

**Global Warming and  
Health:  
Investigating Earth and  
Atmospheric System  
Properties and Issues  
Related to Climate  
Change using  
Geospatial Technology**

**Dr. David A. Padgett  
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Geography  
Tennessee State University  
Nashville, Tennessee**



# Hurricane Katrina

New Orleans,  
Louisiana

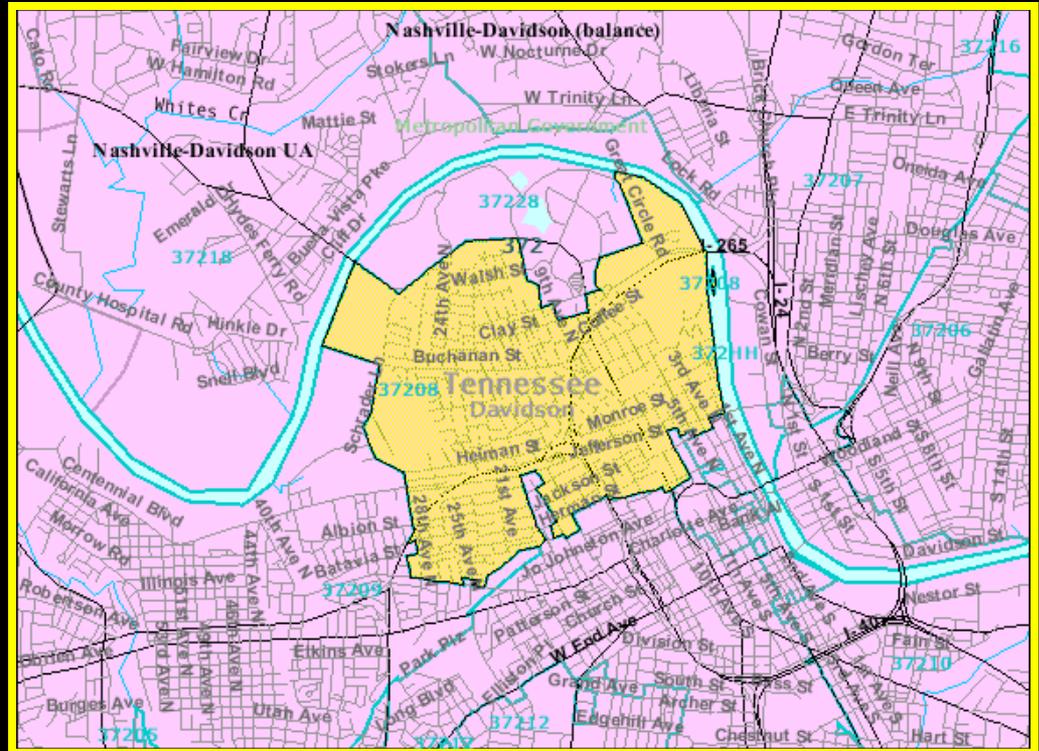
August 29, 2005

Exposed inner-city  
populations'  
increased  
vulnerability to  
extreme weather  
events.



## Nashville's 37208 Zip Code Area: A potentially vulnerable population

- Approximately 93% of the community is African American.
- Among the 9,945 occupied households in the area, 7.4% rely on public transportation as their way to work (the Nashville-Davidson County average is about 2.0%)
- 16.5% have no vehicles available
- 66% of residents live at or below the poverty level.



Source: U.S. Census

# Indicators of Community Vulnerability Associated with Climate Change Impacts upon Human Health



Here are a few examples of how living and working conditions, underlying health conditions, and other environmental impacts can create more vulnerability or greater resilience to climate change health impacts:

- » Living in neighborhoods with high ambient pollution levels increases vulnerability to higher levels of ground-level ozone from rising temperatures.
- » Farmers and farm communities are at higher risk of drought impacts if soils are already depleted or local ground water is contaminated.
- » The risk of heat illness is greater in “urban heat islands” — urban neighborhoods with few trees and parks and lots of pavement; conversely, people in neighborhoods with lots of trees and green space are more resilient in the face of rising temperatures.<sup>80</sup>
- » Limited access to public transit impedes evacuation during a hurricane. People with good access to public transit and well-maintained sidewalks are more likely to use active transportation, get more physical activity, and lower their risk of heart disease.<sup>81,82</sup>
- » People with cardiovascular disease are at greater risk of heat illness; those with asthma are at greater risk from increased ozone levels, wildfire smoke, and increased pollen.<sup>83</sup>
- » People who need medications are more vulnerable to disrupted medical care in a natural disaster.<sup>84</sup>
- » Poverty reduces the capacity to absorb rising food, water, or energy prices. It is much harder for low-income communities to rebuild after a disaster, especially since fewer low-income people have insurance.
- » Farmworkers and other outdoor workers are at higher risk of heat illness.<sup>83</sup>
- » Living in houses with screens can decrease the risk of vector-borne illnesses such as dengue fever.<sup>85</sup>
- » People who live in neighborhoods with strong social networks are likely to do better after a natural disaster because they can rely on help from others.<sup>86</sup>

Source: Rudolph L, Gould S, Berko J. Climate Change, Health, and Equity: Opportunities for Action. 2015. Public Health Institute, Oakland, CA.

# Mapping Nashville's **Red Cross** Emergency Shelters with Geospatial Technology: A **Pearl-Cohn High School** and **TSU** Community Engagement Partnership 2008-2009



**American  
Red Cross**



[www.lanceradvanced.com](http://www.lanceradvanced.com)

**Pearl Cohn High School**



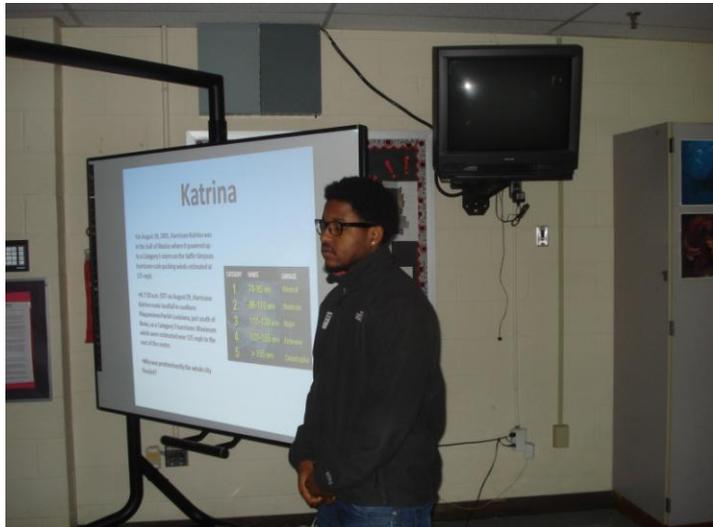
TSU Pilot Center for Academic  
Excellence in Intelligence Studies



TSU Geographic Information  
Sciences Laboratory

Undergraduate TSU students enrolled in the fall 2008 Weather & Climate (GEOG 3500) course are required to develop and teach learning modules for Pearl-Cohn High School students on the dynamic impacts of hurricanes and applications of geographic information systems (GIS) in extreme weather disaster response and preparedness. Pearl-Cohn's enrollment is 93% African American with 93% of students qualifying for the free and reduced price lunch program.

The *Teaching the Levees* Curriculum – based upon Spike Lee's documentary "When the Levees Broke"



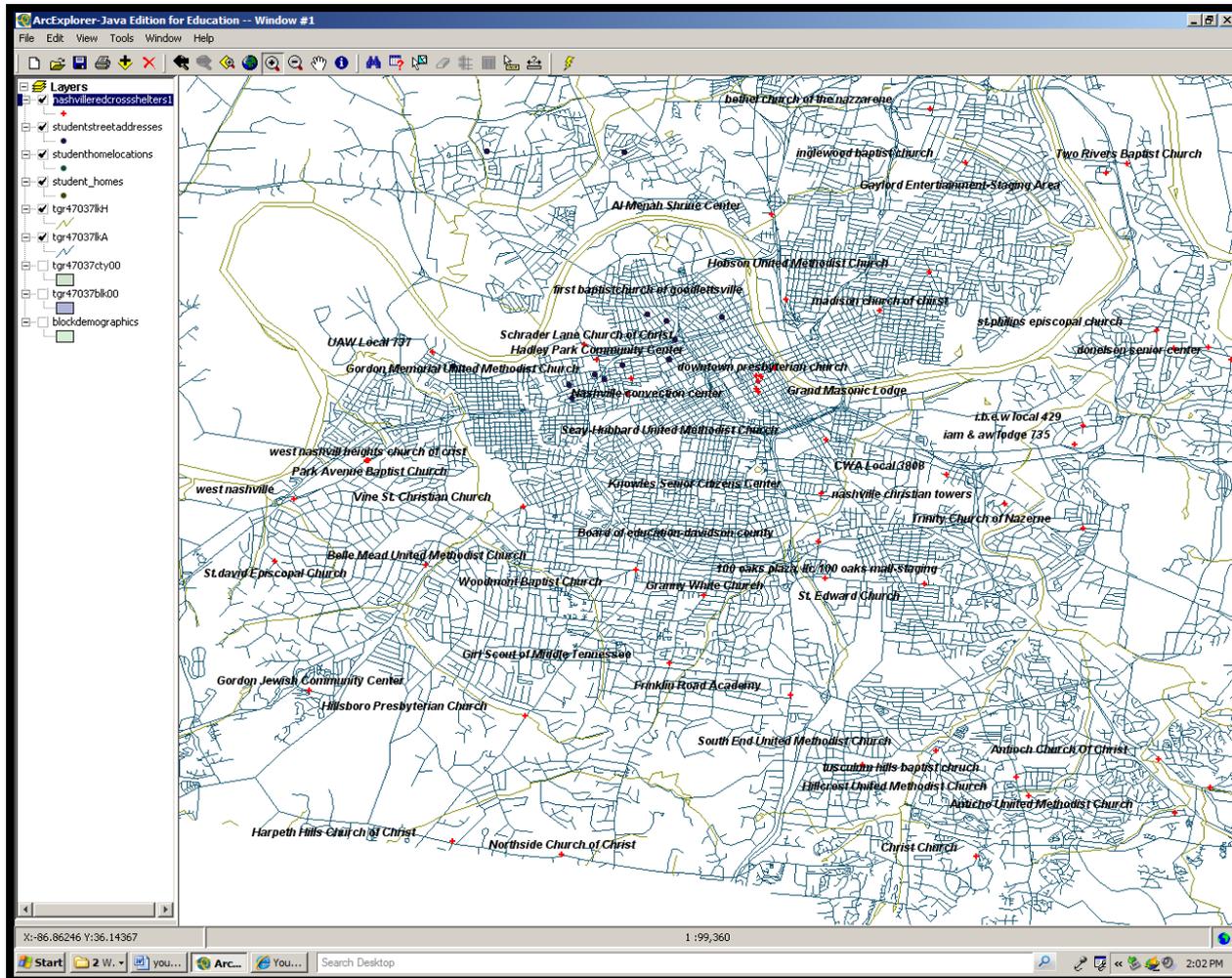
Free Geospatial Technology learning modules for high school students - James Madison University



**Academic year 2008-2009:** TSU Weather & Climate (GEOG 3500) and Urban Geography (GEOG 4850) students worked with Pearl-Cohn High School students using ArcGIS Desktop software to produce emergency shelter maps for the Nashville Red Cross Chapter.

# Project Outcomes

**May 2009** - The Pearl-Cohn High School students produced the first maps of the locations of Nashville's **Red Cross** Emergency Shelters. Prior to this project, no such maps existed.



May 2009 – The TSU/Pearl-Cohn High School Red Cross Emergency Shelters mapping project reveals that one of Nashville's most vulnerable communities, the 37208 zip code area, is underserved in terms of emergency shelter availability. Pearl-Cohn High School is located within the 37208 zip code area.





**June 2009** - For producing the first maps of emergency shelters for the Nashville Chapter of the **American Red Cross**, each Pearl-Cohn High School student and their teacher, Mrs. Debbie Hirsch, was presented a volunteer award certificate

## DAVIDSON COUNTY

### Baptist group, Red Cross team up

The Nashville-based National Baptist Convention USA signed an agreement Thursday that opens its member churches to being disaster relief shelters for the American Red Cross.

The partnership also provides the nation's largest African-American religious organization the resources to offer more disaster relief training to pastors and members.

Rev. Randy Vaughn, director of the office of disaster management for the convention, said the partnership seemed a natural fit.

"Our buildings can be

used as shelters, we can become points of distribution, mass feeding and care, even helping liaison with the community," he said. "It is our hope, after proper praying and so forth, that we will have a large force of National Baptists working alongside volunteers from the Red Cross and other agencies."

He said Hurricanes Katrina and Rita in 2005 awakened the convention to the need to organize its disaster efforts. The convention includes more than 16,000 churches.

— HEIDI HALL  
THE TENNESSEAN

Fall 2009 – The Nashville Office of the American Red Cross partners with the National Baptist Convention USA to recruit its member churches to serve as Red Cross Emergency Shelters.

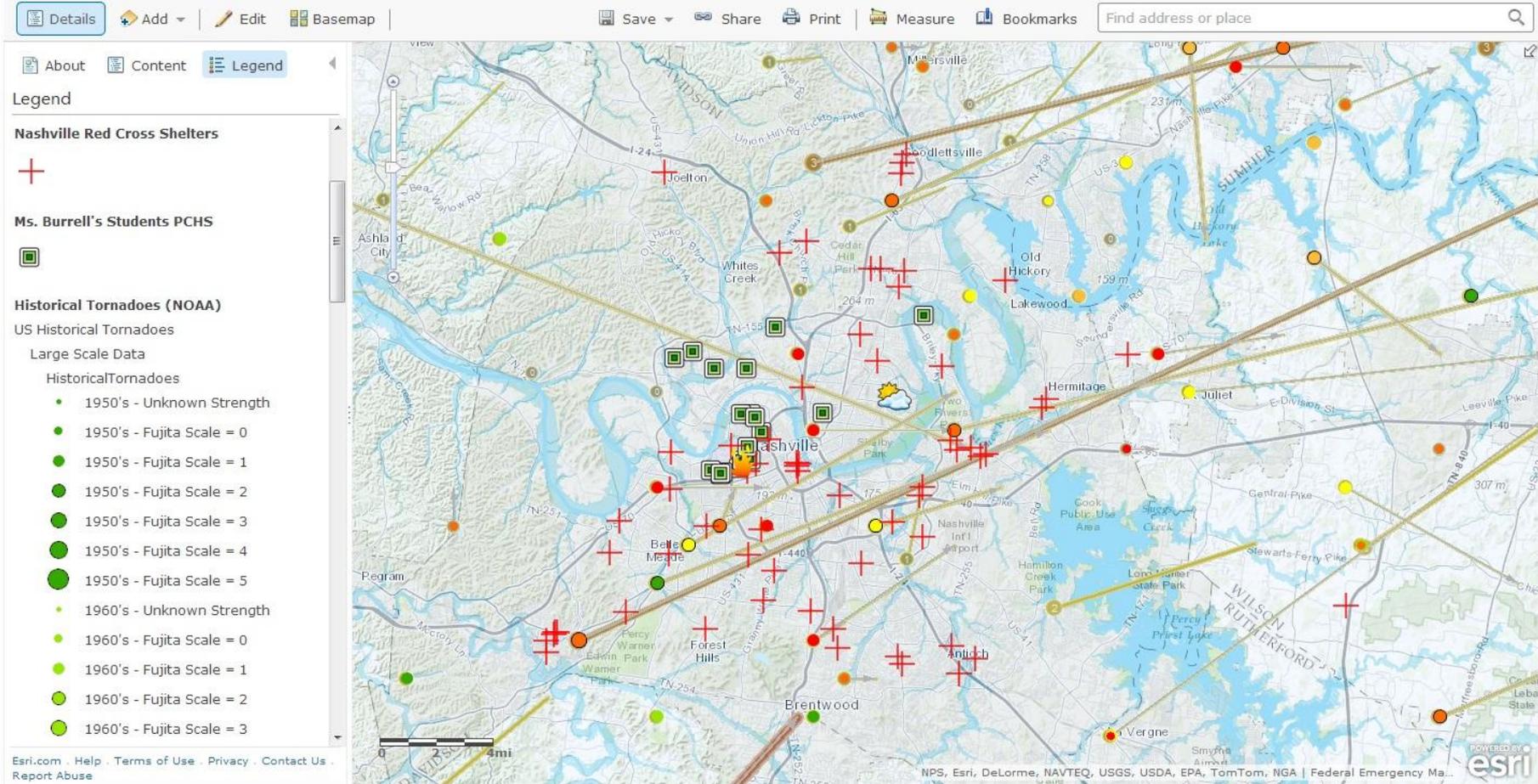
Approximately 85 percent of the shelters are maintained by faith-based organizations.

# May 2010 - Nashville, Tennessee : 500-1000 Year Flood Event

- Worst flooding in 140 years
  - 500-1000 year flooding
  - 17 inches of rain in 2 days
- Cumberland River crested at 52 feet
  - 12 ft above the flood stage
- Release of water by the Army Corps of Engineers
  - Protect critical structures
  - Potentially increased flooding
- \$2 Billion in damages
- Over two dozen fatalities
- More than 10,000 people displaced



The predominantly African American and low-income population in and near the 37208 zip code area was significantly impacted by the 2010 flood, in part due to lack of emergency shelters.



**Fall 2012** – Weather & Climate (GEOG 3500) course students worked with Ms. Yolanda Burrell's Pearl-Cohn High School Physical Sciences class to produce a My Community, Our Earth ([www.mycoe.org](http://www.mycoe.org)) **"Investigating Hazards Activity"** online mapping project based upon emergency preparedness for extreme weather hazards.

www.arcgis.com/home/webmap/viewer.html?webmap=d6b45a663bde4973b9f68e185b7ebef8

ArcGIS MyCOE Project Exchange Map

NEW MAP CREATE PRESENTATION David

Details Add Edit Basemap Save Share Print Measure Bookmarks Find address or place

About Content Legend

Legend

MyCOE Projects and Exchanges

- Climate Change
- Food Security
- Green Economy
- Hazards
- Other

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The **Pearl-Cohn High School** and **Stratford STEM Magnet High School** projects on the **MyCOE** ([www.mycoe.org](http://www.mycoe.org)) **Project Exchange Map**, created using **ArcGIS Online** ([www.arcgis.com](http://www.arcgis.com))  
Nashville, Tennessee

**Summer 2013** - Undergraduate TSU students enrolled in Weather & Climate (GEOG 3500) course were required to develop and teach learning modules for Stratford STEM Magnet High School students based upon the Global Learning and Observations to Benefit the Environment (GLOBE) ([www.globe.gov](http://www.globe.gov)) Atmosphere Protocol. The lesson was supplemented with geospatial technology applications and data from the school's WeatherBug station. **Stratford's enrollment is 68% African American, 6% Hispanic with 91% of students qualifying for free/reduced price lunch.**



THE GLOBE PROGRAM

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21 and 22 May: Online GLOBE [Webinar](#) - latest news about the Student Climate Research Campaign

Partners - Nominate your students for the [Student Science Symposium](#)

16 - 20 July: 16th GLOBE Annual Partner Meeting - [Register now](#)

THE GLOBE SCIENCE NETWORK

Regions

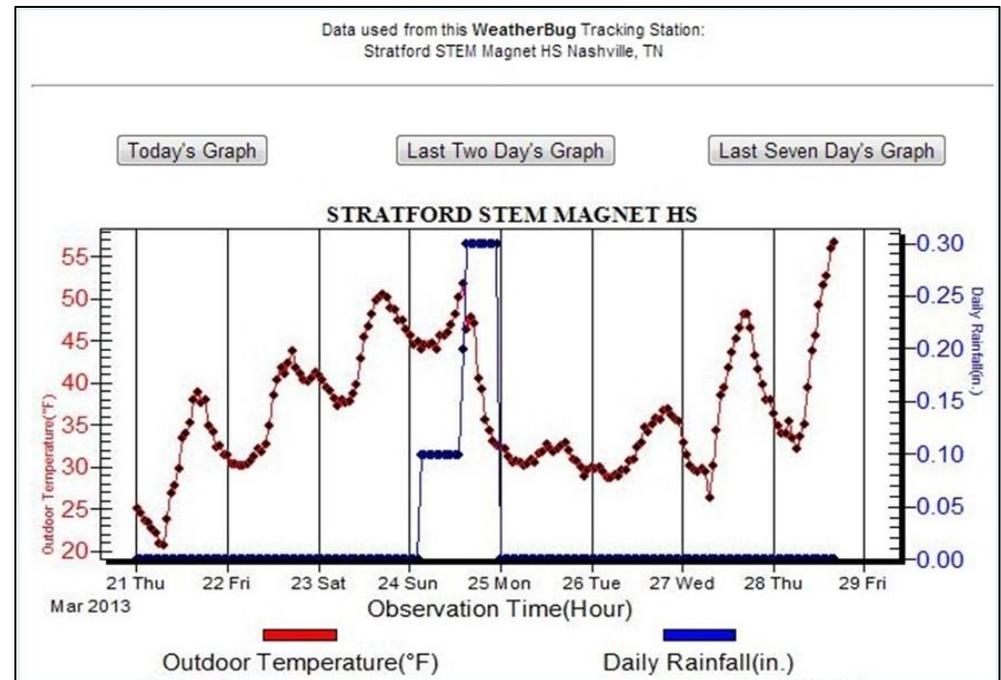
View all GLOBE Countries

Student Climate Research Campaign

GLOBE STARS

RECENT TWEETS

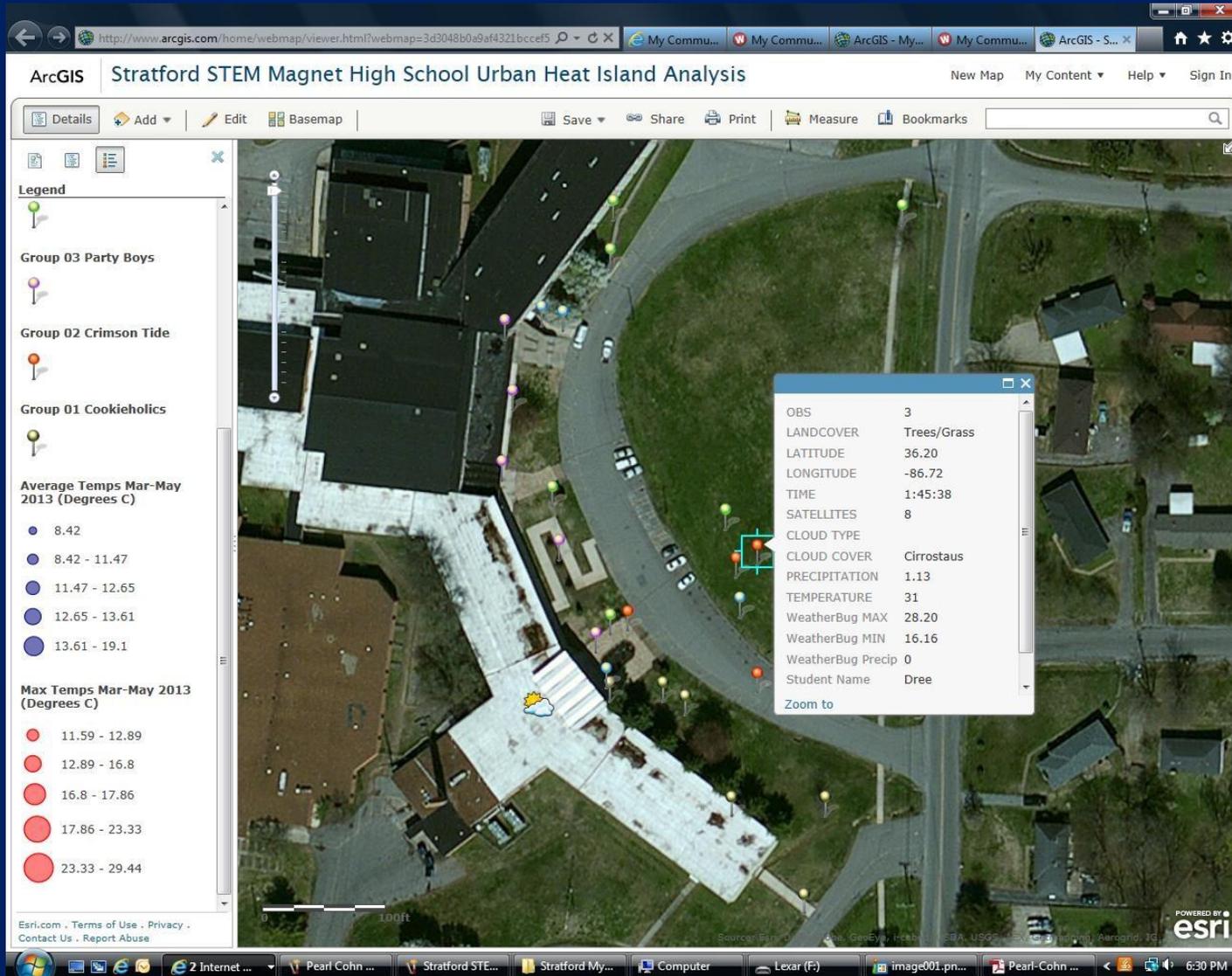
GLOBE is represented at International Symposium on Urban Lakes Monitoring and Management in Sri Lanka <http://www.globe.gov>



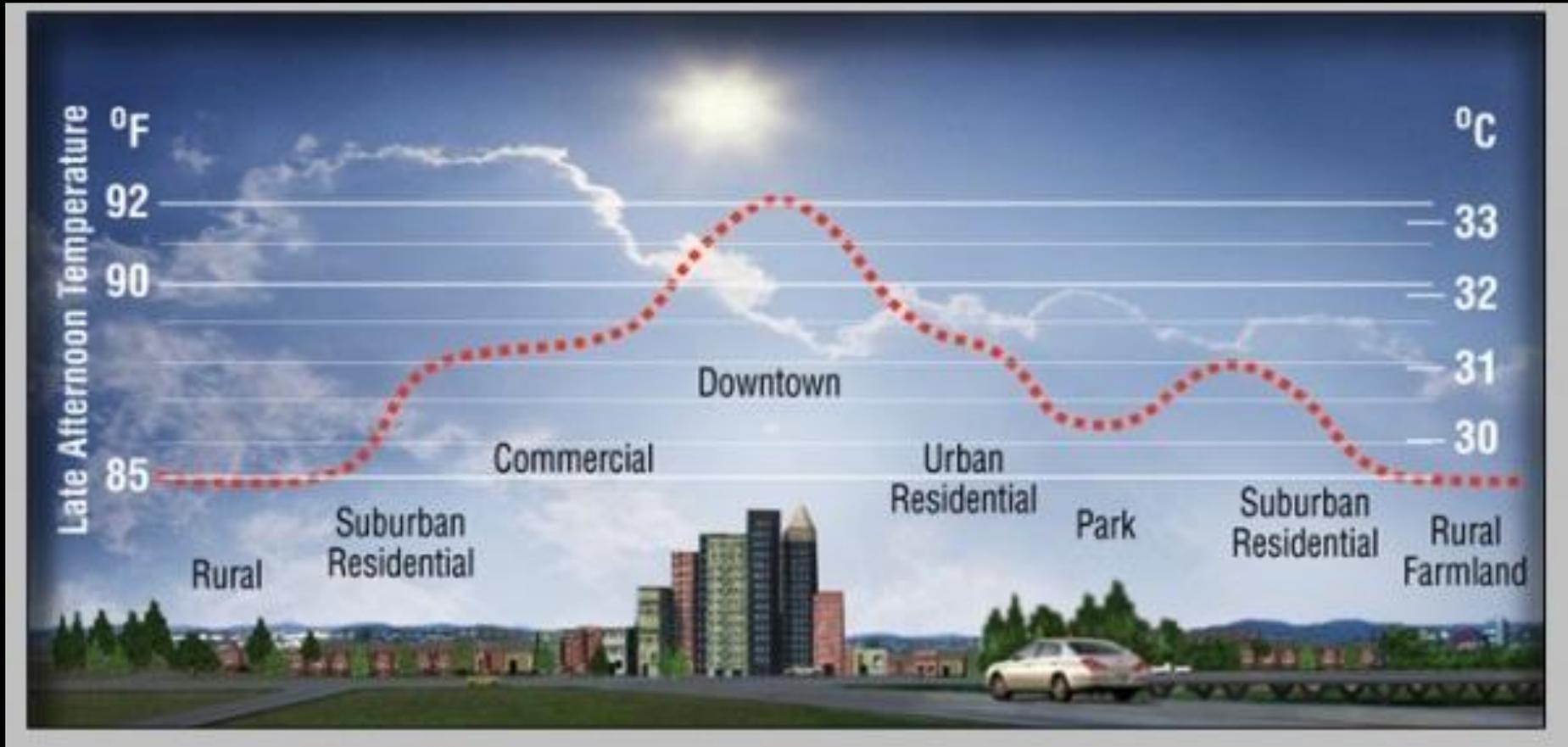
**Summer 2013** - Precipitation, temperature, and cloud cover data were collected per the **GLOBE** Atmosphere Protocol. GPS receivers were used to record data collection point locations on Stratford's campus.



# Summer 2013 – Weather & Climate (GEOG 3500) students worked with Stratford students enrolled in Ms. Allison McVey's AP Geography course on a My Community, Our Earth "Ecological Footprint" project entitled "Urban Heat Islands Analysis".



# URBAN HEAT ISLAND SCHEMATIC



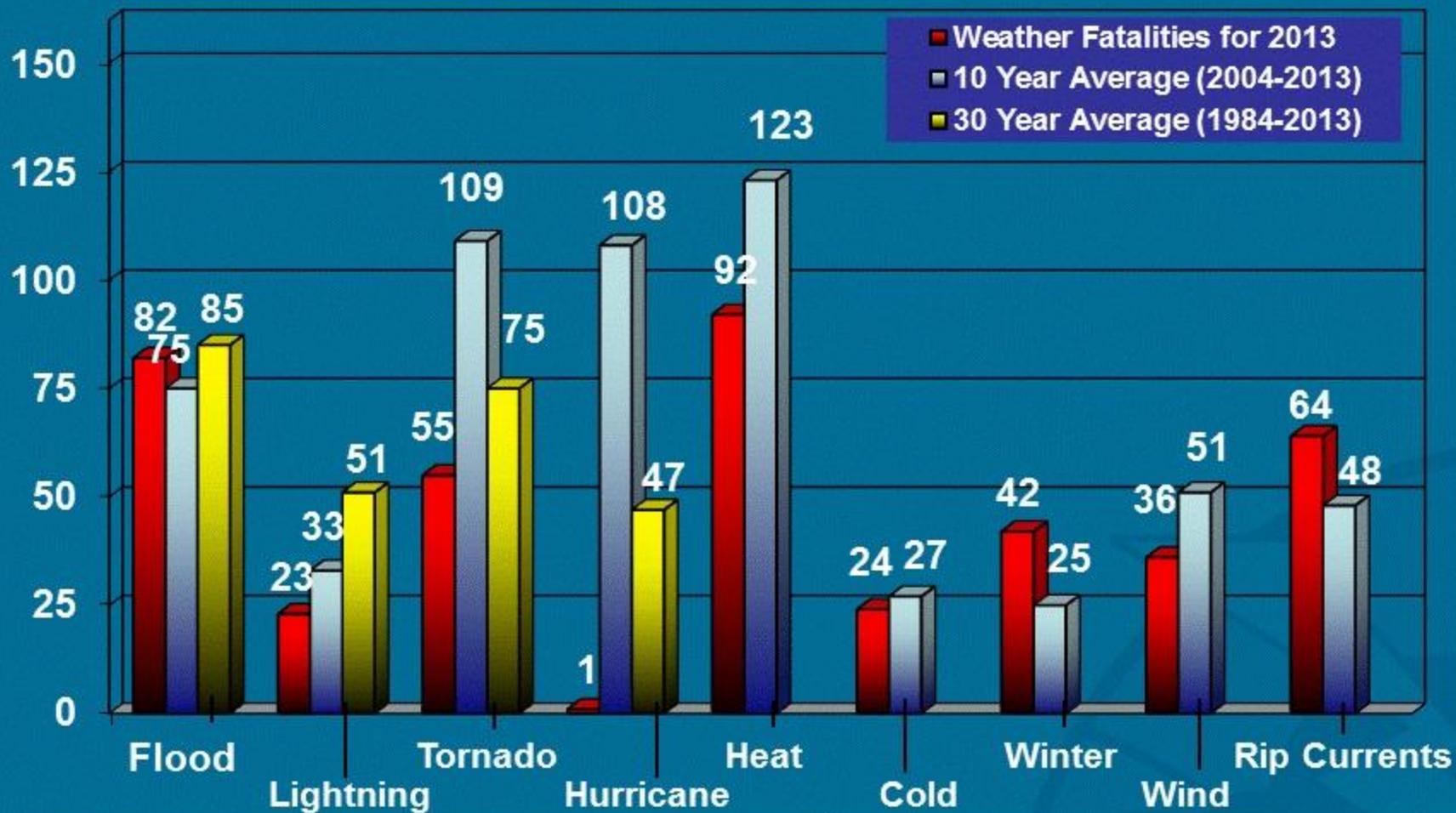
# URBAN HEAT ISLAND IMPACTS

## Effects

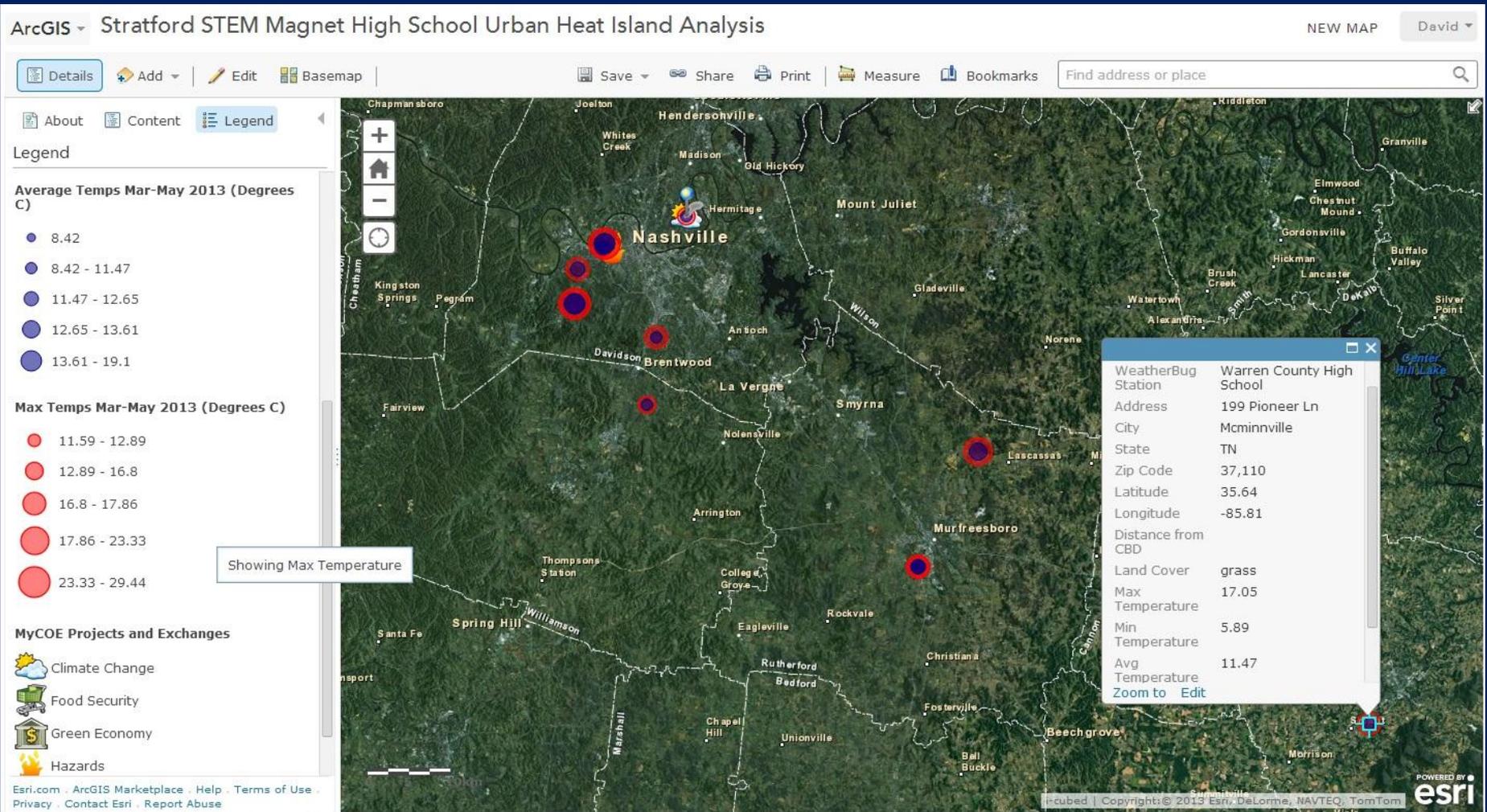
- Direct influence the health and welfare of urban residents.
- Requires more energy for cooling purposes => increases emissions and electric consumption
- Increases precipitation in cities and areas downwind of cities.
- Enhances photochemical reactions, which increases the particles in the air and thus contributes to the formation of smog and clouds.
- Culprit for global warming.
- Affects rain pattern in summertime.



# Weather Fatalities

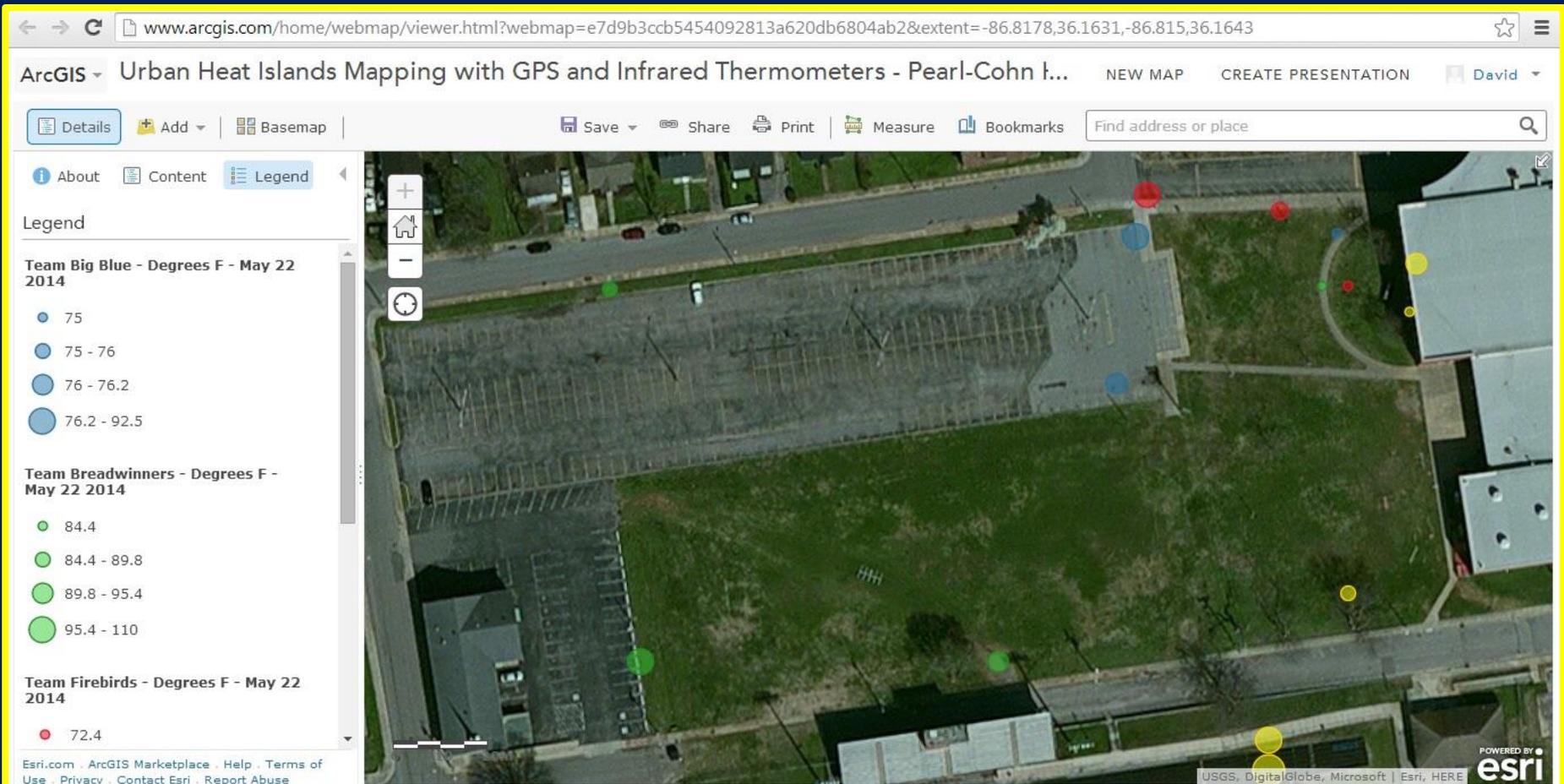


# Summer 2013 - Maximum and Average Daily Temperature data recorded by the Stratford High School WeatherBug Station and other regional stations for March-May 2013 were downloaded and analyzed with regard to effect of land cover upon observed temperatures.





**Summer 2014 – TSU Weather & Climate (GEOG 3500) students worked with PCHS students enrolled in Ms. Yolanda Burrell’s 9<sup>th</sup> grade Physical Sciences course to produce an “Urban Heat Islands Map” using ArcGIS Online for their MyCOE “Ecological Footprint” project.**



Fall 2014 – Tennessee State University and Pearl-Cohn High School Awarded a “Map Your World” Program Grant

<http://mapyourworld.org/#/teachers>



## Map Your World - Nexus 7 Tablet Application

Map it. Track it. Change it. Share it.

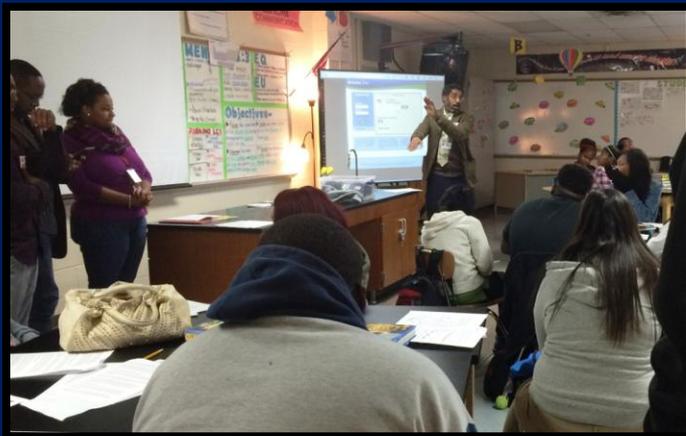
If you work with middle school and/or high school youth and want to incorporate technology into your curriculum, we invite you to participate in an exciting new project – Map Your World – an innovative, multi-platform project that places the power of new technologies into the hands of young change agents.

If your project is selected, you will be awarded five Nexus 7 tablets (valued at \$200 each) to support implementing Map Your World in classrooms and/or youth programs. These tablets, in conjunction with the Map Your World platform and curriculum, will assist youth in using data, interactive maps, and storytelling to develop campaigns addressing issues important to the health and well-being of their communities.

To participate, please review this information and complete the application on the next page. We welcome applications from schools, community organizations, after-school programs, and other organizations serving middle and high school students.

\*\*\*Applications must be received no later than Monday, December 1st.\*\*\*

**Fall 2014** – Tennessee State University students enrolled in Cartography (GEOG 3100) led Ms. Yolanda Burrell’s 9<sup>th</sup> grade Physical Science class through a mapping exercise using the “**Map Your World**” platform to address questions related to “**urban heat islands.**”



PEARL-COHN HIGH SCHOOL  
 MAP YOUR WORLD  
[WWW.MAPYOURWORLD.ORG](http://WWW.MAPYOURWORLD.ORG)  
 INVESTIGATING URBAN HEAT ISLANDS

INSTRUCTORS: MS. YOLANDA BURRELL AND DR. DAVID A. PADGETT

INSTRUCTIONS

Dr. Padgett will begin with a brief introduction to Urban Heat Islands and their impacts upon the environment and human health.

Question: Do measured surface temperatures increase as we move closer to downtown Nashville?

1. Turn on the Nexus 7 Tablet
2. Connect to the PCHS Wifi service
3. Go to the applications screen. Open up the Chrome browser.
4. Go to [www.google.com](http://www.google.com). Search for “WeatherBug Achieve.”
5. Select the WeatherBug Achieve link. Your group will be assigned one of the WeatherBug Stations below. Enter the “WeatherBug Classroom” using the zip code area for your assigned station and then follow the prompts until you get to the station’s homepage.

WeatherBug Station	Zip Code Area	Distance from Downtown Nashville (Miles)
Tennessee State University	37209	2.5
Camp Marymount	37062	20.0
Harding Academy	37205	6.3
Crieve Hall ES	37220	7.1
Vanleer ES	37181	37.0
John F Kennedy MS	37013	13.0
Adventure Science Center	37203	1.5

6. Go to the “Pearl-Cohn High School: Investigating Urban Heat Islands” work sheet. Fill in all of the information and data except for the latitude and longitude for your station. Note: Calculate the Average Temperature using the Maximum Temperature and Minimum Temperature.

7. Dr. Padgett will email you the link to the online survey form. Fill it in with the information from your work sheet. Use the form to locate the latitude and longitude for your WeatherBug station. Click Submit.

**Fall 2014** – TSU World Regional Geography II (GEOG 1020) and Cartography (GEOG 3100) students assisted ninth grade physical sciences students in entering climate data into the Map Your World data collection form hosted on Google Nexus 7 tablets. Data included **maximum and minimum average temperature observations** at selected local WeatherBug stations.

[Current Obs](#)
[Live Display](#)
[Daily Obs](#)
[Monthly Obs](#)
[Graphs](#)

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Data used from this WeatherBug Tracking Station:  
Tennessee State University Nashville, TN

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[November](#)
[December](#)
[January](#)
[February](#)
[March](#)

November, 2014

Observation Date	Max Temp °F	Min Temp °F	Rain / Month in	Rain / Year in	Wind Gust mph	Last Light	Min Pressure "Hg	Max Pressure "Hg	Min Humid %	Max Humid %
11/26/2014	50.78	28.06	2.50	26.13	28.06	02:25 PM	29.95	30.13	29.89	99.65
11/27/2014	38.41	31.26	2.52	26.15	26.75	03:51 PM	30.06	30.44	60.69	93.13
11/28/2014	46.46	24.46	2.52	26.15	17.76	04:05 PM	30.16	30.43	37.63	94.93
11/29/2014	55.79	41.45	2.52	26.15	34.20	03:52 PM	29.96	30.11	43.70	73.60
11/30/2014	68.73	57.26	2.52	26.15	34.64	12:33 PM	29.99	30.09	55.94	80.82

At times data may be incomplete because of occasional power outages and/or technical problems with the weather instruments.

### Pearl-Cohn High School: Investigating Urban Heat Islands

WeatherBug Station

Date

Maximum Temperature

Minimum Temperature

Average Temperature

Distance from Downtown Nashville

**Record your current location**  
GPS coordinates can only be collected when outside.

latitude (x,y °)

longitude (x,y °)

altitude (m)

accuracy (m)

search for place or address



© Mapbox © OpenStreetMap Improve this map

Save as Draft  
  
[log out](#)

**Fall 2014** – Results of Pearl-Cohn High School students’ “urban heat islands” exercise. Regional WeatherBug Station climate data were mapped onto the “Map Your World” program platform. Students analyzed and discussed differences in observed surface temperatures for urban land cover versus green space.

mapyourworld.org/?state=xyz&code=RZVd9xeNu24Toh5vHWKbqqjKPNNeE#/maps/pchsgisf14/16948?owner=true

Do measured surface temperatures increase as we move closer to downtown Nashville?  
Tennessee State University - Main Campus  
Nashville, Tennessee, United States

Find It

Visualize It

Change the question and other settings to show people what needs to change.

Pick a question  
Select...

Pick your visualization  
 Totals  Pie chart  Bar graph  Photos

Pick your point type  
 Points  Heat map

Download CSV

See the Story

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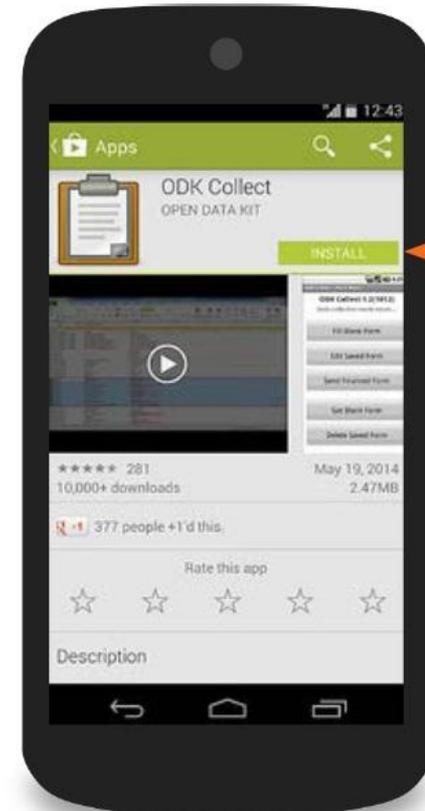
**Summer 2015** – TSU Weather & Climate (GEOG 3500) students replicated the Summer 2014 **urban heat islands** exercise. The “ODK Collect” application replaced pen and paper for entering **surface temperature observations attribute data**. Data collection point latitude/longitude positions were logged using the Google Nexus 7 tablet GPS function.



## MAP IT: COLLECT DATA

Download ODK Collect to your Android device from [Google Play](https://play.google.com/store/apps/details?id=org.odk.collect).

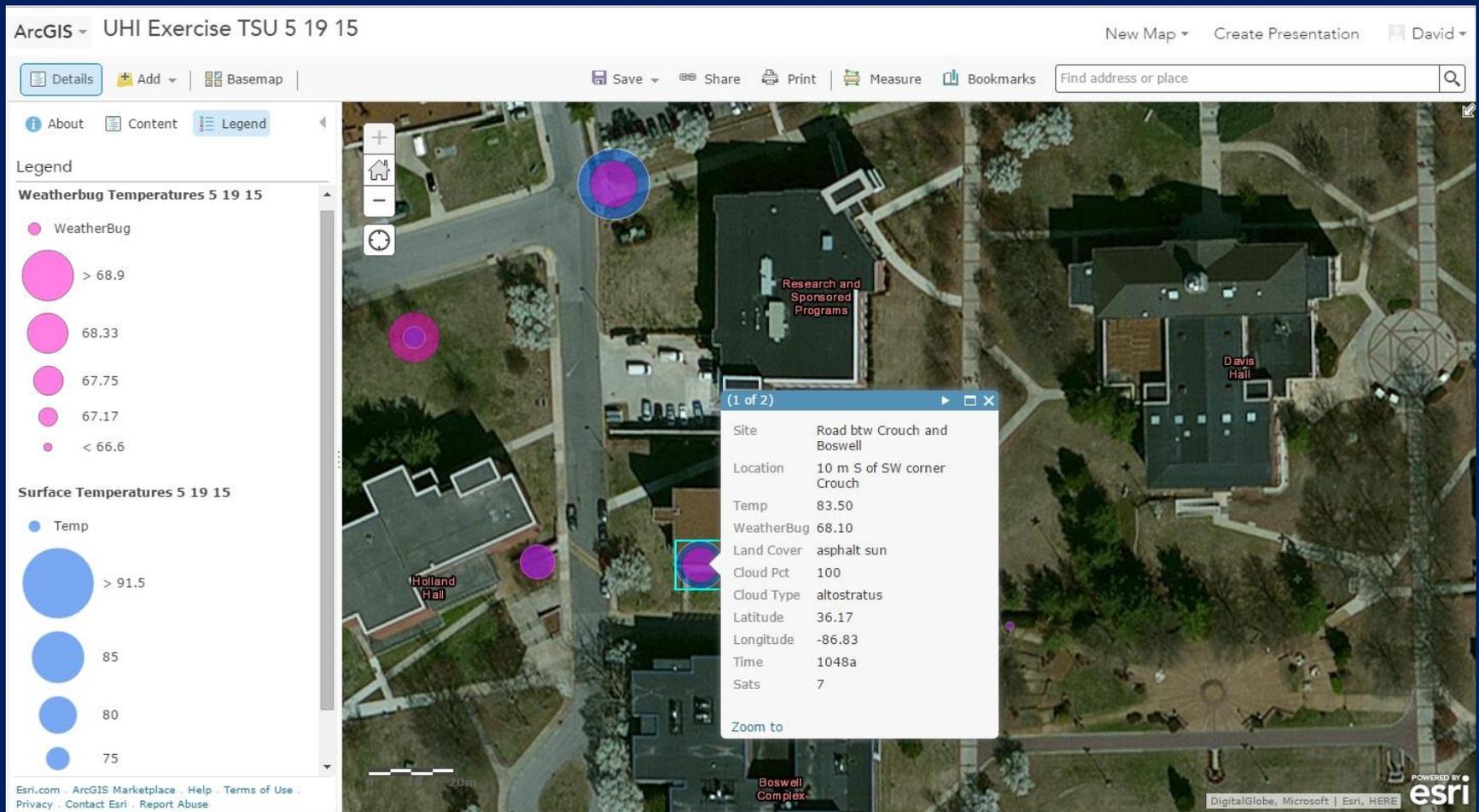
1. Select the Google Play/Android Marketplace icon on your device
2. Search for “ODK Collect” from “Open Data Kit”
3. Select that result and click Install



**Summer 2015** – Students in TSU’s summer 2015 Weather & Climate course developed a new **urban heat islands** lesson with the Nexus 7 tablets. The lesson began with surface temperature data collected using infrared thermometers and then data collection points being mapped onto the Map Your World ([www.mapyourworld.org](http://www.mapyourworld.org)) platform.



**Summer 2015** – The **urban heat islands** lesson concludes with surface temperature data collected using the Nexus 7 tablet being downloaded from the Map Your World map in comma delimited text (CSV) format and then imported into the ArcGIS Online platform. Using ArcGIS, surface temperatures are compared with ambient air temperature data collected from TSU's Weatherbug Station (<http://weather.weatherbug.com/>).





# Mapping Resources



Association of American Geographers (AAG) My Community, Our Earth Program ([www.mycoe.org](http://www.mycoe.org))

Map Your World Program ([www.mapyourworld.org](http://www.mapyourworld.org))

Environmental Systems Research Institute (ESRI) ConnectED Program (<http://connected.esri.com/>)

ESRI ArcGIS Online ([www.arcgis.com](http://www.arcgis.com))

Global Learning and Observations to Benefit the Environment (GLOBE)(<http://www.globe.gov>)

ESRI Story Maps (<http://storymaps.arcgis.com/en/>)



# Acknowledgements

Dr. Sue Fuller, Mrs. Debbie Hirsch, Ms. Beverly Jacobs,  
Ms. Charlie Hall, Mrs. Gwendolyn Adams, Ms. Nekya Young,  
Ms. Ginger Hausser, Mr. Glen Paschall, Mr. Antonio Johnson,  
Mr. Mark Brinkley, Dr. Lonnie Sharpe, Dr. Marva Woods, Dr. Joel Dark,  
Ms. Susan West, Ms. Roni Hagy, Ms. Yolanda Burrell, Mr. Sean Bethune -  
--- All PCHS and TSU student participants; Environmental Systems  
Research Institute; Google, Inc.



# Community-Based Environmental Justice Research using Geospatial Technology and Online Toxics Release Inventory (TRI) Data: A Case Study

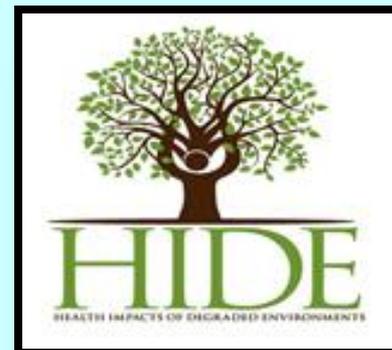
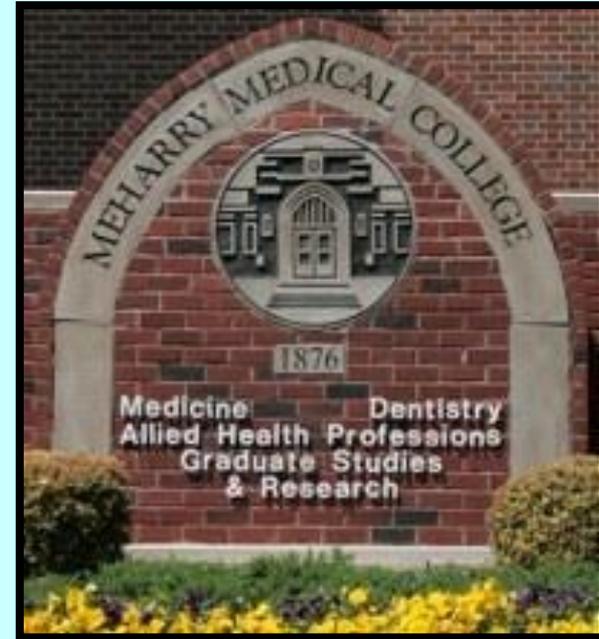


**Dr. David A. Padgett, Associate Professor of Geography**

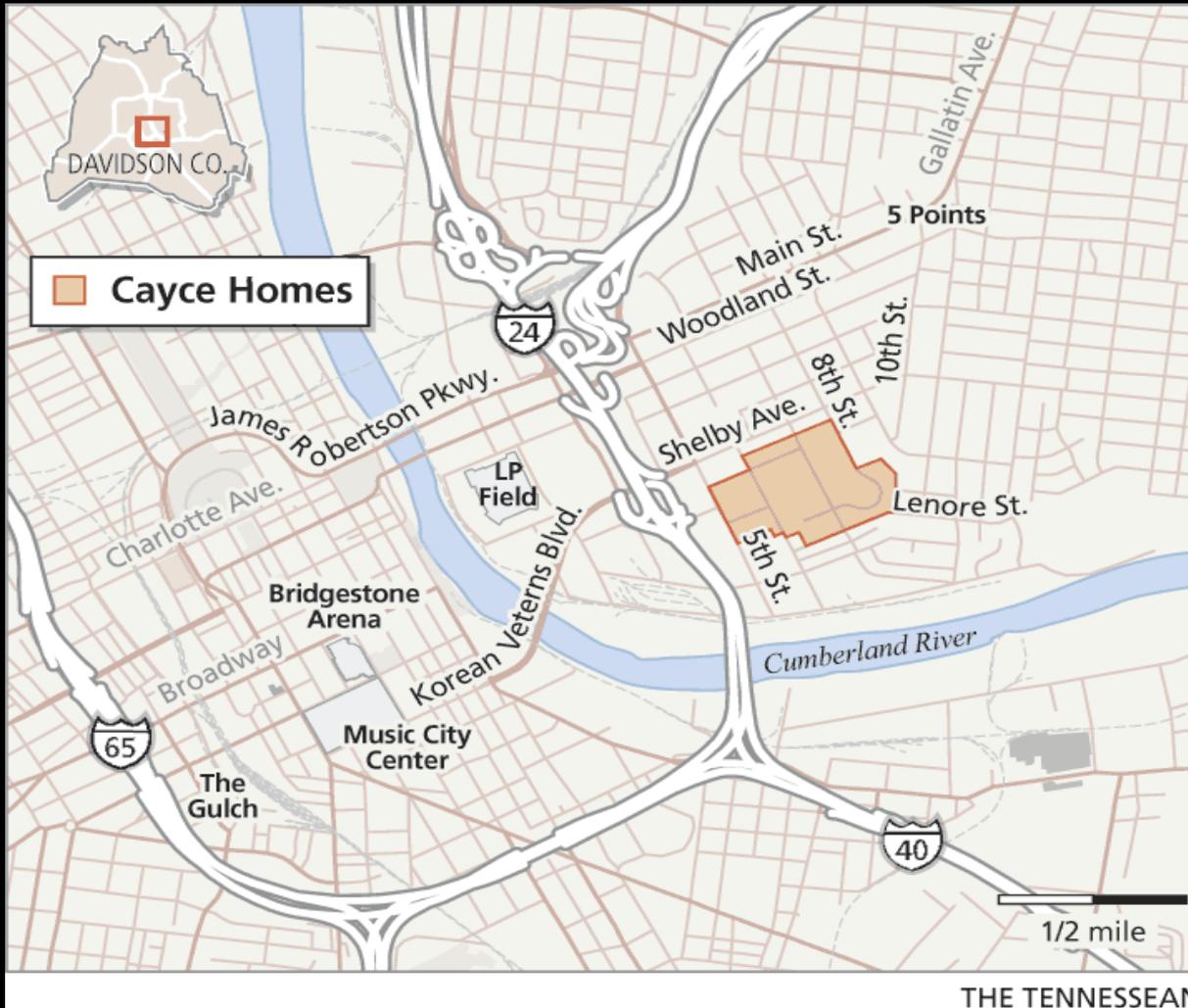


# Community Partners

Martha O'Bryan Center , Meharry Medical College, the Meharry-Vanderbilt Alliance, and Health Impacts of Degraded Environments, Inc.



# Study Area: Cayce Homes and Environs – Nashville, TN



Nashville's largest public housing community with 710 units and over 2,400 residents on 63 acres.

88% of the population is African American with 89% of households are headed by a single parent. 57% of the residents are children under the age of 18

**Residents suffer from above average asthma rates, especially children.**

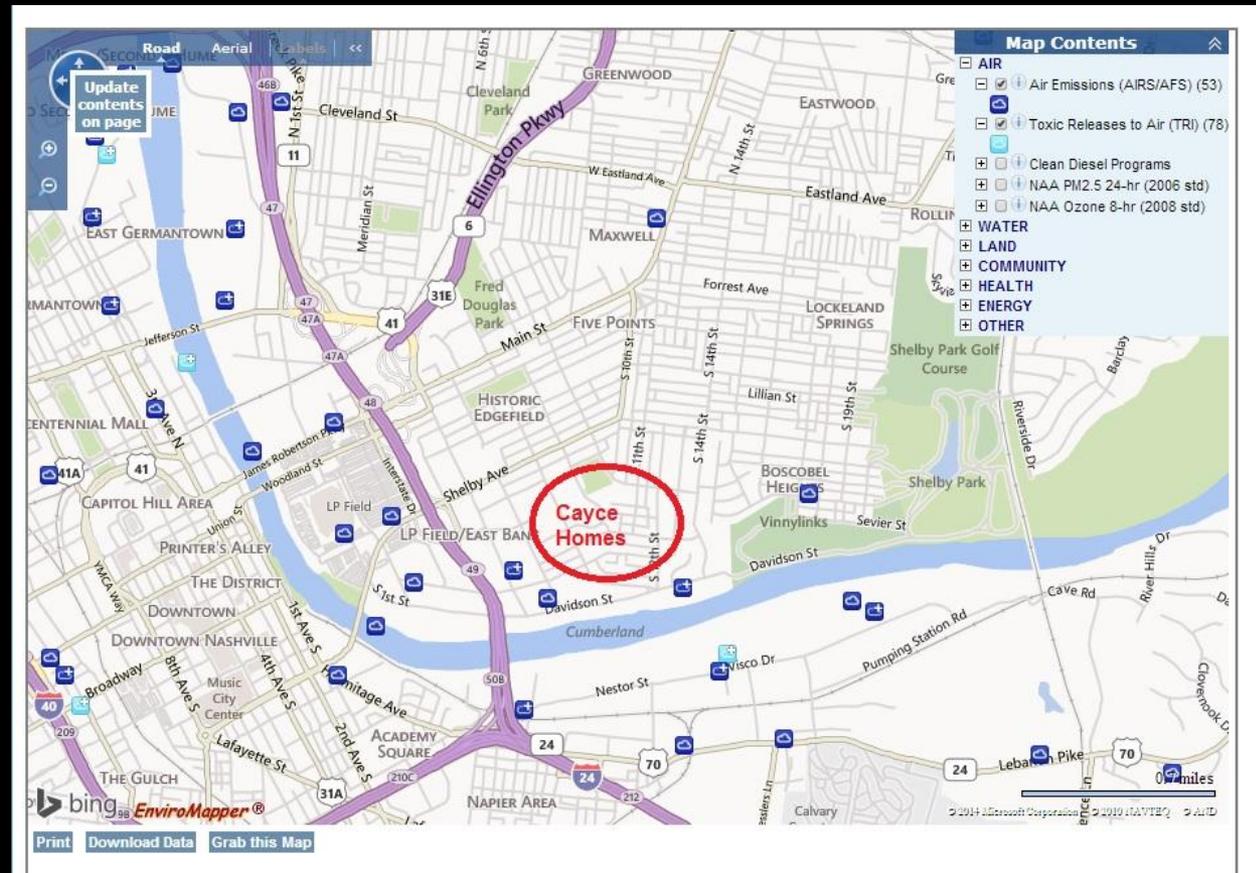


# Map of nearby sources of air pollution

## - Cayce Homes and Environs – Nashville, TN

Community is impacted by a variety of air pollution sources, including TRI facilities, Interstate highways, and small businesses.

No government air monitor is located within two miles of the community.



## The Climate Gap in Health Hazards from Increased Air Pollution

Research suggests that the majority of the health effects due to air pollution are caused by ozone (O<sub>3</sub>) and particulate matter (PM) (Drechsler et al. 2006). However, it should be noted that many other pollutants that are associated with climate change, such as nitrogen dioxide, sulfur dioxide, and carbon monoxide, also have health consequences (Drechsler et al. 2006).

Five of the ten most ozone-polluted metropolitan areas in the United States (Los Angeles, Bakersfield, Visalia, Fresno, and Sacramento) are in California (Cordova et al. 2006; ALA 2008). Because of this, Californians already suffer a relatively high disease burden from air pollution – including 18,000 premature deaths each year and tens of thousands of other illnesses (CARB 2008a).

But climate change threatens to exacerbate California's dirty air problem. Higher temperatures hasten chemical interactions between nitrogen oxide, volatile organic gases and sunlight that lead

to increases in ambient ozone concentrations in urban areas (Jacobson 2008). In California, five of the smoggiest cities are also the locations with the highest projections of ambient ozone increases associated with climate change, as well as the highest densities of people of color and low-income residents.

People of color and the poor in these urban areas are likely to lack health insurance (Cordova et al. 2006). A lack of health insurance among vulnerable populations that are exposed to elevated levels of air pollutants may lead to greater health impacts from air pollution—particularly compared with those who have health insurance.

Moreover, a recent study found that for each 1 degree Celsius (1°C) rise in temperature in the United States, there are an estimated 20–30 excess cancer cases, as well as approximately 1000 (CI: 350–1800) excess air-pollution-associated deaths (Jacobson 2008). About 40 percent of the additional deaths may be due to ozone and the rest to particulate matter annually (Jacobson 2008; Bailey et al. 2008). Three hundred of these annual deaths are thought to occur in California (Bailey et al. 2008).

Source: The Climate Gap: Inequalities in How Climate Change Hurts Americans and How to Close the Gap (<https://dornsife.usc.edu/pere/climategap/>)

Potential sources  
of air pollution  
upwind from  
Cayce Place and  
environs.



CMC Rebar – TRI Facility



PSC Metals – Permitted Air Facility

March 2015 - **Completed**

**Objective:** Meet with community stakeholders at the Martha O'Bryan Center. Discuss plans for outdoor air sampling and health assessments



April 2015 – Air samples collected April 17, 2015 – awaiting results  
**Objective:** Community air quality testing using 6-liter Summa canisters.  
Stakeholders will use global positioning systems (GPS) receivers to map the locations where air samples are collected. Samples will be analyzed by Dr. Sing Chong, Middle Tennessee State University.



April 2015 – 10 second air “grab” samples collected April 17, 2015



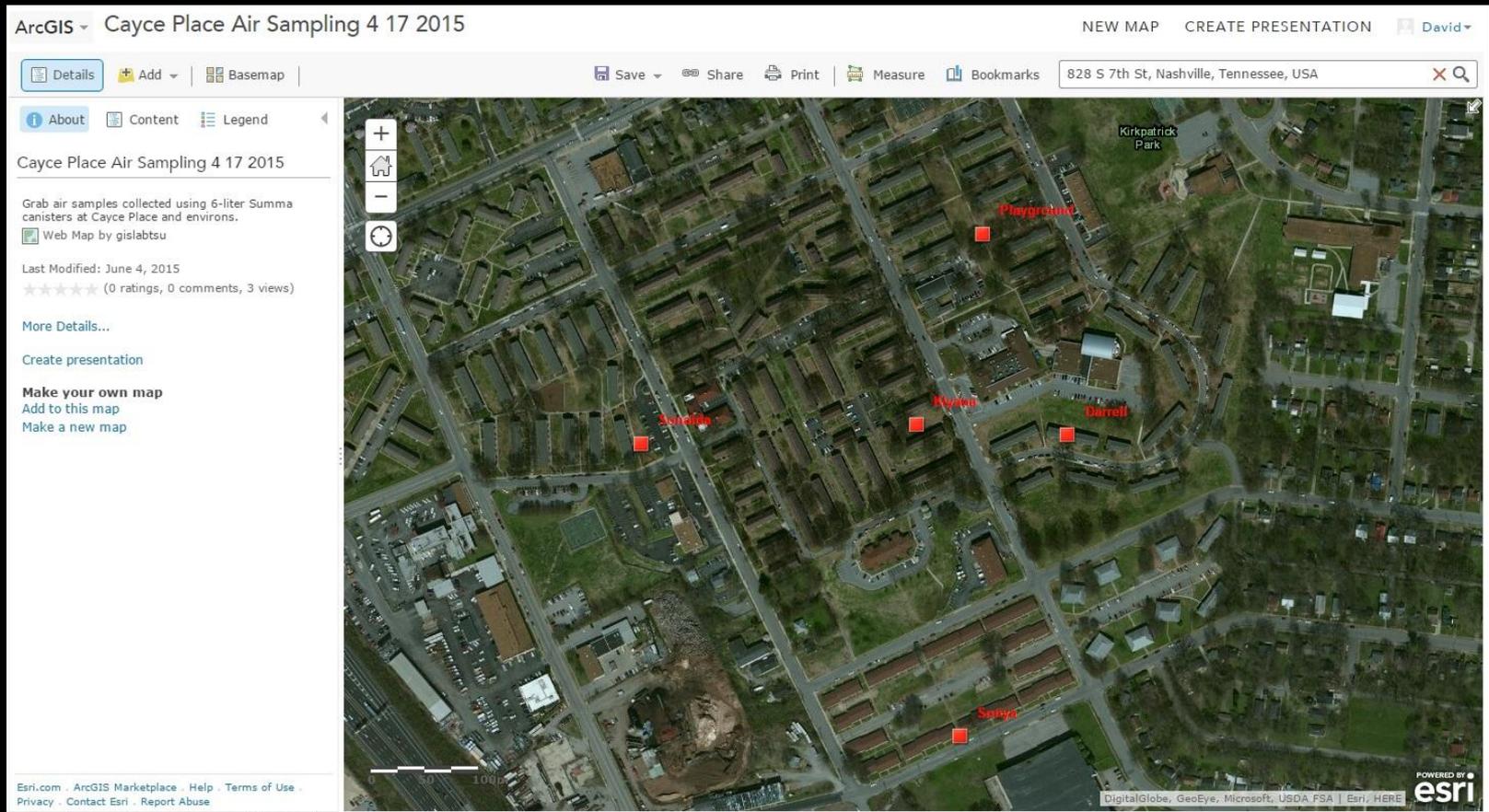
**April 2015 – 10 second air “grab” samples collected April 17, 2015**





April 2015 – **Completed** - April 17, 2015

**Objective:** Community air quality testing using 6-liter Summa canisters. Stakeholders used GPS receivers to map the locations where air samples were collected. See map below.



July 10, 2015

Ten second air “grab” sample results shared with community stakeholders. Location of canister 1993. Sample taken near children’s playground per residents’ request.

The screenshot shows the ArcGIS 'My Map' interface. The map displays an aerial view of a residential neighborhood with a red square marker on a playground. A pop-up window provides the following details:

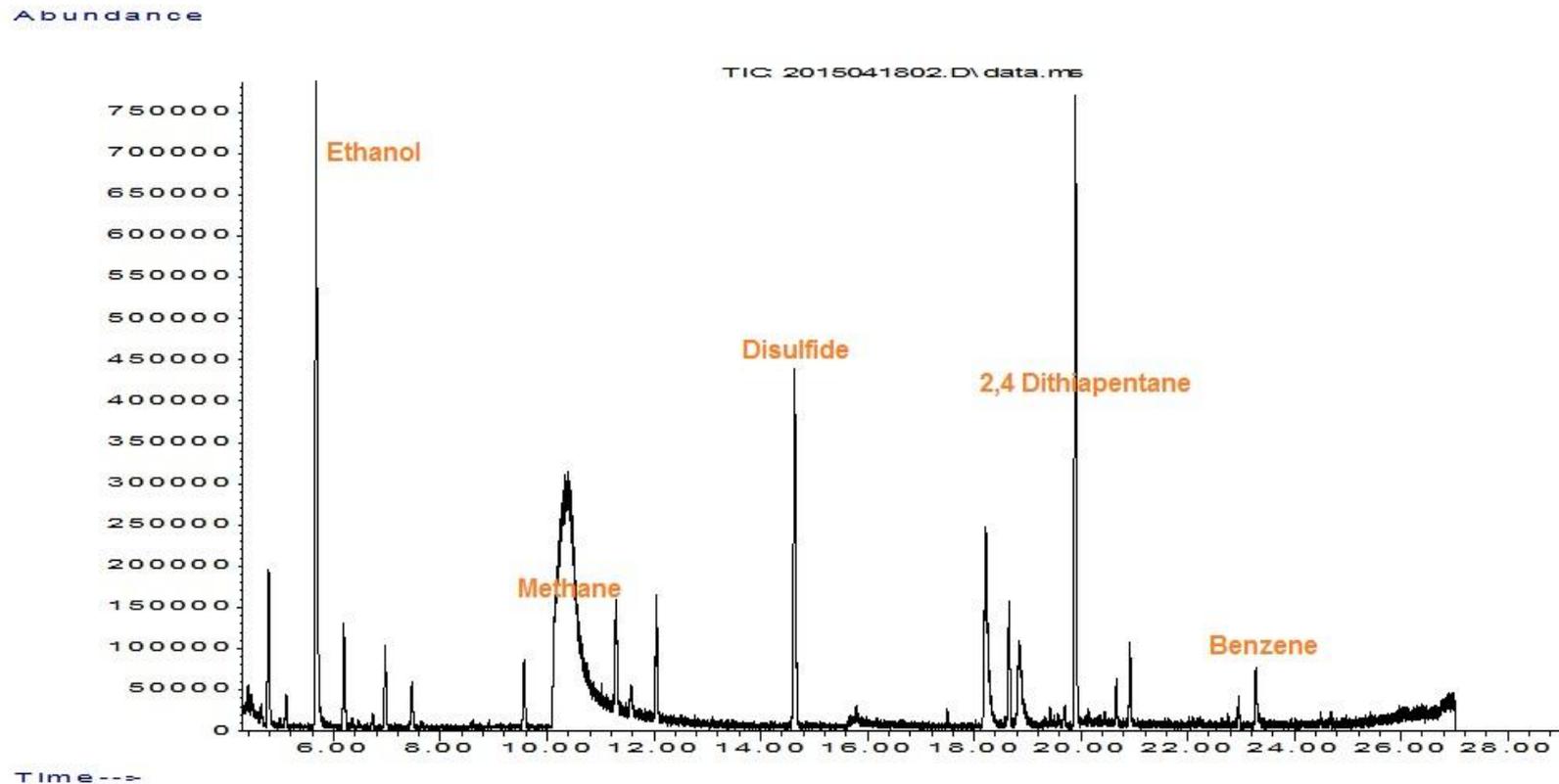
Site	Playground
Chemical	Dimethyl Sulfide, Bromochloro Methane, Benzene, Disulfide-dimethyl, Dithiapentane, Chlorobenzene
Canister	1993
ppb	
MRL	
Location	702 S 8th St
Latitude	36.17
Longitude	-86.76
Time	313p
Sats	7

Zoom to

Map interface elements include: ArcGIS My Map, NEW MAP, David, Save, Share, Print, Measure, Bookmarks, 702 S 8th St, Nashville, Tennessee, USA, About, Content, Legend, CaycePlaceAir 4 17 2015, Imagery, Esri.com, ArcGIS Marketplace, Help, Terms of Use, Privacy, Contact Esri, Report Abuse, DigitalGlobe, Microsoft, esri.

July 10, 2015

Ten second air “grab” sample results shared with community stakeholders. Below is a graphic plot of chemicals detected by canister 1993.



Cayce Air Testing\_SN1993\_-29.52/-12.32/+14.85

July 10, 2015

Ten second air “grab” sample results shared with community stakeholders. Location of canister 5867

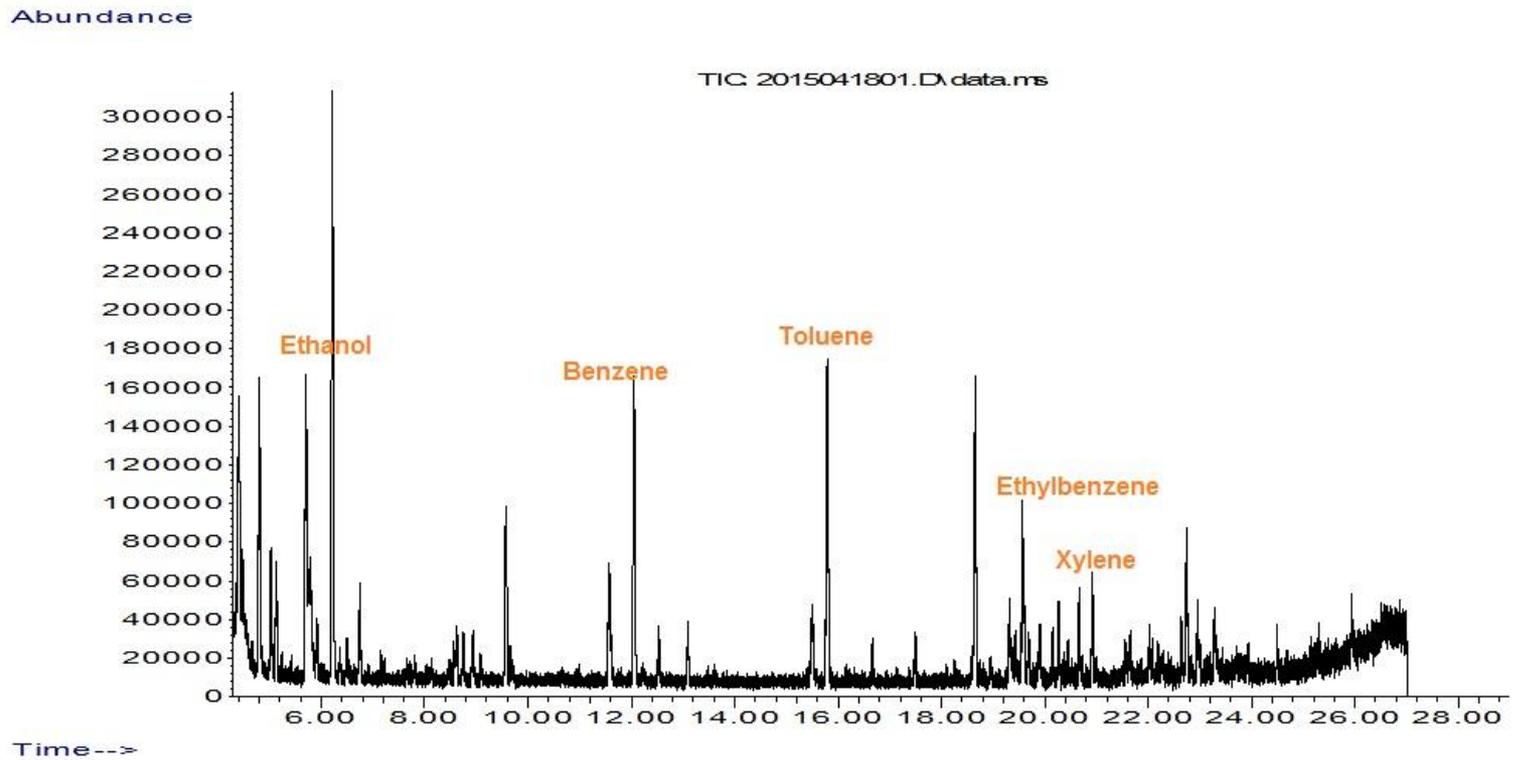
The screenshot shows the ArcGIS web map viewer interface. The browser address bar displays [www.arcgis.com/home/webmap/viewer.html?useExisting=1](http://www.arcgis.com/home/webmap/viewer.html?useExisting=1). The page title is "ArcGIS - My Map". The search bar at the top right contains the text "702 S 8th St, Nashville, Tennessee, USA". The left sidebar shows the "Contents" panel with "CaycePlaceAir 4 17 2015" and "Imagery" layers. The main map area displays an aerial satellite image of an industrial site. A red square marker on the map is highlighted with a blue popup window containing the following data:

Site	Sonya
Chemical	Ethanol, Butanol, Methane, Benzene, Tolulene, Chlorobenzene, Xylene, Ethyl Benzene, Nonane
Canister	5867
ppb	
MRL	
Location	623 Crutcher St
Latitude	36.16
Longitude	-86.76
Time	400p
Sats	6
Zoom to	

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July 10, 2015

Ten second air “grab” sample results shared with community stakeholders. Below is a graphic plot of chemicals detected by canister 5867.



Cayce Air Testing\_SN5867\_-29.32/-1.06/+26.46

July 10, 2015

Ten second air “grab” sample results shared with community stakeholders. Location of canister L5536.

ArcGIS - Cayce Place Air Sampling 4 17 2015

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- Cayce Place Air Sampling Sites - April 17 2015
- Imagery with Labels

Site Sonaida

Chemical Methane, Benzene, Chlorobenzene, Difluoro Benzene

Canister L5536

ppb

MRL

Location 706 S 6th St

Latitude 36.17

Longitude -86.76

Time 329p

Sats 4

Zoom to

Dimethyl Sulfide, Bromochloro Methane, Benzene, Disulfide-dimer

Benzene

Methane - Bromochloro Benzene, Benzene-1,4 Difloro

Ethanol, Butanol, Methane, Benzene, Toluene, Chlorobenzene, Xylen

Kirkpatrick Park

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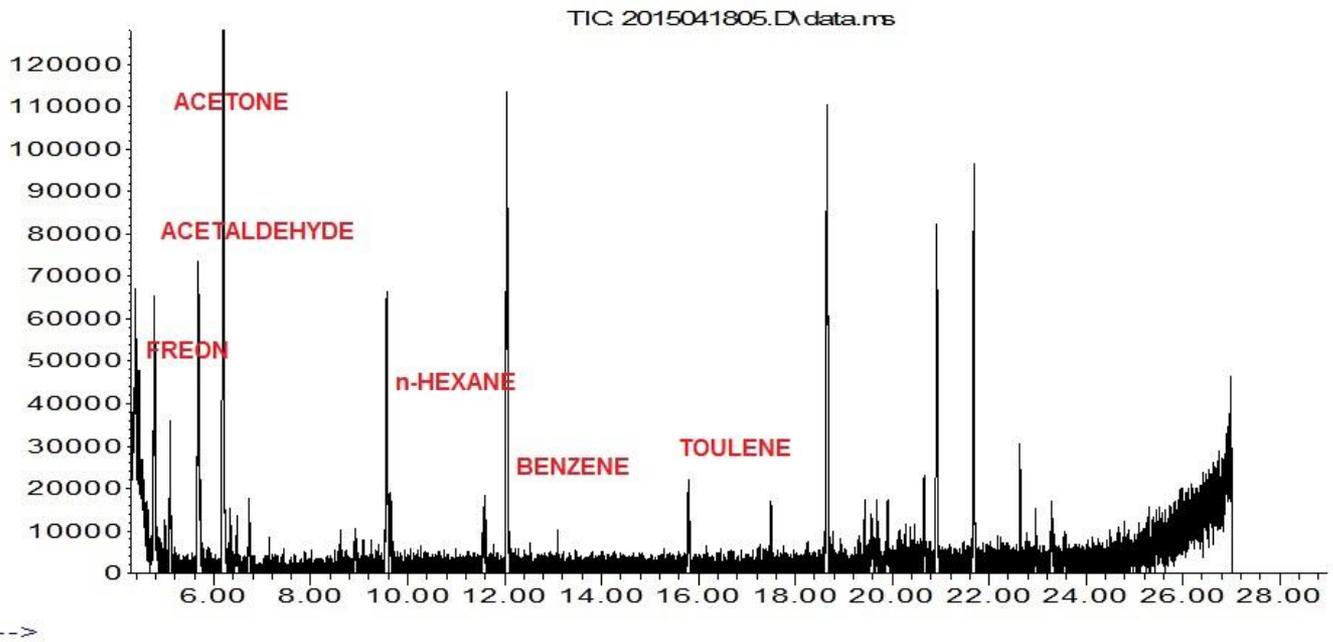
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July 10, 2015

Ten second air “grab” sample results shared with community stakeholders. Below is a graphic plot of chemicals detected by canister L5536.

Cayce Air Testing\_SN-L5530\_-29.71/-21.24/+4.19

Abundance



Cayce Air Testing\_SN-L5536\_-29.73/-8.60/+15.16

July 10, 2015

Ten second air “grab” sample results shared with community stakeholders. Location of canister L5530.

ArcGIS Cayce Place Air Sampling 4 17 2015

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Contents

- Cayce Place Air Sampling Sites - April 17 2015
- Imagery with Labels

Site Kiyana

Chemical Methane-bromochloro, Benzene, Chlorobenzene

Canister L5530

ppb

MRL

Location 828 S 7th St

Latitude 36.17

Longitude -86.76

Time 255p

Sats 4

Zoom to

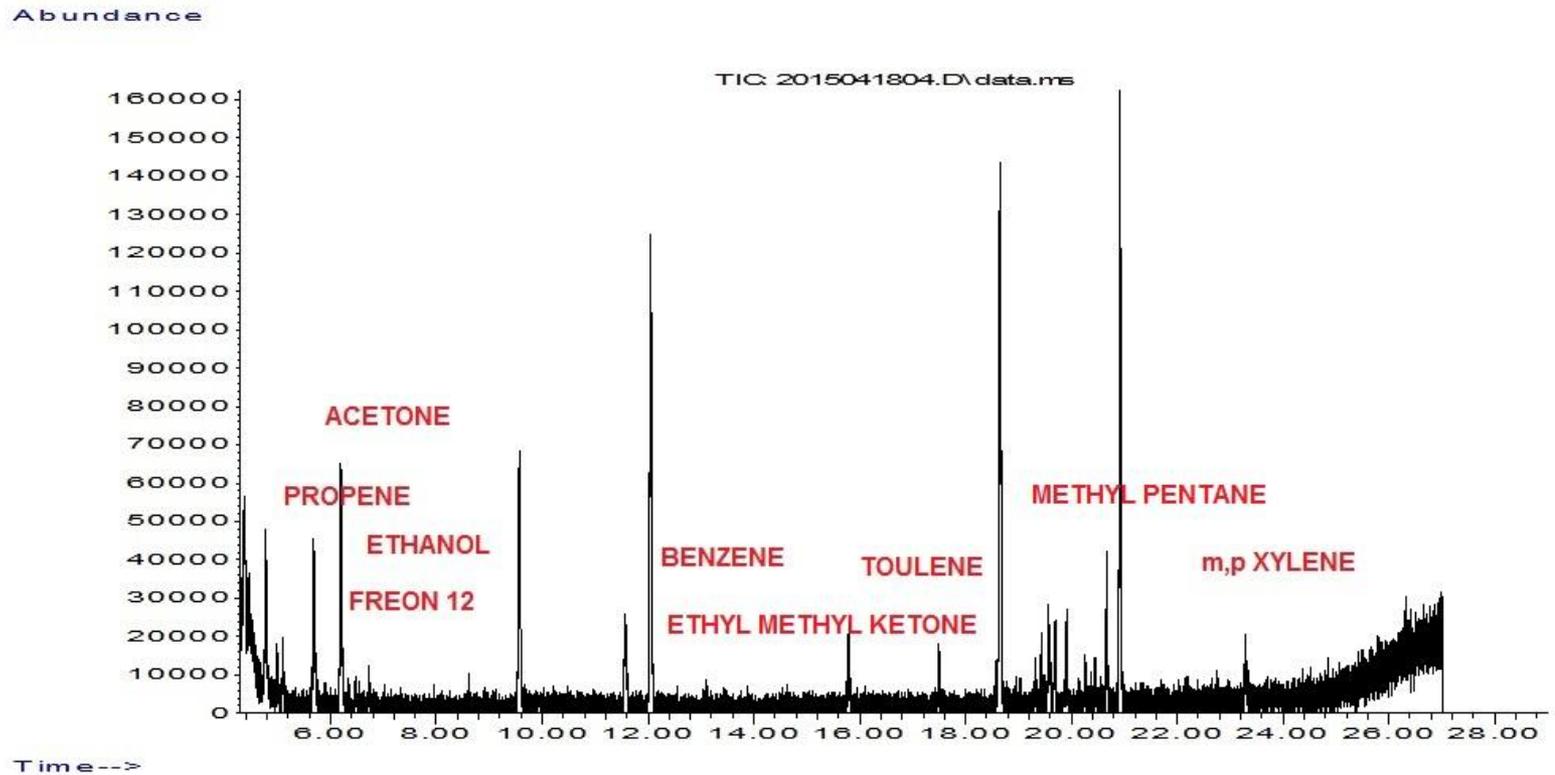
40m

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July 10, 2015

Ten second air “grab” sample results shared with community stakeholders. Below is a graphic plot of chemicals detected by canister L5530.



Cayce Air Testing\_SN-L5530\_-29.71/-21.24/+4.19

July 10, 2015

Ten second air “grab” sample results shared with community stakeholders. Location of canister A8674.

ArcGIS - Cayce Place Air Sampling 4 17 2015

NEW MAP CREATE PRESENTATION David

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About Content Legend

Contents

- ✓ Cayce Place Air Sampling Sites - April 17 2015
- Imagery with Labels

The map displays an aerial view of a residential area with several air sampling sites marked by red squares. A popup window is open over one of the sites, providing detailed information. The popup window contains the following data:

Site	Darrell
Chemical	Methane - Bromochloro Benzene, Benzene-1,4 Difloro, Chlorobenzene
Canister	A8674
ppb	
MRL	
Location	852 S 8th Ct
Latitude	36.17
Longitude	-86.75
Time	344p
Sats	5
Zoom to	

Labels on the map include: Methane-bromochloro, Benzene, Chlorobenzene and 1,4 Difloro, Chlorobenzene.

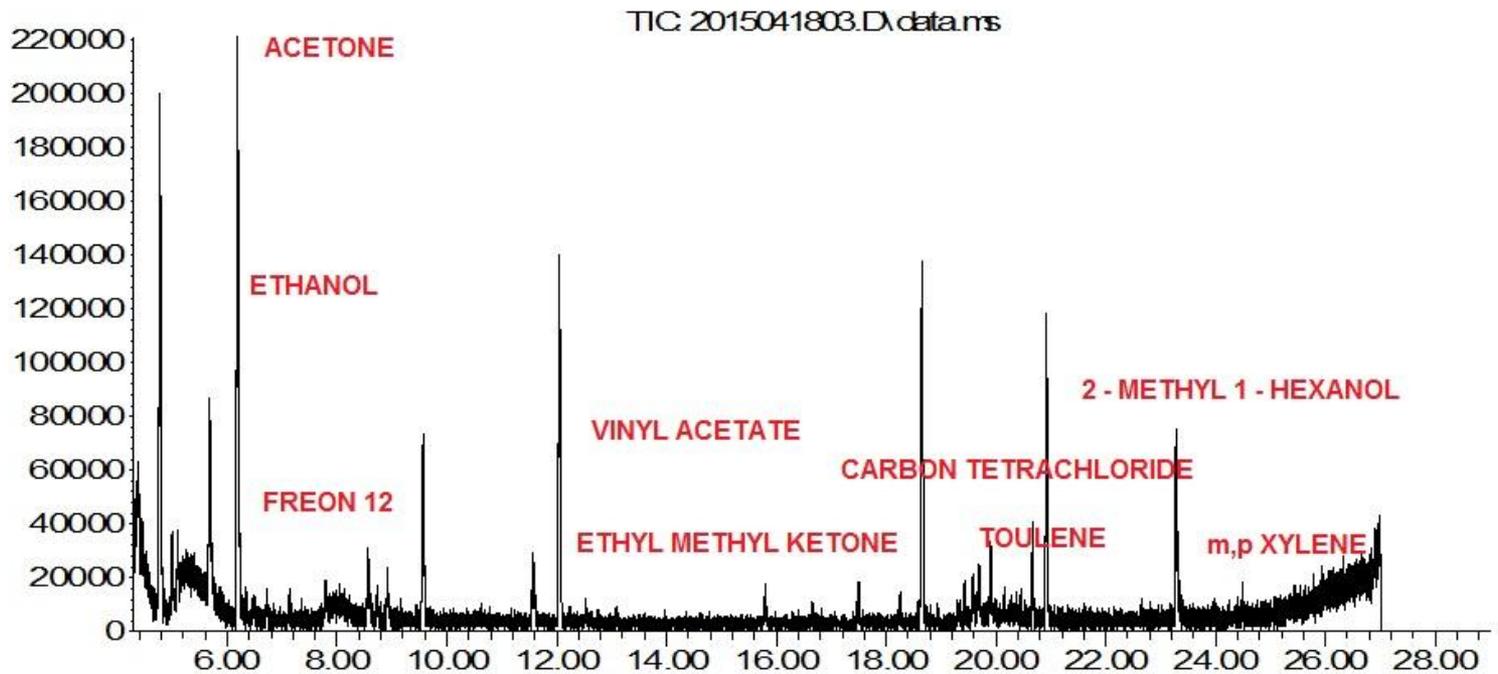
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July 10, 2015

Ten second air “grab” sample results shared with community stakeholders.. Below is a graphic plot of chemicals detected by canister A8674.

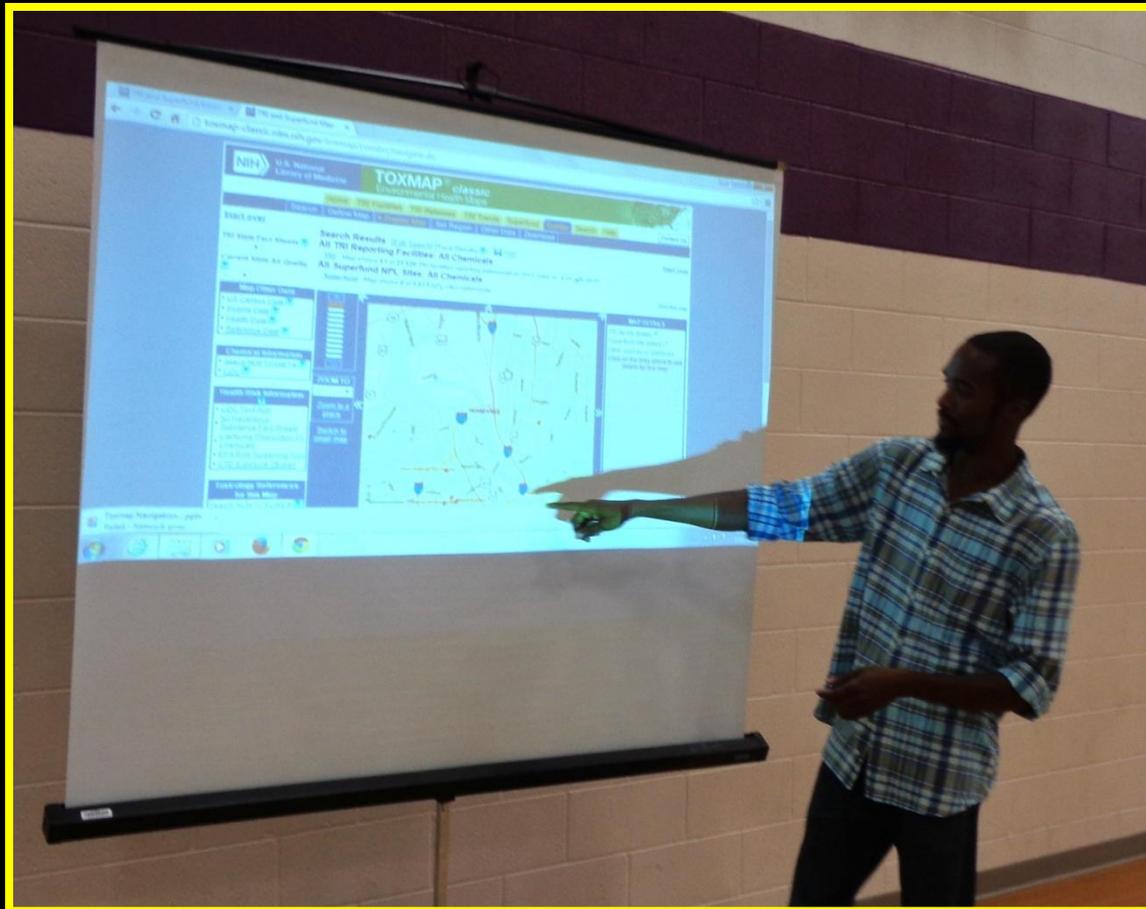
Abundance



Time-->

Cayce Air Testing\_SN-A8674\_-29.56/-15.18/+11.19

# Technical Assistance on how to use various online search tools to determine potential sources of air pollution impacting your community.



# TOXMAP

## National Institutes of Health



U.S. Department of Health & Human Services

www.hhs.gov



U.S. National  
Library of Medicine

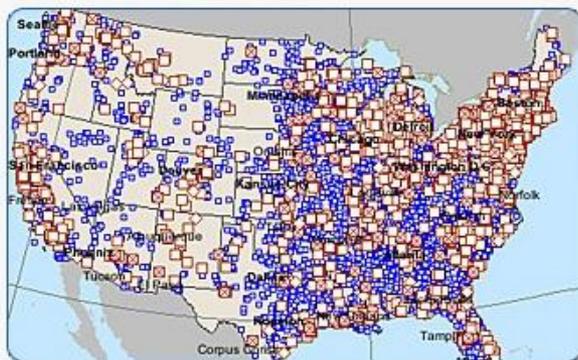
**TOXMAP** Environmental  
Health Maps

[Home](#) | [About](#) | [News](#) | [FAQ](#) | [Glossary](#)

[NLN Environmental Health Portal](#)

### Two Ways to Explore Toxic Chemicals in Your Community

#### TOXMAP *classic*



**TOXMAP classic** provides an Advanced Search as well as the ability to save search results and to build custom regions to focus your search. It does not require Flash and is accessible to users with disabilities. No new features are planned.

#### TOXMAP *beta*



The **beta** version of TOXMAP is in active development. It has an improved map appearance and interactive capabilities as well as improved U.S. Census layers, availability by Census tract, and additional and updated datasets.

Note: Both versions of TOXMAP open in new windows - please disable pop-up blockers.

TOXMAP belongs to a group of TOXNET databases related to toxicology, hazardous chemicals, environmental health, and toxic releases.

Connect with Us [Share](#)

#### News

- **TOXMAP beta now includes TRI 2012 data**
- New TOXMAP web site
- See all TOXMAP news

#### More Information

- What is TOXMAP?
- Which TOXMAP should I use?
- What is the Toxics Release Inventory (TRI)?
- What is the "Superfund" Program?
- Does TOXMAP show all sources of toxic chemicals?
- What data sources does TOXMAP use?
- Learn to use TOXMAP

# U.S. EPA Environmental Justice Screening and Mapping Tool (EJ SCREEN)

← → ↻ www2.epa.gov/ejscreen

EPA United States Environmental Protection Agency

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## EJSCREEN: Environmental Justice Screening and Mapping Tool

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### Launch the EJSCREEN Tool

Explore EPA's environmental justice screening and mapping tool



### Links

- Environmental Justice at EPA
- Grants and Other Funding Opportunities
- EPA's Environmental Justice in Action Blog
- Sign up to receive updates on EJSCREEN

In order to better meet the Agency's responsibilities related to the protection of public health and the environment, EPA has developed a new environmental justice (EJ) mapping and screening tool called EJSCREEN. It is based on nationally consistent data and an approach that combines environmental and demographic indicators in maps and reports.

### What is EJSCREEN?



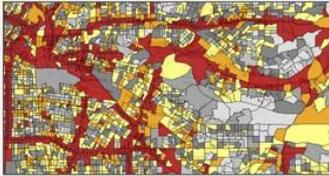
- [What is EJSCREEN?](#)
  - [How was It Developed?](#)
  - [How Does EPA Use It?](#)
  - [Purposes and Uses](#)

### Learn to Use EJSCREEN



- [Learn to Use EJSCREEN](#)

### Launch the Tool



- [Launch the EJSCREEN Tool](#)



# TSU TRI University Challenge Timeline

Summer-Fall 2015

**Objective:** One-hour community air quality testing using 6-liter Summa canisters.



# TSU TRI University Challenge Timeline

**August-December 2015**

**Objective: Cross-reference one-hour community air quality testing results with local TRI releases.** Discussion of next steps with community stakeholders, based upon the results



**January-February 2016**

**Objective: Develop and publish a draft instruction manual for community-based mapping of community-based air samples and cross-referencing with TRI release data**

**Objective: Produce maps of the Cayce Homes community-based air sampling project, and possibly pilot test EPA's C-FERST and/or RETIGO.**



# QUESTIONS?



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