

# Application for NIHHIS Urban Heat Island Mapping | CAPA Heat Watch 2022

## Part 1

*Last Name: Celebrezze*

*First Name: David*

*Affiliation/Organization: Columbus Department of Public Utilities*

*Position/Title: GreenSpot Coordinator*

*In what city/county and state (or if outside the U.S., what city and country) do you intend to run an Urban Heat Island (UHI) mapping campaign?*

*City of Columbus, Ohio as well as Opportunity Zones and Control Zones within Franklin County."*

*What is the approximate total area (in square miles) a UHI mapping campaign in your region would cover?*

*250 square miles*

*Will you be the primary contact, and your organization the lead organization for this local campaign? If not, please specify with full contact information*

*[Primary contact here]*

*For successful applicants, NOAA covers the price charged by CAPA Strategies for a basic Heat Watch campaign (~\$12K to map up to 100 sq mi, not inclusive of volunteer subsidies or refreshments; campaigns larger than this cost more). Can your organization or partner organizations provide matching funds (a portion of the ~\$12K) to offset the cost of a campaign, and if so, at what amount? If you don't have firm funding yet but expect to later, you may note that. Matching funds are not required, but help us reach more communities. [Note: The price reflected is for U.S. cities- the cost may vary for international cities]*

*Yes, we can provide matching funds for up to \$20,000 and are willing to provide additional funds if needed for the success of the project.*

*During the campaign, in what ways do you anticipate local partners in your city can support mapping participants and engage community members in implementing solutions to extreme heat? (Check all that apply) Through non-profit organizations*

Offering a stipend/money for gas

Cold water

Food

Child care

- X Community events
- X Other: Volunteer management

*What in-kind support will you provide?*

All partners included, about 25 staff members will participate in the mapping.

We will also recruit an additional 80+ volunteers

The lead applicant will coordinate the implementation of the grant and work with partners on recruiting volunteers, public engagement, developing materials and distribution, and final reporting.

New in '22 - Options for Additional Monitoring Products

*In response to requests from campaigners in previous years, we will pilot additional monitoring products in a few cities. While the standard campaigns provide a good snapshot of how temperatures vary in a city/county on a hot day, adding stationary sensors to the campaign can provide a longitudinal look at how these spatial patterns also vary over time under varying weather conditions. Deploying stationary sensors comes with several additional responsibilities, however. Local campaign organizers will be expected to ensure they have cleared their plans to mount sensors with the city/county/police, and they will have to prepare and mount ~20 sensors (provided by CAPA Strategies) within trees or on other surfaces. They will also have to collect these sensors several weeks later and return them to CAPA Strategies for analysis. NOAA plans to cover the cost of acquiring the stationary sensors to pilot monitoring in 2 campaigns. The pilot communities will be selected based on climate, existing coverage of sensors, and other scientific factors.*

*Please indicate below if you would be interested in using additional monitoring products during the course of the campaign - and willing to commit the extra time and effort required to include them (see above).*

*You may also suggest other measurements you would like to see incorporated into the campaigns in the future. (Optional)*

X Stationary temperature & humidity sensors [we plan to pilot this in 2 U.S. cities in 2022]

X Air quality monitoring as part of the mobile field campaign

Other:

*If you checked any of the boxes in the previous question, please tell us why you are interested in these monitoring products (i.e. do you have a specific concern in mind?) Your answer*

Yes, stationary temperature and humidity sensors. The Mid-Ohio Regional Planning Commission has existing stationary air quality monitors focused on vulnerable locations where the stationary temperature and humidity sensors can be placed. These stations provide a long-term record of particulate matter pollution levels in vulnerable communities that could complement the array of mobile and stationary sensors provided by CAPA Strategies during the study period. A land-use classification, conducted by Ohio State to inform installation of an array of weather stations on campus and expanded to the City of Columbus, could be used to inform siting of the stationary sensors provided by CAPA Strategies.

These monitors will provide a different, baseline data set that will be complementary to the mobile data. The mobile data will give us a snapshot of the spatial variability in temperature over the city, letting us know where hotspots are. The stationary data will give us long-term (in terms of time) data that lets us know how the temperature in our city is varying over time in specific locations. Those will both provide

important information about the ways we need to tackle supporting our communities in the case of extreme temperature events.

Yes, air quality monitoring. This will build upon existing work that has begun of understanding what air quality looks like from neighborhood to neighborhood in Columbus/Franklin County with a specific focus on our most vulnerable neighborhoods. The Mid-Ohio Regional Planning Commission has an existing network of 20 particulate matter monitors focusing on neighborhoods deemed vulnerable based on socioeconomic and health indicators. These monitors are installed and will be used to gather a year's worth of air pollution data. The monitors were calibrated by partnering with the Ohio Environmental Protection Agency to co-locate the sensors with a regulatory grade monitor. The Ohio State University is also locally deploying stationary monitors to assess the contributions of transportation to local air pollution levels. This grant will build on that foundation to include more neighborhoods and a different type of data. The project website is here:

<https://www.morpc.org/program-service/neighborhood-air-quality-monitoring-program/>

## Part 2

[Statement of Need] 2000 characters or less (currently at 1,984 with spaces)

*Please describe briefly the challenges faced by your community as a result of urban heat, noting how and why understanding the distribution of heat is important.*

Columbus and Franklin County residents face acute challenges due to extreme heat. According to the 2014 ClimateCentral report, Columbus, OH is ranked a top 10 city with the most intense summer urban heat islands and ranked #1 city with the fastest-growing urban heat island (0.84°F per decade increase since 1970). Since then the city grew by an additional 100,000 residents. Due to this rapid growth, we lost even more green space and canopy coverage (currently 22%), contributing toward the City's creation of an equity-focused Climate Action Plan and Urban Forestry Master Plan each adopted in 2021.

Heat remains one of the greatest weather-related causes of death in the US and in Columbus and Franklin County. Almost 20% of Columbus residents (176,620) are in poverty and 17.5% are over 65 or under 5 making up a vulnerable population according to the U.S. Census website. According to the Asthma and Allergy Foundation of America's 2021 report, Columbus ranks 13th in 100 cities in higher than average emergency room visits for asthma attacks, and higher than average scores for quick-relief and long-term controller medicine use. According to Limaye et al. (2018), Franklin County is anticipated to see between 25 and 32 additional deaths per 100,000 for those age 65+ in the year 2069 versus 2007. Those residents are more likely to live in neighborhoods that have low tree canopy and less access to public transportation.

The mapping will help prioritize which neighborhoods should be the focus for resources to continue the efforts of dismantling systemic racism and imparting environmental justice. The results of this study will bolster current efforts for home energy efficiency upgrades, tree giveaways, and access to green and outdoor spaces in low-income neighborhoods. It will guide leadership, decision-makers, and developers to choose infrastructure and plans that will help mitigate the urban heat island and provide co-benefits when future investments are made.

## [Goals & Anticipated Outcomes] 2000 characters or less. Currently at 1,942 (with spaces)

*What are your goals for conducting a UHI campaign in your region? How do you plan to use the map and data to improve community resilience to extreme heat?*

Bringing environmental justice, racial justice and equity to all neighborhoods in Columbus is a central theme of Columbus' Climate Action Plan (CAP) and the Columbus Urban Forestry Master Plan (UFMP). Using the heat map allows the CAP to meet the following practices:

- Center on equity, diversity, and inclusion
- Build community capacity through engagement
- Partner with residents and community groups to deliver meaningful change through actions.

An important goal of our collaborative approach is to create a cohesive heat map including opportunity and control neighborhoods within Franklin County.

The city is planning several priority resilience hub locations as part of CAP to serve as cooling centers for heat emergency days, conditioned shelters for utility outages, and safe food and water distribution centers in a recovery mode after disruptions. The city of Columbus plans to use the detailed heat map to guide our tree equity program as a detailed heat map will deliver key insight into street tree planting areas of the highest need. This includes information that can focus our GreenSpot Community Backyards program to the areas that need it the most. This program offers rebates (or free) for rain barrels, native trees, and native plants. Columbus' city zoning code is also currently under review, and the heat map could have a positive impact on an equitable revision of the zoning code.

In 2020, the City of Columbus partnered with Davey Resource Group to compare the 2013 land cover data to surface level temperatures as part of the Urban Forestry Master Plan. An update of land cover data is planned for 2022. Having more granular in-situ measurements from the UHI mapping will provide updated and improved temperature data to be analyzed alongside this updated land cover data.

## [Effective Partnerships] 2000 characters or less (currently at 1,930 with spaces)

*Describe the major partnerships you have developed or could develop to support a heat campaign in your region. For each group you list, please characterize the current status of your partnership (for example: you plan to approach them, you've received verbal confirmation of their intent to partner, you have a formal commitment of volunteer time and/or funding from them).*

We engaged with partners that committed verbally to provide staff time and support the project with in-kind contributions.

In addition, Franklin County Public Health and Franklin Soil and Water Conservation District will contribute \$1,000 combined to the matching fund for adjacent communities outside of Columbus city limits as well as staff time for the project.

The list of partners (in addition to City Departments including Public Utilities, Rec & Parks, & Public Service) committed to the project are:

- Franklin Soil and Water Conservation District: provide part of the match, promote the project, recruit volunteers, use the data in helping identify neighborhoods to focus the Community Backyards program.
- Franklin County Public Health: provide part of the match, and staff time for underserved communities in Franklin County outside of Columbus, provide coordination with local governments in Franklin County that participate in the mapping efforts.
- The Ohio State University Byrd Polar & Climate Research Center: committed to monitoring long, medium, and near term conditions to identify days for data collection in the summer. They have an existing array of weather stations deployed on campus and two small research-grade weather stations that could be assigned for longer-term monitoring if siting permission and security can be established.
- Mid-Ohio Regional Planning Commission (MORPC): help recruit volunteers and provide staff time, promote the project and utilize existing stationary air quality monitoring stations.
- Green Columbus: help recruit volunteers, promote the project, and assist in the creation of outreach material and distribution.
- Friends of the Lower Olentangy Watershed: help recruit volunteers, promote the project, and assist in the creation of outreach material and distribution within the Olentangy Watershed.
- Columbus City Council Member Emmanuel Remy: Promote the project, potentially provide additional funds.

## [Volunteer Engagement & Support] 2000 characters or less (currently 1,781 with spaces)

*How do you plan to recruit, engage, and support diverse volunteers for the campaign with your partners?*

Using our combined email lists of over 30,000 volunteers and sustainability members, the group will start an outreach campaign around Earth Day in April to recruit about 200-300 interested volunteers in addition to neighborhood climate champions and staff.

A landing page and flyers will help inform the public. We will also use yard signs at our community tree nurseries and community centers in our underserved communities to get neighbors involved.

We will partner with local media (radio, TV, and print) to reach a diverse pool of potential volunteers.

Engaging the public through partnering with our seven settlement houses in Columbus will allow us to reach a diverse group of people in the neighborhoods that benefit the most from heat mapping.

Setting up an event in our volunteer management tool (GivePulse) for the day of the mapping lets us register volunteers and communicate effectively with them in the lead-up to the event.

The nonprofit partners will reach out to local businesses and the Columbus Foundation to raise money for supplies like water and food for that day as well as gas cards.

The city has many avenues to recruit, engage, and support a core group of diverse volunteers. The city's GreenSpot program has a membership of 16,000 residents; Columbus Recreation and Parks has a volunteer base of 10,000; the city's Keep Columbus Beautiful program will assist in volunteer recruitment; Franklin Soil and Water Conservation District, MORPC, and Franklin County Public Health can provide additional staff time.

We will reach out to our local e-bike rental program provider Co-Go to use e-bikes to cover areas that will be inaccessible by car.

One of our takeaways from viewing panel discussions with previous participants was to have a large pool of volunteers to make sure we end up with 80-100 actual volunteers/staff on the day of the mapping.

## [Environmental Justice] 2000 characters or less (currently 1,972 with spaces)

*How are you planning to use this campaign and its results to enhance environmental justice initiatives in your community?*

In regards to the campaign, the city will contribute funds to create climate ambassadors in these communities that will be compensated for their efforts. We will work with non-profits such as IMPACT Community Action (who frequently work with BIPOC and low-income residents) and who the City is actively partnering with on a clean energy workforce program. This will serve as an opportunity to build and strengthen relationships in the BIPOC community and connect the importance of environmental justice, climate change and heat to their everyday lives. Many local partners (churches, volunteer groups, etc.) also signaled interest to participate beyond the heat mapping efforts. Other partnerships could include the Breathing Association, the LifeCare Alliance, and Central Ohio Area Agency on Aging.

Regarding outcomes, as part of the Climate Action Plan, the city has strategies and goals around energy efficiency, access to greenspace, canopy growth, and creating community based resiliency hubs. The heat mapping data would inform strategies and resource deployment for each of these areas, and would help target investment for weatherization program expansion the City is planning with IMPACT Community Action. It would simultaneously inform strategies for greenspace preservation and inform resources needed for resiliency hubs.

Additionally through the Urban Forestry Master Plan, the city is committed to addressing inequalities of the tree canopy cover by 2030. The heat map, in combination with American Forests tree equity data, allows the city to most effectively identify locations in the highest need of trees.

Opportunity communities outside of the city limits are also directly impacted by the consequences of UHI and climate change. Franklin County entities plan to work in tandem with City teams on this UHI project. Data collected from these vulnerable areas will contribute to the combined efforts to address environmental justice.



## Previous participants (videos)

I recommend these two examples from previous participants:

King County (CA): <https://youtu.be/P8bry00lx1M?t=355> and

Cincinnati <https://youtu.be/P8bry00lx1M?t=1252>

(I added timestamps to the youtube links so the videos start right at their presentations)

Here are the results from this year's participants:

Bronx:

[https://youtu.be/TUK\\_BSJyn2o?t=1340](https://youtu.be/TUK_BSJyn2o?t=1340)

Charleston:

[https://youtu.be/TUK\\_BSJyn2o?t=1994](https://youtu.be/TUK_BSJyn2o?t=1994)

Clarksdale, IA

[https://youtu.be/TUK\\_BSJyn2o?t=2745](https://youtu.be/TUK_BSJyn2o?t=2745)