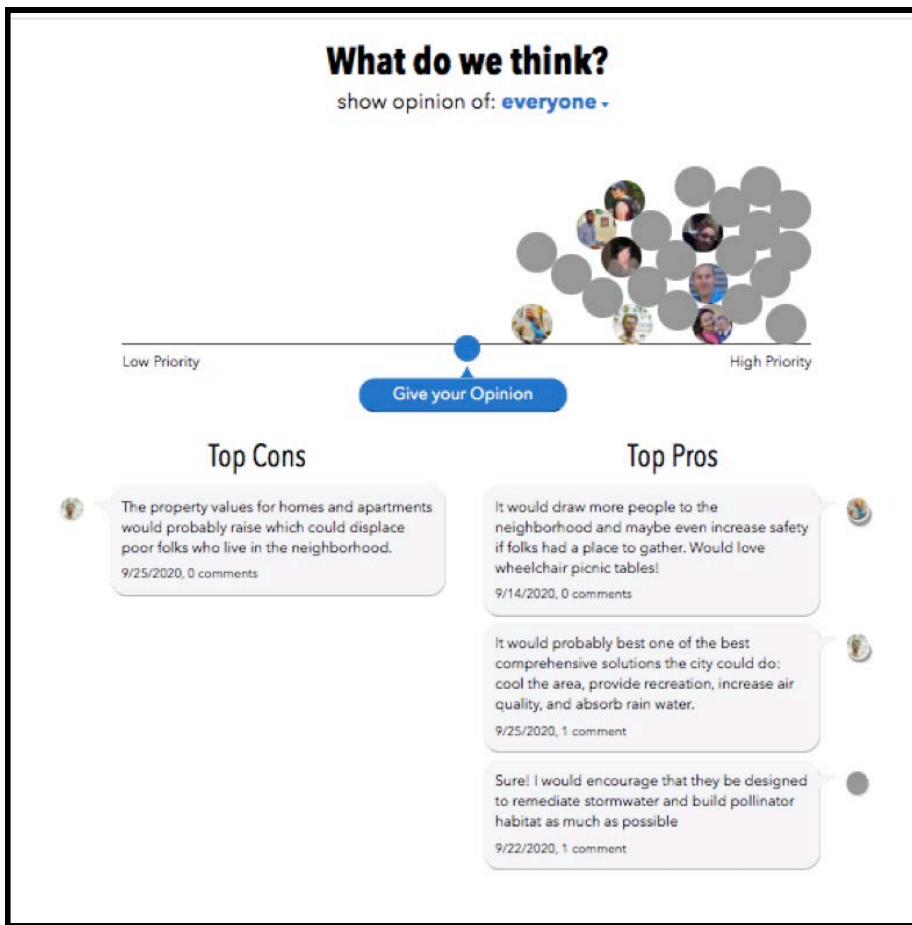


Figure 6 (above): Screenshot of participant comments related to the “pocket parks” proposal. Note the relative popularity of the proposal.

Do you have other ideas to help reduce the heat island effect?

Share them below!

[add new](#) | sort by **trending**

show opinion of: **everyone**

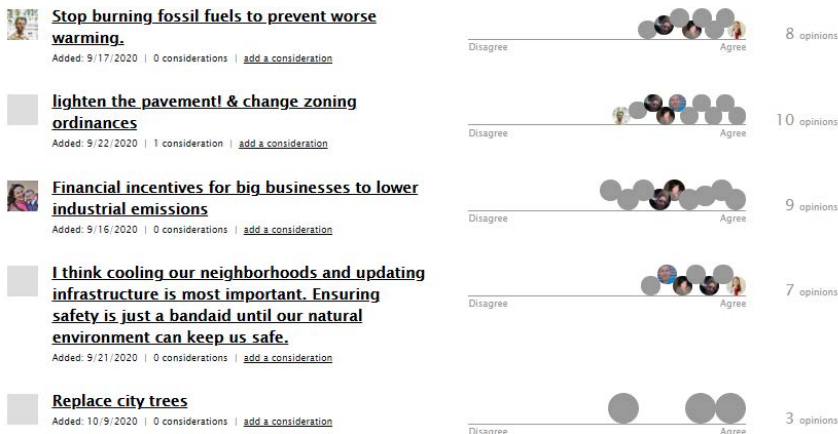


Figure 7 (above): Participants share, rate and comment on their own proposals.

Updating Aging Infrastructure

This solution would replace outdated and inefficient electrical structures and equipment at individual and citywide levels. Components include improving weatherization, replacing old cooling systems, burying power lines, and installing a smart grid system.



Improving Weatherization

Cost: \$ Timeline: ⌚

Adding insulation, weatherstripping, and more efficient doors and windows to a building decreases the amount of cooled air that is lost. Weatherization can also help reduce mold and mildew, and decrease heating costs in winter, but weatherizing old buildings can be expensive.

Least
Important



Most
Important



Replacing Inefficient Cooling Systems

Cost: \$\$ Timeline: ⌚ ⌚

Updated cooling systems use less energy to cool a space, which reduces stress on the electrical grid and lowers cooling costs for both homes and businesses. Reducing energy use can help lower outside temperatures, but disposing of old systems that can't be recycled or fixed creates a lot of waste.

Least



Most

Figure 8 (above): Photo of the online forum's paper version. Participants put an "X" on the line to indicate how important they feel a particular proposal is.

Cool It, Worcester!

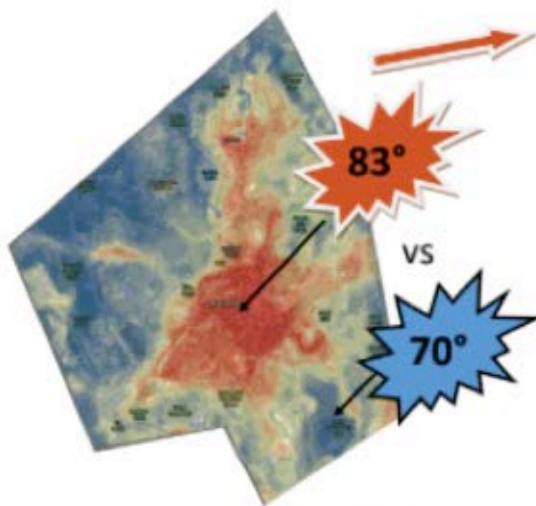
Worcester is hot. Too hot. And summers are getting hotter.

Many areas in the city have no shade, and pavement and buildings hold in the sun's heat like an oven. These **heat islands** don't just cause discomfort, they drive up energy costs for residents, damage air and water quality, and increase the risk of heat-related illnesses—even death.

Worcester needs your help! How do you think we should cool the city and keep residents safe and healthy?

Share your thoughts and opinions online starting Sept 16.

<http://coolitworcester.consider.it>



Join us for a VIRTUAL

kickoff event:

September 16, 2020

1-2 pm

<https://bit.ly/2QLzbnN>

Register online:

coolitworcester.consider.it

Participate anytime
through October 18.

The first 50 participants
receive a \$20 gift card.



Figure 9: Recruitment flyer. This was posted online as a graphic with an explanation about the project.

Libraries, Museums, and Environmental Justice: A Community Conversation

March 5, 2021

Jade Marks, U-M Museum of Natural History

Justin Schell, U-M Library

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Target Community

The broader target community for this forum included multiple municipalities across [southeast Michigan](#) and the rural communities that surround them. Geographically, this includes cities such as Ann Arbor, Ypsilanti, Dearborn, Detroit, and Flint, as well as smaller municipalities of Washtenaw, Wayne, Macomb, Monroe, Saint Clair, Oakland, and Genesee counties (Appendix A, Figure 1).

A long history of structural and institutional racism, including redlining, has resulted in vastly different demographics across the forum's geographic extent. Black residents per county varies from 89% in the most urban portions of Wayne County to less than 0.1% in some rural Townships of Washtenaw County (U.S. Census, 2018). The rise of the automobile industry during the early 1900s attracted many immigrants to southeast Michigan in search of jobs, which helped establish long-standing Greek, Polish, Arab, Mexican, and Irish communities. In particular, the Arab-American population in Dearborn, MI makes up the largest Arab population for a single city in the U.S. A 2015 Equity Profile report spanning the six-county area encompassing Detroit, Warren, and Dearborn indicated several trends in the population and demographics for the area. Diversity is increasing in the six-county study area, particularly among Asians, Latinos and Arab Americans. This trend is anticipated to continue. In 2010, 32% of residents within the study area identified as People of Color. There is also a trend of overall population decline in metropolitan areas, driven by a loss of manufacturing jobs. Historically, Detroit has contended for the title of most segregated city in the U.S. (PolicyLink, 2015). Alternatively, in Washtenaw County, where the University of Michigan is located, populations in Ann Arbor and Ypsilanti have remained stable for the past decade (U.S. Census, 2021).

Forum Topic

The mission of this forum was to bring together voices and resources across southeastern Michigan in a conversation about how cultural heritage institutions can support local environmental justice work and facilitate better access to environmental data. Some cultural heritage institutions have already found meaningful ways to support local environmental justice work, but more can be done. We hoped to identify ways that museums and libraries can engage with current environmental justice movements, as well as the infrastructure and cultural changes that institutions like ours would need to support environmental justice in a strategic and consistent way. Beyond our own geographic scope, we hoped this forum will serve as a framework for institutions who wish to understand the environmental justice concerns in their own communities and plan for a proactive response to locally-specific problems.

Societal Questions

From the Flint water crisis to air quality issues in Detroit, the fight for environmental justice has deep roots in Michigan. As museums and libraries reinvent themselves amid Covid-19 with a heightened awareness of racial inequalities, environmental injustices should be a priority. With over 150 museums and cultural institutions located within the geographic scope of this forum, the University of Michigan Museum of Natural History and the University of Michigan Library are just two of many

institutions in the area that could use their resources more strategically to meet the needs of their visitors and communities (Pure Michigan, 2021).

Many of the communities most affected by pollution and other environmental toxins are lower-income communities. More often than not they are also communities of color. However, we also see the emerging issue of PFAS contamination as an area of concern throughout Michigan, including in communities that are predominantly white. Taking an intersectional approach will allow us to bring together people from multiple communities that may differ demographically, but share commonalities as victims of and advocates against pollution and other environmental injustices. Since this forum addresses environmental justice, as opposed to broader issues of sustainability, questions of how power has been inequitably shared will be front and center.

There are many economic, ethical, social and environmental implications for this work. To address as many of these implications as possible, we sought to engage a number of local expert and stakeholder groups both in the planning process (design workshops) and as participants in the forum. A robust, but not comprehensive list of those potential implications can be found in Appendix B, along with the groups we engaged early in the planning process to help address them.

Target Audience for Forum Output

Just as we anticipated diversity in our participation, we envisioned many different groups being able to use the results of this forum, including:

- Cultural heritage institutions that seek to better support environmental justice movements in their local areas (whether that be in Michigan or elsewhere) through transparent and community-led/co-created partnerships.
- Environmental justice groups seeking to better understand the possibilities and opportunities of working together with cultural heritage institutions.
- Members of the public interested in learning more about the environmental justice issues in their area
- Museum and library audiences who can hold institutions accountable for addressing real as opposed to perceived community needs.

Forum Design, Development, and Dissemination

As a cursory look at local environmental justice priorities, the U-M Museum of Natural History sent a survey to 12,000 email subscribers on June 23, 2020, and posted it on the Museum's social media platforms (Facebook, Twitter, Instagram). The survey was also shared by a local news outlet on their website. Our goals were to understand the kinds of environmental data and information that people were interested in, what kind of experience they had searching for and utilizing environmental data in their own lives, and how this may correlate with factors such as age, race, gender identity, and education. We received a total of 119 responses.

The vast majority of respondents were either “concerned” or “very concerned” about all of the environmental issues in the survey: air quality, soil contamination, water quality, transportation, energy, biodiversity loss, and climate (Appendix A, Figure 2). Water was the area that people had the most concern about (76% of respondents said they were “very concerned” with issues of water quality). Additionally, approximately 75% of respondents had searched for environmental data on any of these topics, with water quality being the frequent search topic (56% responding) (Appendix A, Figure 3). Approximately 50% of respondents that had searched for environmental data were unable to find it. A majority of respondents (63%) reported that they used the data they searched for to make decisions about their own lifestyle (where they swim, whether they buy a water filter, etc).

This strengthened what we had previously known anecdotally, that water was one of the most important topics that people in Michigan were concerned about, and not only in the most visible areas, such as the ongoing water crises in Flint and Detroit, but also PFAS contamination throughout the state. However the number of people who voiced concern about other environmental issues guided us to a forum design with the flexibility to address multiple issues, rather than focusing on a single issue. The survey also revealed a consensus among our respondents that data access, data interpretation, and equity are all concerns, but the question of how cultural institutions should or could address these concerns is not something our respondents had considered.

The survey also revealed a need for greater accessibility to environmental data, a theme we incorporated into the wider forum, both through the scenarios we seeded the platform with, and through the creation of a “Needs and Resources” Google Form that participants could use to inquire about accessing specific environmental data that we may have access to or be able to help them find.

Additionally, the survey confirmed a stereotype about the limited reach that museums (and particularly the U-M Museum of Natural History) engage with: predominantly white (84% of respondents) and well-educated (75% of respondents have a postgraduate degree). This informed us that we would need to leverage our relationships with stakeholders and community leaders to gain new perspectives and get new demographics involved (Appendix A, Figure 4).

In June and July 2020 we held four design workshops with eight scientific, community, and technical experts to inform the forum design, scope, and format, and to discuss the usefulness of the forum outcomes for their work in environmental justice. These workshops also helped us develop a network of people and organizations to reach out to for participation recruitment. Generally, our design workshop participants agreed that an asynchronous method would attract a broader demographic of people. Unlike scheduled Zoom sessions, a website can be accessed at any time, making it attractive for parents, individuals working swing and night shifts, and those with multiple jobs.

The design workshops also helped us understand limitations related to internet access, mobile compatibility, time constraints, and participants feeling that time is wasted if outcomes are not actionable. Several stakeholders expressed that their constituents would benefit from being invited to participate, as opposed to seeing the forum advertised in a post or newsletter, and that we could provide this personal connection by getting community leaders involved.

Although approximately 85% of southeast Michigan households have internet access, households without internet are located predominantly in communities of color. To address the digital divide, design workshop participants cautioned us to offer low-tech options for participation that could be integrated with digital responses. We were also advised to encourage participation through stories, images, and art, thereby acknowledging the many ways of knowing and communicating that exist. In the end we settled on an interactive, asynchronous forum, paired with options offline/low-tech for participation, and synchronous Zoom sessions by request/need. While many community leaders thought a paper/mail-in forum would improve our reach they also expressed concerns about distribution due to the pandemic. We settled on a pilot of 75 self-addressed, stamped postcards distributed to three locations in Dearborn and Detroit, with capacity to scale up if successful.

Scientific, Community, and Technical Experts

The Design Canvas in Appendix C outlines the various ways scientific, community, and technical experts engaged with the project. The individuals who participated in pre-development design workshops came from a diverse group of organizations and backgrounds, including representatives from multiple environmental non-profits in southeast Michigan and U-M faculty experts working in many areas, including faculty who had many years of experience partnering with environmental justice groups in southeast Michigan. For a detailed list of those who participated in the design workshops, please see Appendix A, Table 1. After design workshops were completed, we initiated research on web platforms, began content development, moved content through our internal review process, and ultimately launched the forum on December 16, 2020. The Project Timeline listed in Appendix C, outlines activities and progress over the two months the forum was active.

Platform and Content Development

We reviewed approximately 30 online platforms for ease of use, intended audience and purpose, cost, design flexibility, access and accessibility, moderation capabilities, and capacity to facilitate multidirectional conversation. These platforms included those used and/or developed by the University of Michigan for classroom use, tools developed in the civic tech/civic engagement arena, and message board platforms (involve.org, 2020). As detailed in Appendix D, we chose seven platforms to examine more closely and soon realized that no single platform would fit all of our needs. Building or modifying an existing platform internally would require more time, expertise, and funding than was available. We decided that Consider.it had the best mix of multi-directional conversation, structured topic engagement, voting, moderation, and back-end capabilities. The fact that it had been used for similar community forums (including events at the Museum of Science, Boston) also contributed to our decision.

On Consider.it, participants prioritize different scenarios on a sliding scale, with the opinions on the left being lower priority, opinions on the right being higher priority, and the middle being neutral. These “sliders” are complimented by a framework for written feedback in the form of pros and cons. The pro/con framework, referred to as “considerations,” allows for greater detail and elaboration on initial opinions. Participants can also comment on the considerations of others, allowing for another kind of multi-directional dialogue. The relationship between scenarios, opinions, considerations and comments

are outlined in Appendix A, Figure 5. The final version of the website can be found at envforum.consider.it.

We worked closely with Consider.it developer Kevin Minter to build a site that included the main prioritizing functionality of the platform, an embedded Google Form for requesting specific data-related support, and a virtual gallery to share and archive low-tech and “offline” participation. This last design element addressed one of our main concerns: that creating an account would be a barrier to participation. We created a voicemail, PO Box, self-addressed, stamped postcards, and a project-specific email address. We also seeded the platform with scenarios that were developed as part of the design workshops so the first participants had something that they could react to. Finally, we created a short video that walked visitors through the site.

Target Participants and Forum Recruitment Strategy

Target participants included individuals who are affected by water, air, or other kinds of pollution in their everyday lives; information professionals from cultural heritage institutions; environmental justice, non-profit, and community leaders; and environmental policy scholars working in collaboration with those communities. Our recruitment strategy evolved as we grappled with low participation, and we accepted feedback from stakeholders, community organizations, and colleagues. These strategies included recruitment through scientific, community, and technical experts; promotional channels such as listservs, electronic newsletters, and social media; recruitment through community organizations; paid participation; and Craigslist ads.

Recruitment Through Stakeholders and Community Organizations

To recruit forum participants we first relied on the design workshop participants and other community stakeholders who work directly with groups in environmentally sensitive areas and with members of the public that our institutions do not already serve. Because these stakeholders have already developed trusting relationships with communities of interest, we deferred to them to help build connections with publics outside of our normal sphere. Invitation emails were sent to our design workshop participants and one or more points of contact from more than 10 additional community organizations. These organizations ranged in focus from social justice and community building to conservation and land stewardship. For a full list of these organizations and their focus, please see Appendix A, Table 2. Halfway through the forum, when asynchronous participation was low, we sent follow-up emails offering to lead interactive Zoom sessions with any group that would be interested. When participants registered their account they were automatically entered into a drawing to win Visa cash gift card prizes. Three groups were offered guaranteed Visa cash gift card incentives for a commitment to participate on the forum website or in an interactive Zoom session.

Promotional Channels & Craigslist

We used social media, listservs, and electronic newsletters for larger-scale promotion of the forum, including the U-M Museum of Natural History channels, other affiliated organizations like the Planet Blue Ambassador Network, and the electronic communications of six different community organizations. A full list of the different promotional channels we utilized before and during the forum can be found in Appendix A, Table 3. It should be noted that number of followers and subscribers only reflects potential reach, not engagement with the content. Almost universally, open rates and social media engagements are down due to the stressors of the pandemic. We also attempted to run a Craigslist ad during the last week of the forum, but our posts were flagged and removed within hours. Unable to determine the cause of this removal, we abandoned this strategy.

Results and Outcomes

Thirty-nine participants interacted with the forum synchronously in two live interactive webinars/Zoom sessions and asynchronously on the [Museums, Libraries, and Environmental Justice](#) website. We received three responses to the forum via email and two individuals responded using the embedded Google Form. None of the 75 postcards we distributed were returned, nor did we receive any voicemails. Although participation was lower than we had hoped, participants contributed new ideas, responded to one another, and participated in multi-directional dialogue. We were also successful in building new relationships, strengthening existing partnerships, and attracting new audiences.

From a demographics perspective, our pre-survey respondents were predominantly (84%) white. No respondents identified as Black or Indigenous, and only one person identified as multi-racial or multi-ethnic (Appendix A, Figure 4). Nearly $\frac{2}{3}$ of respondents identified as female, with the majority of the remaining responses identified as male. (3 respondents chose “prefer not to say” or “prefer to self describe”). While we received responses from a wide range of ages, the largest responses were from people who were 35 - 44, 55 - 64, or 65 - 74 (Appendix A, Figures 6 and 7).

While the majority of our forum participants (71%) also identified as white, the forum itself engaged more individuals who identify as People of Color. We did engage participants who identified as Middle Eastern, Black/African American, Latinx, and Native American (Appendix A, Figure 8). Our Forum participants predominantly identified as female (82%), with the rest either identifying as male or leaving it blank (Appendix A, Figure 9). The three age groups most represented in the Forum were 30-39 (30%), 40-49 (25%), and 19-29 (20%), which is somewhat similar to the pre-survey, although forum participants skewed younger (Appendix A, Figure 10).

Finally, participants came from throughout the state, with some who previously lived or worked in Michigan participating from their new home elsewhere in the country. As shown in the map in Appendix A, Figure 11 while participants were primarily concentrated in Southeast Michigan (which makes sense given the geographic focus of the forum), the two centers of this participation were in the Ann Arbor and Detroit areas.

Responses on the Website

The forum website was live from December 16th - March 1st. On the Consider.it platform, 39 users engaged 236 times by contributing 147 opinions on 20 unique scenarios, 15 of which were proposed by the forum participants, and 5 of which were seeded by the forum development team. On these scenarios, participants shared 82 considerations in narrative form, voicing pros and cons related to each scenario. Interaction between participants consisted of these considerations and 14 comments between users (Appendix A, Figures 12 and 13). As facilitators, we used the U-M Museum of Natural History account to spark multidirectional dialogue by asking socratic questions and asking participants to elaborate on their ideas in the comments. Unfortunately, sporadic participation meant that few participants saw these comments and probing questions.

The 20 different scenarios, designed to understand participants' priorities for how libraries and museums could support environmental justice movements, fell into five broad categories: space usage, exhibit development, online and offline tools, communications support, and values statements.

Nearly all of the scenarios proposed by our participants were ranked positively. However, not every participant ranked every scenario. Thus, it is difficult to quantitatively determine a top priority from the data. Unlike a forum that examines a specific policy, our forum did not lend itself well to the pro/con framework. For example, in a sea level rise forum, budget, adaptation, and mitigation decisions could have decidedly negative consequences for certain populations or resources. Alternatively, the "cons" created in our forum were often questions about context and approach or things that an institution should keep in mind when taking on a particular project; rarely did someone assert that a project shouldn't be done, or that there is a downside to working with a cultural institution in such a way. With this in mind, the following sections provide representative summaries of the discussions within each of the five categories.

Space Usage

The scenarios in this category fell under both conventional and more innovative uses of museum and library spaces. All scenarios in the space usage category were on the positive side of the priority spectrum. On the more conventional side, many people supported using public library spaces for organizations to hold meetings and information sessions, as well as places that could host book clubs, film screenings, and other interactive events on local environmental justice topics. However, one participant voiced a concern that if the institution itself is programming these events as opposed to only letting groups reserve space, it must make sure to pair the event with an action opportunity so that attendees do not simply "learn about a problem and then go home." This resonates with the responses to another proposal: using public lab spaces in a natural history museum to develop programming on environmental justice issues in their communities by exploring local data. While this scenario was met with a positive ranking and many positive considerations, one participant wanted to be sure the institution(s) pursuing this project worked with community members to determine what issues and/or data would be the most beneficial to incorporate.

Exhibit Development

Participants created and commented on four scenarios related to museum exhibit development. Some of the proposals focused on the content of an exhibition, such as the history of lead in water, the creation of tactile visualizations (in this example, one made out of clay), or a role-playing game that would help people visualize or otherwise engage with issues in less passive, and perhaps more meaningful ways. The comments on these two proposals suggested ways that participants and members of the affected communities could and should be involved in planning the experience of the exhibit. This desire was strongly stated as part of a third proposal, in which a participant suggested that a museum hire members of local Indigenous groups to create an exhibit highlighting not only the history of these culture(s), but also the contemporary challenges and successes they experience. Respondents to the proposal voiced that this is important not just for Indigenous communities, but for other communities of color as well.

Online and Offline Tools

Three scenarios were proposed by participants that detailed how both public and academic libraries could develop online and offline tools to assist communities with education, information, and data needs. These included checking out air quality sensors from a library, partnering with a civic tech organization to develop a pollution reporting tool, and an academic library providing more intentional access to resources (articles, datasets, etc.) normally available only to members of that particular academic institution. Most of the participants rated these as positive on the priority spectrum, although a few people rated the reporting tool proposal as a lower priority on the spectrum. Comments on these proposals not only addressed who would have access to and control of the tools, but also how they could help facilitate information sharing *between* institutions. In other words, libraries would not have to reinvent the wheel for each issue or community group, but could learn and share what they've developed with other libraries and groups.

Communications Support

Participants created two proposals related to institutions assisting with communication needs, specifically help with mailers and infographics related to pollution and other environmental issues. Both proposals received positive responses in terms of priority, though the mailers (due to their effort, potential waste, and likelihood of getting thrown away) had some responses on the lower priority side of the spectrum. Comments on these proposals included a desire to expand beyond a single issue and possibly make these visualizations interactive, agreed on the importance of these kinds of visualizations as they can help communicate issues in a different way (especially with communities that may have low literacy rates or speak languages other than English), and saw them as a way to reach people outside of the affected communities as a way to build broader support for action.

Values Statements

The final set of proposals were less programmatic and focused more on the values that institutions should hold when engaging with environmental justice work. Many of them highlighted the necessity of

meaningful collaboration with communities they serve: not expecting communities to only come to them, valuing the time that communities do spend engaging with cultural heritage institutions, making sure communities see the results of any engagement or research project, and, more generally, making sure communities are an equal partner in any project or programming. These proposals were added in the final days of the forum, so they received fewer responses from other participants. The responses they did receive were almost uniformly on the positive end of the priority spectrum.

Live Interactive Webinars/Zoom Sessions

To compliment the asynchronous forum we hosted two synchronous Zoom sessions: a Kick-off/How-to webinar on January 12, 2021, and one interactive Zoom session on February 26, 2021. One session, with the Michigan League of Conservation Voters is forthcoming. The Kick-off/How-to webinar was scheduled shortly after the soft launch in late December, advertised on the forum website, and promoted heavily by a community stakeholder who helped us select the date/time. We experienced low participation (6 attendees), but high engagement among those present. We attribute the low participation largely to unforeseen events surrounding the webinar, which occurred half-way between the violent white supremacist attack on the U.S. Capitol and the 2021 Inauguration. After receiving an extension through the end of February, we reached out to a dozen or so stakeholders and community organizations and offered to collaborate on or lead interactive Zoom sessions for their groups as an alternative or complement to participation on the forum website. Three individuals representing three organizations expressed interest in a Zoom session. On February 26th we met with representatives from the Bailey Park Neighborhood Development Corporation (Detroit), Flint River Ecology Study (Flint), and The Porch Project (Flint).

The February 26th Zoom session was particularly productive in two areas: relationships building and generating value statement scenarios; the latter addressed specific concerns related to cultural heritage/community partnerships. One participant confessed that the forum topic was challenging for her to speak to, because she does not consider museums or libraries to be resources. In her area, these institutions are located in gentrified neighborhoods with multiple barriers to access. This led to a discussion on the importance of institutions who want to support environmental justice work allocating resources that allow them to come to the community, rather than always expecting the community to come to them. Another reason local environmental justice organizations struggle viewing libraries and museums as a resource is their historic failure to recognize community leaders as equal partners and pay them for their time working on collaborative projects or speaking on panels. This concern also came up with one of our design workshop participants during an informal conversation on the forum's progress. One solution involves building honorariums or hourly wages for community partners into annual budgets and grant applications.

Attendees agreed that environmental justice stems from self-advocacy, something that can be challenging when cities or neighborhoods are labeled as "sacrifice zones." Helping residents recognize the ways people can complement nature and how to self-advocate starts at an early age. One scenario that followed from this was museums and libraries leveraging their relationships with local school districts to share information from environmental justice organizations with youth.

During this workshop we were able to not only build stronger connections with the attending organizations, but also connect two organizations with similar goals who were not previously collaborating. Two of the three participants stayed on the Zoom call for almost an extra hour, reminding us that one of the best things museum and library professionals can do to support environmental justice work is to bring people together and be a catalyst for conversations.

Outreach Conducted / Partnerships Developed

Our effort to develop partnerships with organizations and individuals committed to pursuing environmental justice began very early in the process and continued during the forum itself. Through our design workshops a few existing connections evolved into a broader network of potential partners. Some of these groups came from the environmental justice, environment, and sustainability communities, while others were from libraries and museums. In hopes of facilitating a wider participation and building lasting relationships we worked directly with these personal connections to encourage participation and continued to provide them with updates throughout the duration of the forum. For groups we thought might be interested in collaborating on an interactive Zoom webinar we first attended one of their meetings simply to listen and learn. In this regard, we made meaningful connections with several new potential partners and strengthened relationships with our existing contacts.

When it came to developing deeper partnerships, for both the short-term goal of forum participation or longer-term goals of developing environmental justice programming and projects, we were less successful. Although we proposed partnering with a number of different groups on interactive webinars, the informational webinar on January 12th and the informal meeting on February 26th were all that came to fruition. We also attempted to use incentives (in the form of cash gift cards) to encourage participation, but many organizational leaders were not confident this would lead to significant participation, stemming from concerns about interest and bandwidth within their communities. Several groups had postponed meetings altogether until the pandemic subsided.

Although we did not build partnerships in the specific ways we had hoped to, we did make many excellent connections to groups that could develop into partnerships in the future, particularly after meeting in person is an option. During the informal meeting on February 26th participants from community organizations who had never met before quickly realized how closely their missions and goals aligned. From the beginning of this project, we recognized our institutions' roles as not just facilitators of projects and collaborations, but also institutions who can bring together individuals and communities who may not otherwise connect.

Our next steps include following up with the individuals who expressed data needs through the Google Form and assessing where the scenarios and priorities generated in the forum can be integrated into existing plans or prioritized for the future. We also plan to follow up with all of the groups we engaged with for this project to share a streamlined version of this report.

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Appendix A: Tables and Figures

Figure 1: Regional Geographic Extent of Target Community

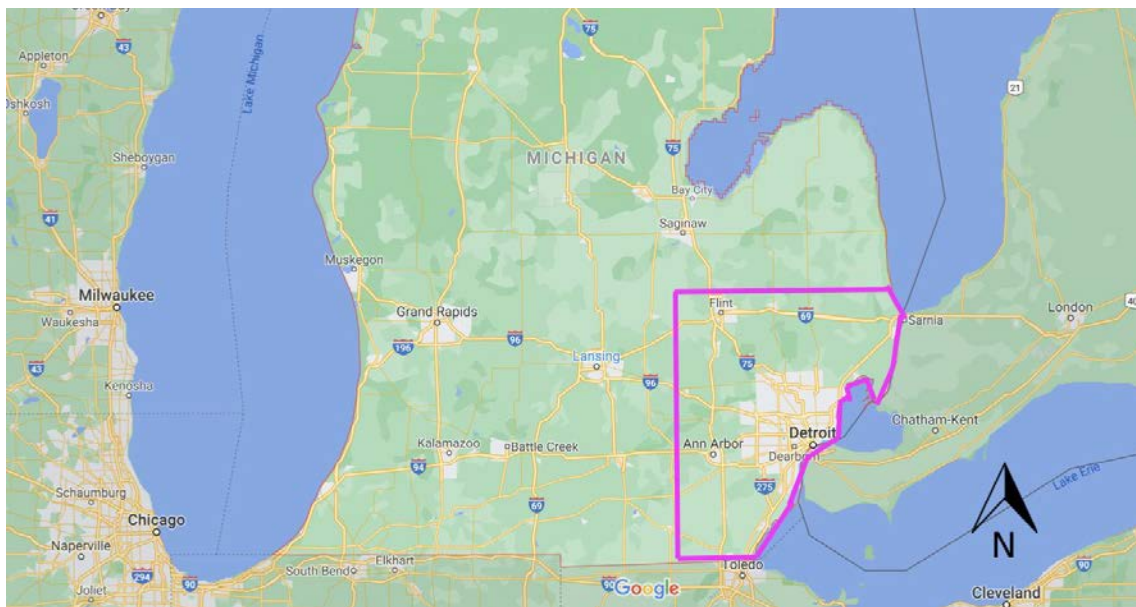
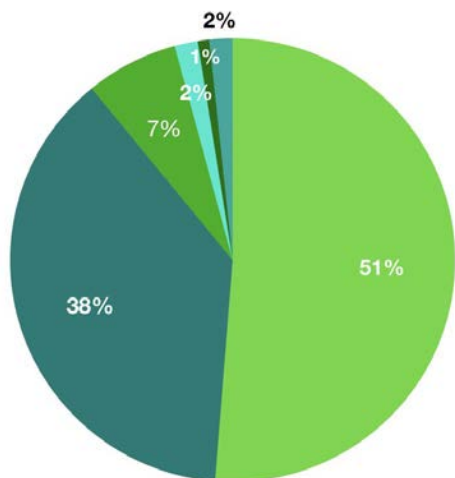


Figure 2: Pre-Survey Summary of Environmental Concerns

- Very Concerned
- Concerned
- A Little Concerned
- I'm Not Sure
- Not Concerned
- No Response

How concerned are you about air quality (air pollution, visibility, etc.)?



How concerned are you about transportation issues (public transportation, bike and pedestrian infrastructure, car emissions, etc.)?

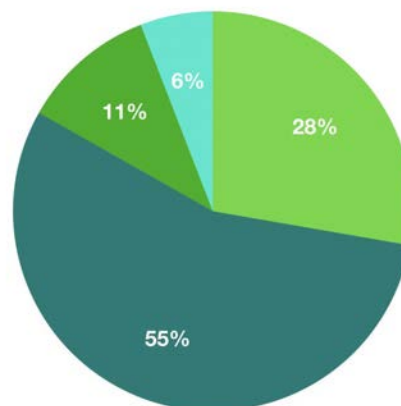
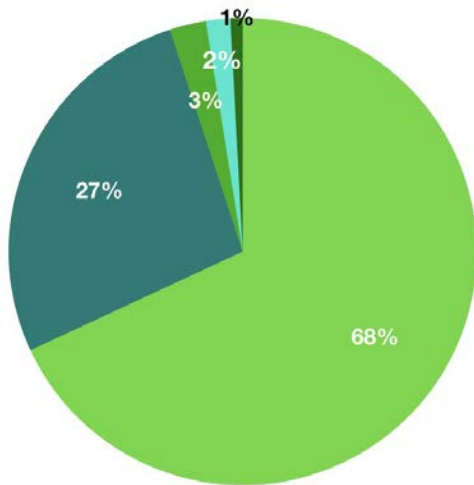
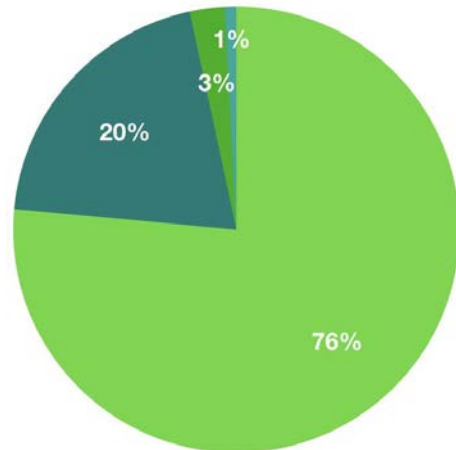


Figure 2 Continued: Pre-Survey Summary of Environmental Concerns

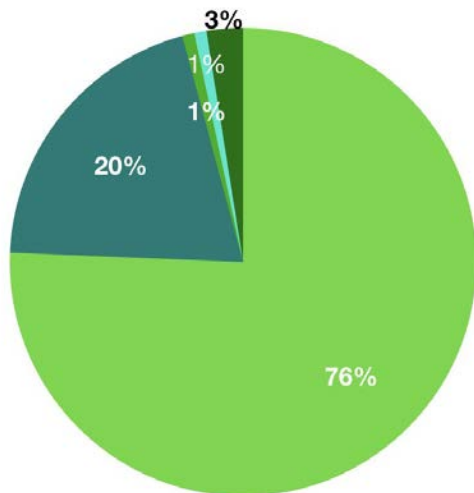
How concerned are you about loss of biodiversity (plant, animal, microbial)?



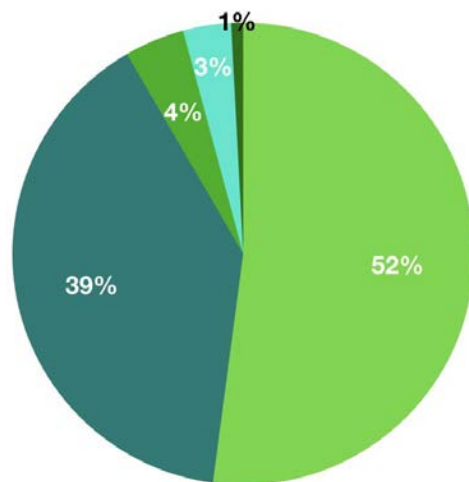
How concerned are you about water quality (drinking water, water bodies, etc.)?



How concerned are you about climate change (changing temperatures, weather patterns, etc.)?



How concerned are you about energy (energy sources -wind, nuclear, solar, fossil fuels, etc. or household energy needs)?



**Figure 2 Continued:
Pre-Survey Summary of Environmental Concerns**

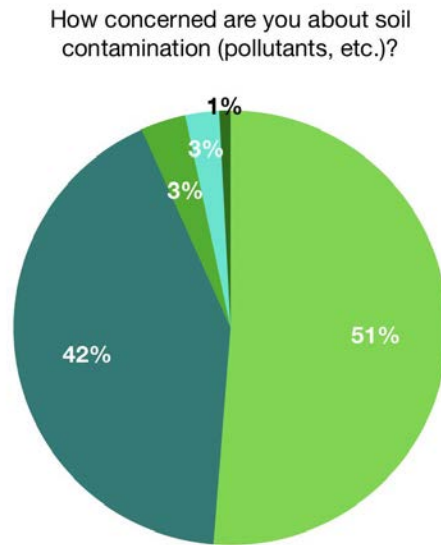


Figure 3: Pre-Survey Summary: Access to Data

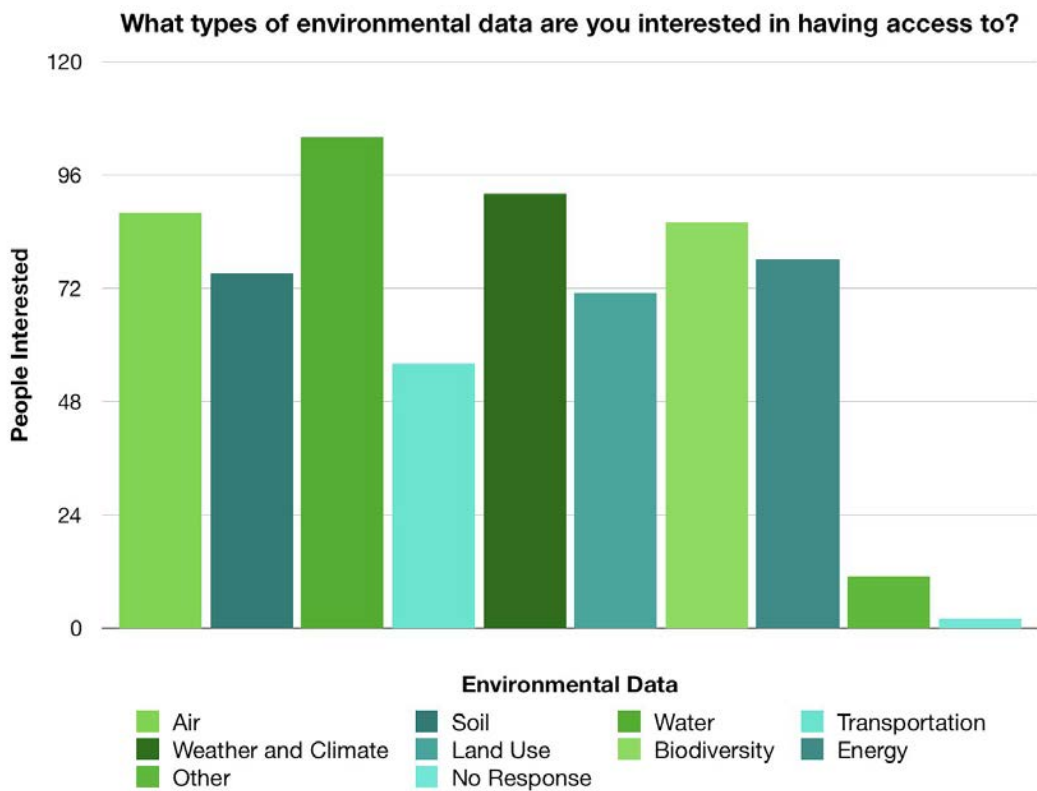


Figure 4: Pre-Survey Respondents Race and Ethnicity

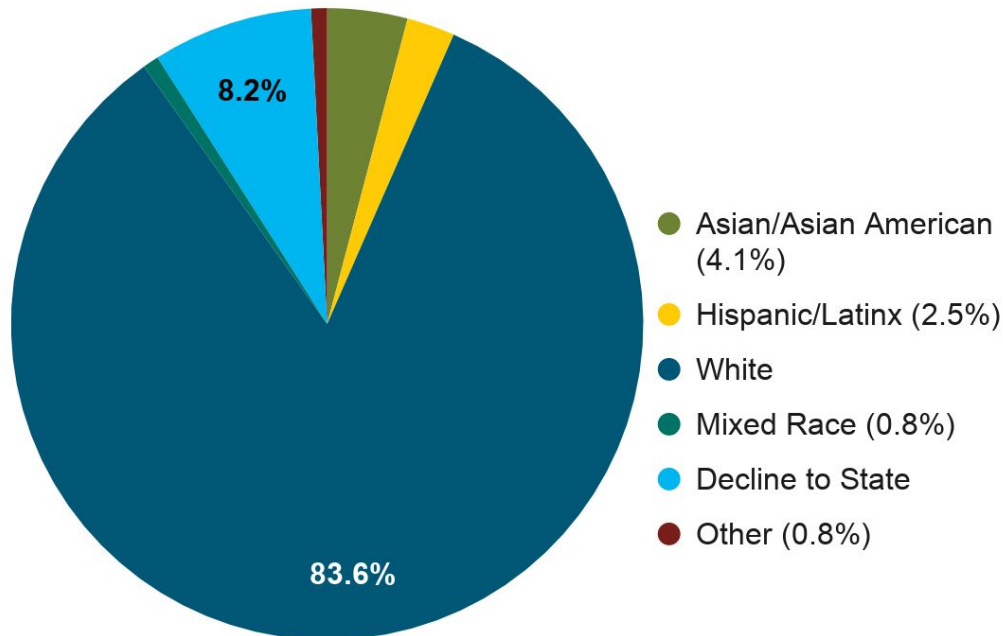


Table 1: Scientific, Community, and Technical Experts

Design Workshop Participant	Organization	Area of Focus
Ember McCoy	U-M Ann Arbor / School for Environment and Sustainability (SEAS)	Air Quality
Jason Frenzel	Huron River Watershed Council	Water
Tony Reames	U-M Ann Arbor (SEAS)	Energy Justice
David Bleckley	U-M Ann Arbor / Inter-university Consortium for Political and Social Research	Social Science Data
Abigail Dumes	U-M Ann Arbor / Women's Studies	Water
Beth Gibbons	American Society of Adaptation Professionals	Climate Adaptation
Shannon Martin	Ziibiwing Center	Museum / Indigenous Perspectives
Natalie Thompson	Environmental Health Research to Action / U-M Dearborn	Public Health
Carmel Price	Environmental Health Research to Action / U-M Dearborn	Sociology / Social Justice

Table 2: Community Organizations

Organization	Area of Focus
Michigan Environmental Justice Council	Environmental Justice
Neutral Zone	Youth Engagement
Southwest Detroit Environmental Vision	Environmental Justice
Natural Areas Preservation	Conservation
Interfaith Council for Peace and Justice	Social Justice
Survivors Speak	Social Justice, Racial Inequalities
Planet Blue	Climate Change / Sustainability
Michigan League of Conservation Voters	Environmental Policy
Bailey Park Neighborhood Development Corporation	Safety / Sustainability / Stewardship
The Porch Project	Community Building
Ypsilanti District Library	Information Accessibility / Community Building

Table 3: Forum Recruitment Through Promotional Channels

Organization	Platform	Subscribers
U-M Museum of Natural History	Electronic Newsletter	14,000
U-M Museum of Natural History	Social Media	15,700
U-M Museum of Natural History	Self-Addressed Postcards	75
Salah Ali's Mailing List	Email	64
Planet Detroit Newsletter	Electronic Newsletter	2,000
Science for the People (U-M Chapter)	Email	173
Ypsilanti District Library	Facebook	4,000
Interfaith Council for Peace and Justice	Facebook	4,000
Ypsilanti Sustainability Commission	Facebook	500
U-M Student Sustainability Coalition	Email	Unknown
Civic/Community Engaged Faculty	Email	10
Planet Blue Ambassador Newsletter	Electronic Newsletter	5,000
Michigan Emerging Museum Professionals	Facebook	700
Southeast Michigan Museum Membership Managers	Email	50

Figure 5: Relationship Between Scenarios, Opinions, Considerations and Comments on the Consider.it Platform

Scenarios:

Individual projects, ideas, or priorities submitted by participants.

A natural history museum uses its public lab spaces to develop scientific education programming around environmental justice topics using local data.

Added: 11/6/2020 | 8 considerations | [add a consideration](#)

A natural history museum in Michigan creates an exhibit about the history of lead in water.

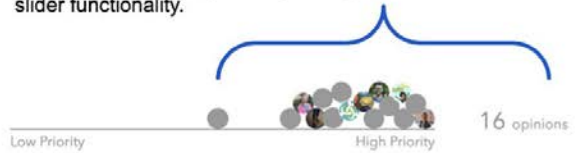
Added: 11/6/2020 | 7 considerations | [add a consideration](#)

A public library offers consultations on air quality sensors, as well as kits that community members could check out.

Added: 11/6/2020 | 3 considerations | [add a consideration](#)

Opinions:

"High" vs "low" priority rankings using the Consider.it slider functionality.



Considerations:

Narrative "pros" and "cons" in response to a specific idea, project, or scenario.

Slide Your Overall Opinion

Low Priority High Priority

Others' Cons

- Copyright issues may limit the advocates role. 2 weeks ago, 0 comments
- Access to libraries is an issue here. Which libraries have information? How do libraries share with each other? How do non-affiliated folks have access? 5 weeks ago, 1 comment
- Who has access to these resources? 5 weeks ago, 1 comment

Comments:
Narrative responses to the considerations of other forum participants.

Give your Cons

- Academic libraries may be intimidating to people with low literacy 1/10/2021, 2 comments

Give your Pros

- accurate information is key and not so easy to come by 1/4/2021, 1 comment
- A centralized data point would

Discuss this Point

Mona Munroe-Younis: To this concern, libraries could help facilitate data/resource gathering from other libraries.

Jade: Write a comment

Save comment

Others' Pros

- Useful if paired with programming for how to read, interpret and act on the data. Yesterday, 0 comments
- Giving all citizens access to the same resources that academic institutions have is a meaningful step toward empowering all of us to be advocates and change makers. 2 weeks ago, 1 comment
- I think this point is particularly important if it increases access to library or connectivity between libraries. 5 weeks ago, 1 comment

Considerations:

Narrative "pros" and "cons" in response to a specific idea, project, or scenario.

Figure 6: Gender of Pre-Survey Respondents

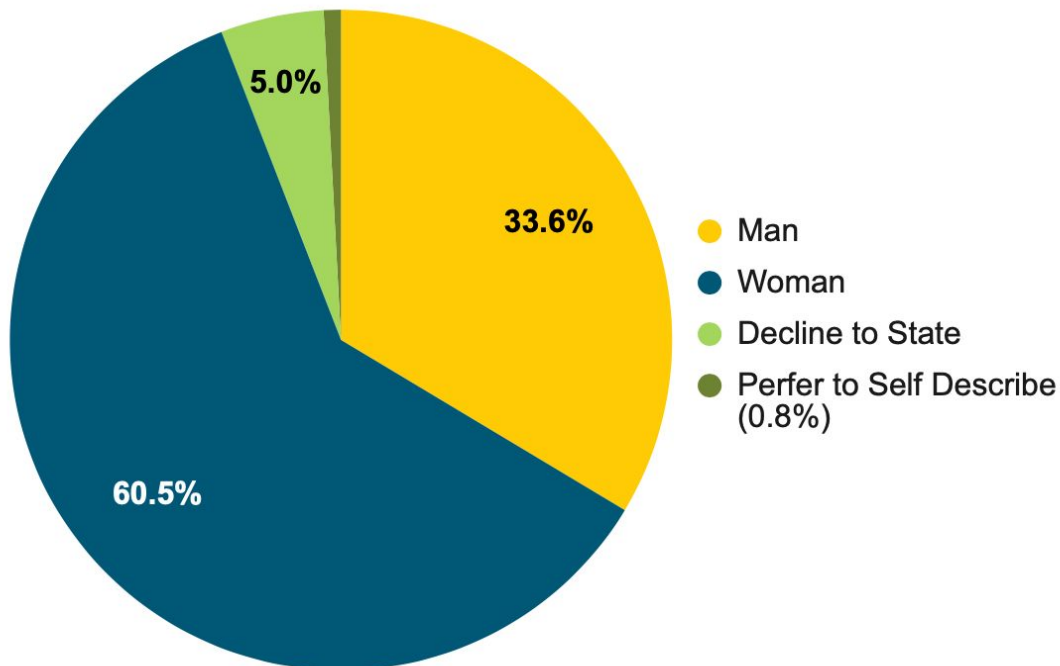


Figure 7: Age of Pre-Survey Respondents

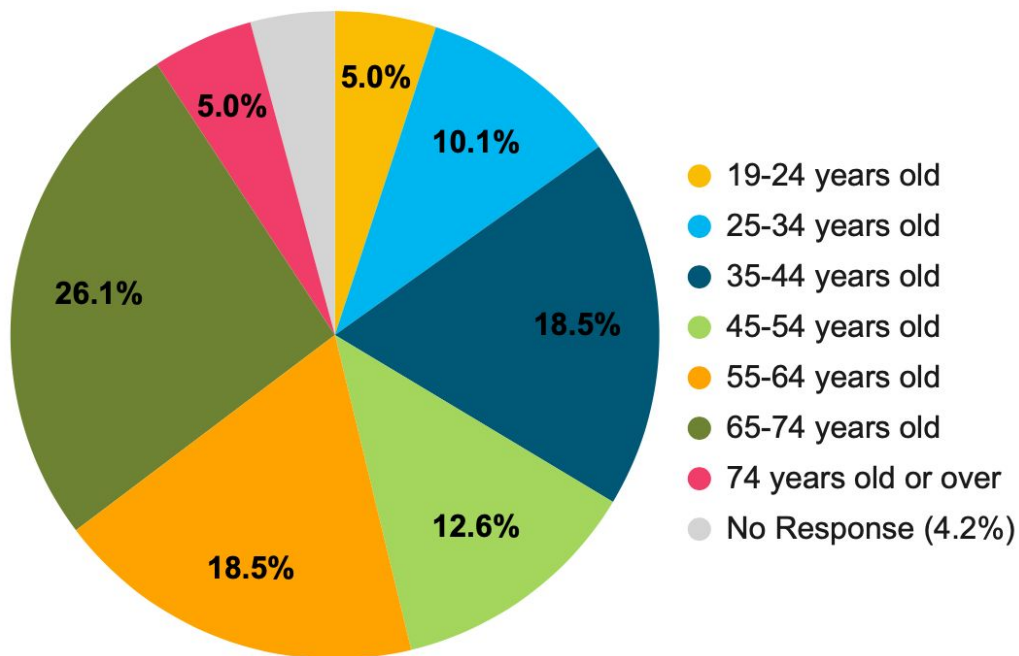


Figure 8: Race and Ethnicity of Forum Participants

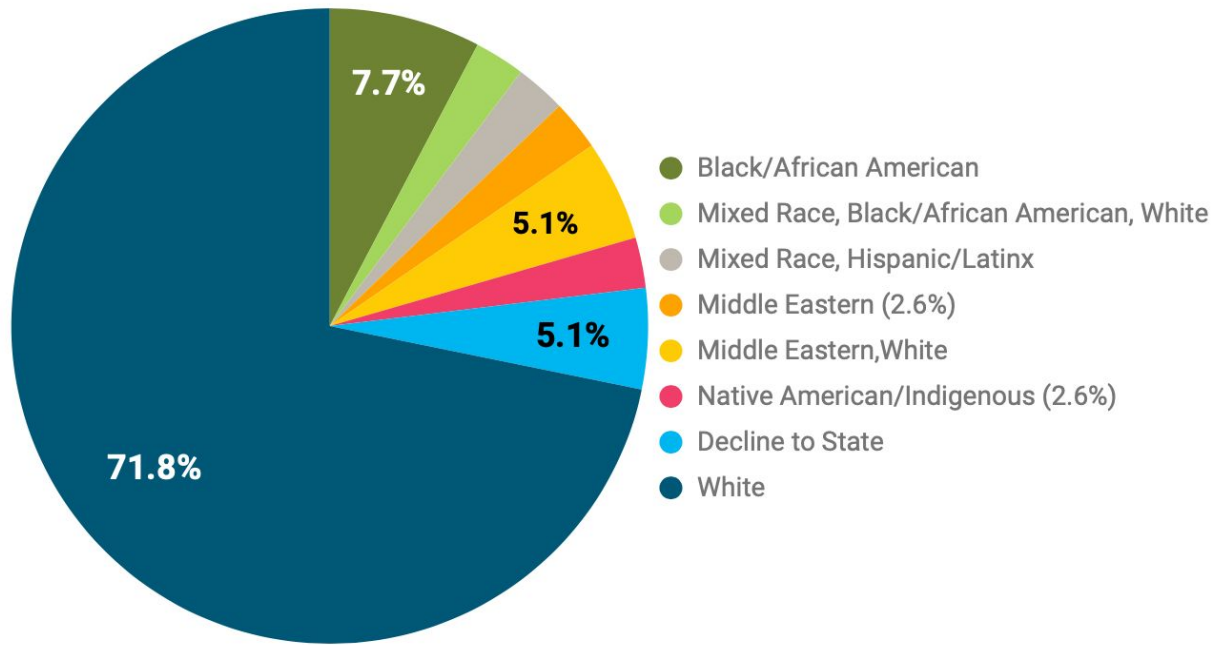


Figure 9: Gender of Forum Participants

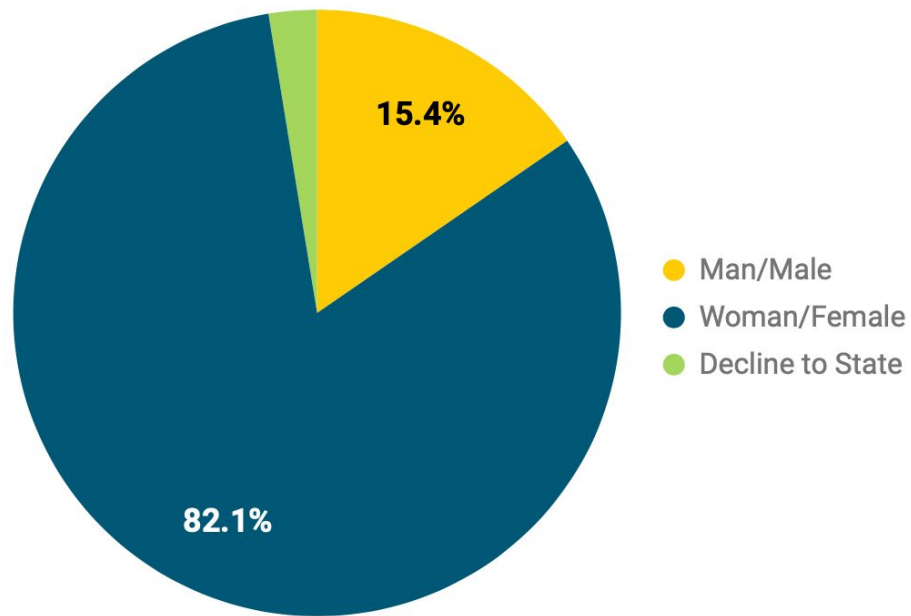


Figure 10: Age of Forum Participants

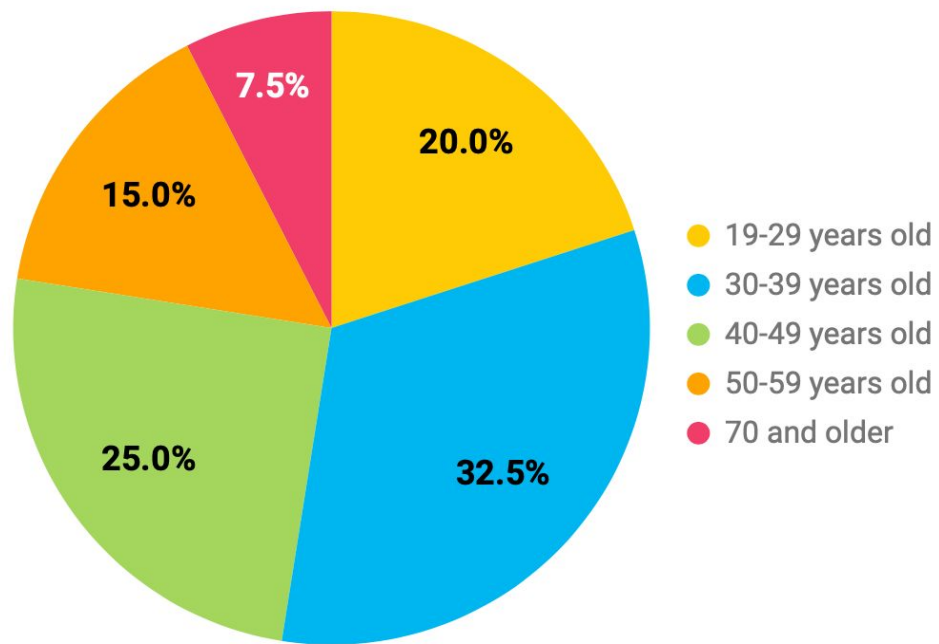
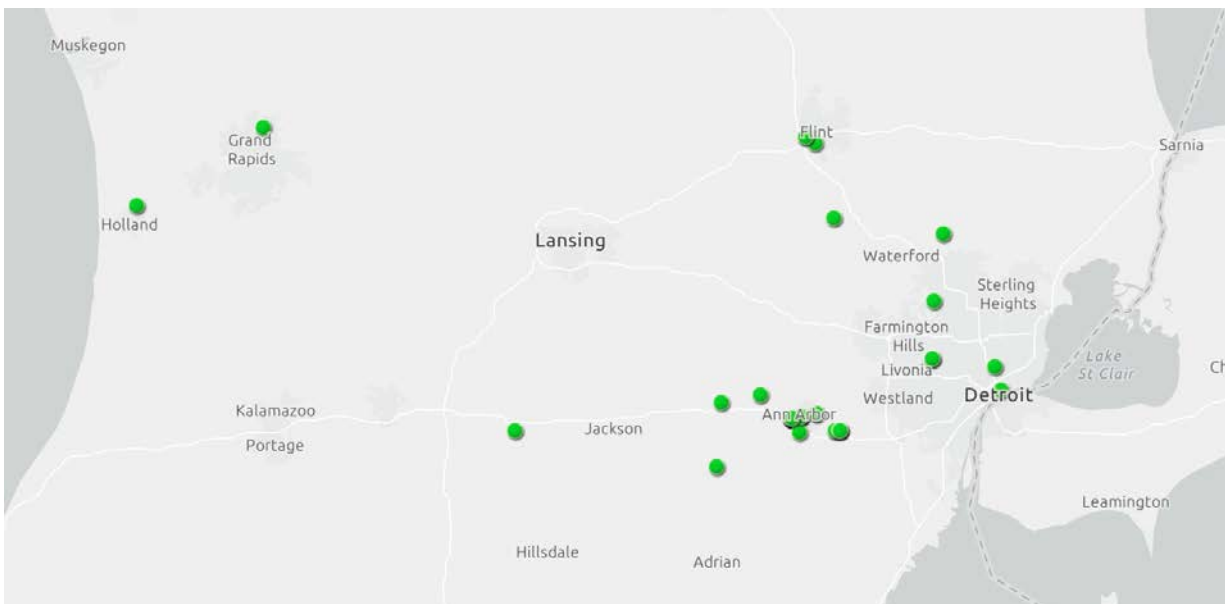
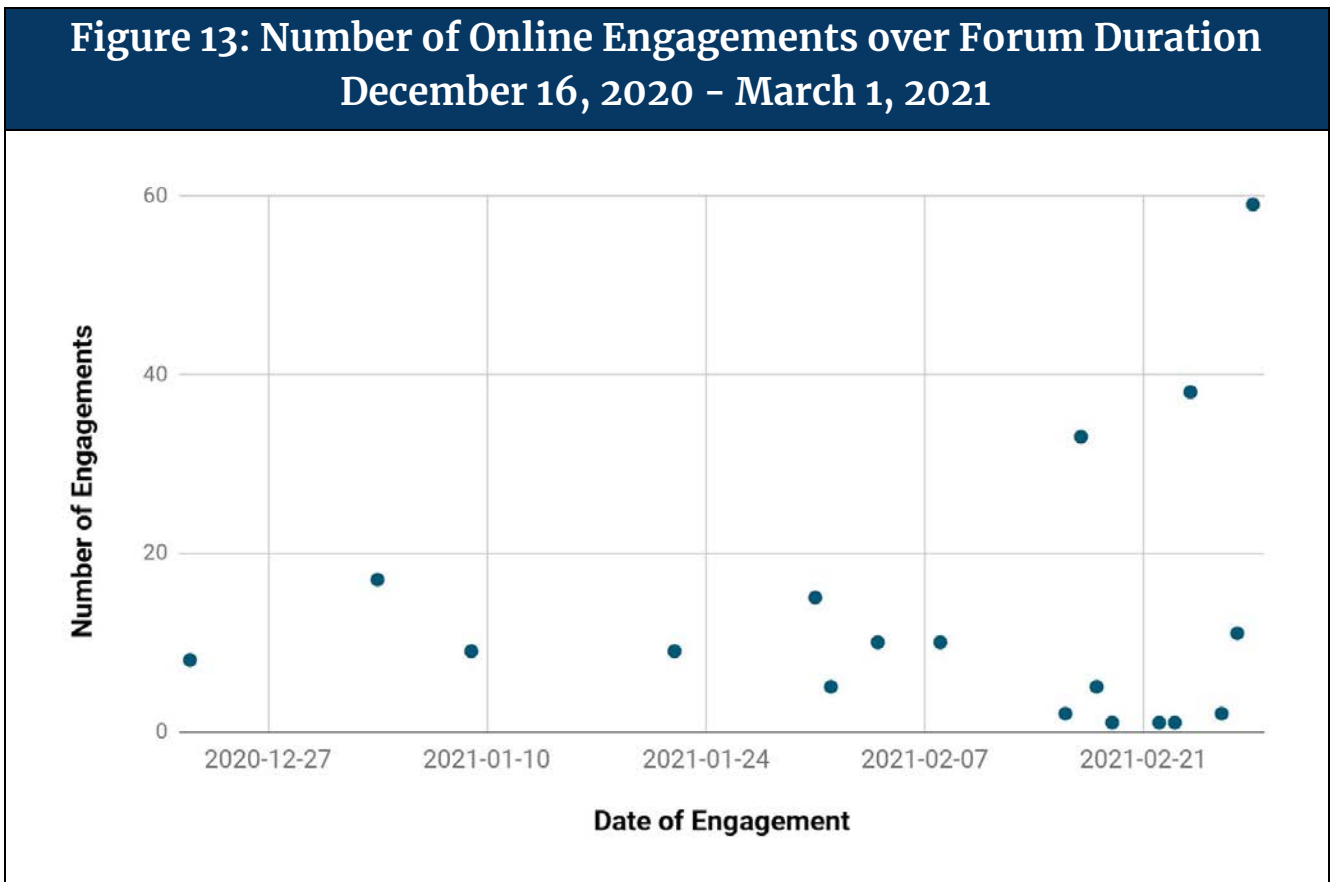
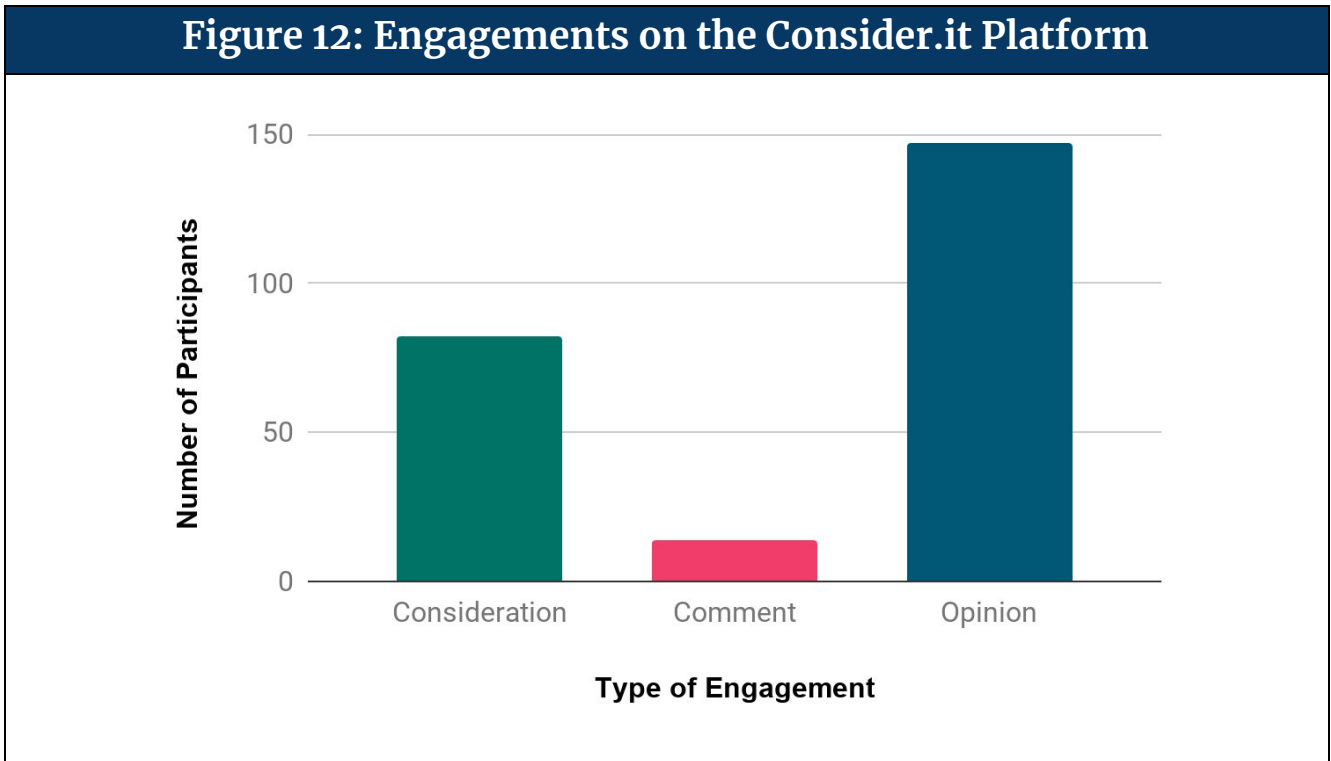


Figure 11: Map of Participant Locations

Subset of participants' locations, focused on southern and southeast Michigan.





Appendix B: Implications

Ethical Implications

- Communities negatively impacted by environmental degradation, pollution, and unfair allocation of environmental goods and services tend to be minority groups and communities that are socioeconomically disadvantaged, resulting in decreased quality of life (health, property value, access to services, etc)
- Public access to data is sometimes restricted, which could be discussed and/or contested from a variety of ethical perspectives.
 - Among the many reasons for withholding data from the public: terms set forth in grants and by funding agencies, data that is considered part of proprietary research, culturally sensitive information (especially when working with indigenous communities), or when release of the data would negatively affect communities that helped produce the data.
- Even if data is made public, it can be very hard to navigate different web or physical systems (libraries, archives, etc) to actually access the data/information; institutions producing or making data available have an ethical obligation to facilitate access to this data (beyond just saying “it’s public” and not doing anything further)
- Even publicly available data and data interpretation is often not translated into languages other than English, which creates barriers to understanding within the many different backgrounds of people that can live within a given community

Economic Implications

- In the private sector, environmental data is treated like a commodity. The process of acquiring, interpreting, and presenting environmental data is revenue-generating for some entities.
- The results of environmental studies could put pressure on municipalities to undertake costly infrastructure upgrades and remediation measures (i.e. replacing entire water systems, extensive bioremediation, etc.)
- Data must be managed and curated to have meaning and be appropriately applied, requiring resources that may be beyond the scope of an institution’s current capacity (necessitating additional funding, staff, etc)
- Communities impacted by environmental degradation, pollution, and unfair allocation of environmental goods and services may experience health issues that limit their capacity to work; removing/alleviating impacts will have a positive economic impact for those who are being affected.
- If the environmental concern being studied is being caused by a company (manufacturing facility, etc.) measures enacted to correct the issue (following data collection) may have economic implications for that business.
- Local-centralization of environmental data collection and processing could create jobs within impacted communities.

Social Implications

- It is not enough to provide data to communities or for communities to collect their own data. To be valuable, there must be the infrastructure for managing that data and adequate training or assistance with interpreting it.
- Great(er) accessibility of data can positively impact environmental literacy.
- If countries are monitoring their own environmental health, companies and municipalities will be held accountable by their constituents.
- Greater agency for communities that are being negatively by environmental issues (pollution, water quality, etc) to understand the problems they're facing, collect the information/data they need, and advocate for solutions
 - Developing partnerships with outside experts, rather than automatically assuming outside expertise is correct and the most important voice in the conversation

Environmental Implications





- Environmental data, and the concerns it can help address, impacts whole ecosystems and organisms other than people.
- Improving air quality, water quality, etc. has implications for other environmental issues such as biodiversity.

Experts and Stakeholders	Forum Implications			
	Social	Ethical	Economic	Environmental
Environmental Justice Groups	★	★		★
Youth Organizations	★	★		
Local Governments	★	★	★	
Private/ Public Partnerships	★	★	★	
Academic Researchers			★	★
Non-profits		★		★
Data + Information Instructure People/Institutions			★	
Policymakers	★		★	

Appendix C: Project Timeline and Design Canvas



Project Timeline Museums, Libraries, and Environmental Justice: A Community Conversation

<p>December 16, 2020</p> 	<p>Soft Launch Forum website goes live. Announce to design workshop participants encouraging them to share it with their organizations, networks, and communities.</p>
<p>January 4, 2021</p> 	<p>First Promotional Push UMMNH announces forum with promotional email to 14,000 subscribers and 12,300+ social media followers.</p>
<p>January 12, 2021</p> 	<p>Kick-off/How-to Webinar How-to webinar to provide project background and technical assistance. (6 attendees)</p>
<p>January 14-20, 2021</p> 	<p>Extending Reach + Incentives Email invitations go out to additional community organizations. 3 groups offered incentives/paid participation.</p>
<p>January 31, 2021</p> 	<p>Project Extension Project end-date extended from January 31st to March 1st. Announce extension to design workshop participants and receptive community organizations.</p>
<p>February 15, 2021</p> 	<p>Second Promotional Push UMMNH announces forum extension with a second social media campaign targeting 12,300+ followers.</p>
<p>February 26, 2021</p> 	<p>1st Interactive Zoom Session Interactive Zoom session with Bailey Park Neighborhood Development Corporation, Flint River Ecology Study, & The Porch Project (3 attendees)</p>
<p>March 1, 2021</p> 	<p>Forum Officially Ends A visual bookmarking tool that helps you discover and save creative ideas.</p>
<p>March 9, 2021</p> 	<p>2nd Interactive Zoom Session Although it is technically after the grant period, we plan on hosting an interactive Zoom session with the Michigan League of Conservation Voters.</p>

Forum Design Canvas

Key Partners	Key Activities	Value Proposition	Audience Relationship	Audience Segments
<p>Who are our partners/stakeholders? EJ groups (community, non-profit, etc.) Data + Information people/institutions Academics who partner with community organizations</p> <p>What resources do they provide? Expert knowledge on a variety of EJ issues Pulse of community concerns</p> <p>What activities do they perform? Prioritize environmental needs of the community Teach communities how to self-advocate Help understand/solve access issues</p>	<p>Design Design workshops, website development</p> <p>Deliberate How cultural heritage institutions can support EJ Ways to address info/data challenges</p> <p>Disseminate Share strategies (community level response) and ways that ISEs can support EJ (broader response)</p> <p>Key Resources ISE Physical space/venue Institutional support: graphics, marketing, review process</p> <p>ISE Partner Connections to key partners and audiences segments</p>	<p>What value will we provide to our audience? Connection among disparate groups Clear prioritization of community needs/desires</p> <p>What problem are we solving? Better understanding access to environmental information/data</p> <p>What innovation are we bringing? Perhaps none, innovation happens among the groups - at the community level. We are facilitators.</p> <p>What needs are we addressing? Equity in access to environmental data</p>	<p>What relationships do we have? Data/info. people, non-govt. & educational audience segments</p> <p>What relationships do we need to build? Youth activists and minority groups of the general public</p> <p>Audience Channel How do we reach our audience for inputs and outputs? Build personal connections.</p> <p>How do we integrate audience inputs and outputs? Blur lines between audience & participants. Let them be part of the process.</p>	<p>Government State - MI DEQ Municipalities Counties</p> <p>Non-Government Huron River Watershed Council, EHRA, ASAP, NAP, Sierra Club, etc.</p> <p>Educational SEAS/EJ Faculty Museums Libraries (U-M, YDL, AADL) University Data Repositories (Deep Blue Data, ICPSR)</p> <p>Industry For-profit environmental groups and LLCs</p> <p>Community Community-based EJ Groups Social Justice Group</p>
<p>Cost/Funding Honorariums for Design Workshop Participants - (\$750) Student Docent Help - Pre-Forum Survey - (\$75) Consider it Web Development - (\$4,000) Participant Incentives - (\$1850)</p>		<p>Output/Outcome/Evaluation Output Forum website with ideas/proposals for future project planning and dissemination to partners, environmental data needs Form (active), report Outcome Partnerships, projects & programming, value statements Evaluation Data analysis, scenario/proposal summary, follow-up survey</p>		

Appendix D: Platform Review Process

High-Level Overview: Online Platforms for Virtual Engagement

Adapted from Digital Tools for Participation: Where to Start (involve.org, 2020)

Platform	Use	Synchronous / Asynchronous	Web Address
Canvas	Teaching	Either	https://www.instructure.com/canvas
Citizen Space	Commenting / feedback	Asynchronous	https://www.delib.net/citizen_space
CitizenLab	Ideas generation Voting / prioritisation	Asynchronous	https://www.citizenlab.co
Cmnty	Discussion forum Ideas generation Interactive Q&A Voting / prioritisation	Asynchronous	https://www.cmnty.com/#how-it-works
Common Ground for Action	Discussion forum	Asynchronous	https://www.nifi.org/en/cga-online-forums
Concept Board	Ideas generation Interactive whiteboard	Synchronous	conceptboard.com
Consider.it	Deliberation Forums	Asynchronous	https://consider.it
Consul	Ideas generation	Asynchronous	http://consulproject.org/en/
Crowdspot	Crowd-mapping Ideas generation	Asynchronous	http://crowdspot.com.au
Deliberatorium	Argument visualisation Ideas generation	Asynchronous	http://deliberatorium.mit.edu:8000/ci/login?
Democracy OS	Decision-making Ideas generation Voting / prioritisation	Asynchronous	http://democracyos.org/
Dialogue	Ideas generation Voting / prioritisation	Asynchronous	https://www.delib.net/dialogue
Discourse	Discussion forum	Either	https://www.discourse.org
Dropbox Paper	Co-drafting	Either	https://paper.dropbox.com/
Election Buddy	Voting / prioritisation	Asynchronous	https://electionbuddy.com/
Engagement HQ	Commenting / feedback Crowd-mapping Discussion forum Ideas generation Voting / prioritisation	Either	https://www.bangthetable.com/engagement-hq-community-software
Ethelo	Decision-making Discussion forum Ideas generation Voting / prioritisation	Either	https://ethelo.com/t

Etherpad	Co-drafting	Either	https://etherpad.org
Flarum	Discussion forum	Either	https://flarum.org
FixMyStreet	Crowd-mapping	Asynchronous	https://www.fixmystreet.com
Gamut	Teaching	Either	https://ai.umich.edu/blog/say-hello-to-gamut/
GroupMap	Ideas generation Interactive whiteboard	Synchronous	https://www.groupmap.com
Ideaflip	Ideas generation Interactive whiteboard	Synchronous	https://ideaflip.com
Ideascale	Ideas generation Voting / prioritisation	Asynchronous	https://ideascale.com
iObeya	Ideas generation Interactive whiteboard	Synchronous	https://www.iobeya.com/en
Jamboard	Ideas generation Interactive whiteboard	Synchronous	https://jamboard.google.com
Jitsi	Video-conferencing	Synchronous	https://jitsi.org
Yellow Dig	Teaching	Asynchronous	https://www.yellowdig.co/product

In-Depth Review: Online Platforms for Virtual Engagement

Platform	Pros	Cons	Other Considerations
Canvas	<p>Participants can provide information and input in written and multimedia formats.</p> <p>Completely customizable with internal U-M tech support.</p> <p>Many families may be familiar with learning management systems as a result of facilitating their children's e-learning which might make it more approachable.</p> <p>Many other tools can be embedded directly into Canvas (Padlets, Yellow Dig, etc.) for improved functionality.</p> <p>Analytics allow you to track participants log-ins and how much time they are spending on each page/prompt/feature.</p>	<p>Can feel like a "class" even if it is not meant to by virtue of being a LMS.</p> <p>Facilitators would have to add/invite participants outside of UM individually. In other words, participants can't self-register.</p>	<p>Even though participants have to be signed-up by a facilitator, the content of the Canvas module can be made public as in read-only form.</p> <p>Can use "peer review" feature to partner participants for small-group brainstorm.</p> <p>Easy lift.</p>
Consider.it	<p>Argument visualisation</p> <p>Commenting / feedback</p> <p>Decision-making</p> <p>Specifically designed to administer forum</p>	<p>Would consume a substantial part of the budget to customize.</p> <p>Would require facilitators to</p>	<p>Still need to research specifics of registering/sign-up</p>

	<p>and has been successfully implemented for this style of community forum in the past (MOS)</p> <p>Analytics and data export</p>	<p>learn/master a new online-tool.</p>	
Yellow Dig	<p>Designed to mimic social media platforms and might therefore be more user-friendly.</p> <p>U-M has a license.</p> <p>Meets FERPA requirements, and implements additional methods of data protection beyond what FERPA requires.</p>	<p>Don't know much about this tool. Needs more research.</p>	<p>Can be integrated into Canvas.</p>
Gamut	<p>Suite of online learning tools from Academic Innovation are available for immediate use by any U-M faculty or instructional staff. Each tool is a standalone web application that uses a technology called the Learning Tools Interoperability protocol, which allows them to easily integrate into any course on Canvas, Coursera, edX, or FutureLearn.</p> <p>Internal tool, potential to customize for our forum needs.</p>	<p>Would require facilitators to learn/master a new online-tool.</p> <p>This application will be new for everyone - for the facilitators and for the forum participants.</p>	<p>Still need to research specifics of registering/sign-up</p>
Common Ground for Action	<p>Like Consider-it, this platform allows participants to decide if they support or don't support an action and explain why in their own words.</p> <p>Features a graphic representation of groups values/opinions which updates in real-time.</p> <p>2-fold deliberation: Specifically asks participants for feedback on both the proposed actions themselves and if they are willing to accept any drawbacks.</p> <p>Synchronous but not a video platform. Uses a chat window in addition to drag & drop options.</p>	<p>Misclassified as asynchronous. Needs to be actively moderated.</p> <p>No way to do video/audio. Participants are limited to typing in the chat window and toggling/sliding things on the application.</p> <p>Not everyone will be able to keep up with the chat. Folks type at different speeds, read at different speeds, etc.</p> <p>Doesn't appear to be mobile compatible. Website says "Works on any laptop or tablet (with a physical keyboard)"</p>	<p>Questions:</p> <p>Ability to modify upvoting language - right now it is set up as support/don't support?</p> <p>Email cga@nifi.org for more info.</p>
Discourse	<p>Free, open source forum software.</p>	<p>Looks like a glorified message board</p>	<p>Managed forum hosting from \$100 / month</p>