Citizen Science Panel

Children's Environmental Health Summit 2019
Center for Rural Development

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UK College of Nursing/UK-CARES

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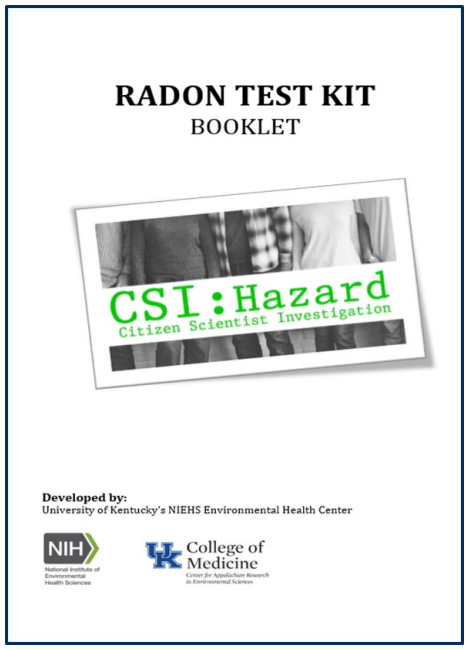
University of Kentucky

Center for Appalachian Research in Environmental Sciences

Citizen Science in Environmental Health

- Citizens involved in science as researchers, taking on community-based monitoring, or data collection, report back, and community-based planning and management of resources
- Equal partnership among citizen scientists, academic researchers and community-based organizations
- Rigorous training



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Mountain Air PhotoVoice Project

Children's Environmental Health Summit
Center for Rural Development
October 10, 2019

Katie Cardarelli, Ph.D.

Mountain Air Project

UNIVERSITY OF KENTUCKY
College of Public Health

Background - Respiratory Disparities

- Compared to national rates, Appalachian Kentuckians have 50% higher rates of adult asthma and chronic obstructive pulmonary disease (CDC, 2018)
- Using a community-engaged approach, MAP examines environmental determinants of respiratory illness in Harlan and Letcher Counties
- Epidemiologic study, exposure monitoring, intervention implementation
- MAP PhotoVoice Goal - to enhance understanding of potentially missing information about environmental determinants of respiratory disparities in Letcher County, Kentucky

Community advisory board retreat in fall 2018: involve youth!

NIEHS R01ES024771: MPI Browning, Schoenberg

Photovoice – WHAT?

- Community-based/engaged research approach/method
- Shared experiences empowers community members to be agents of social change
- Photo and journal record of perceived strengths and challenges of a community leading to actionable change
- Dissemination exhibit to broaden community understanding

Photovoice – HOW?

- Participants respond and reflect on a research related question with photographs and journaling
- Pre/Post-Survey – demographics and respiratory disparities knowledge
- Participants discuss their photographs and journaling with group
- Participants determine which challenges are most important to share with larger community
- Identify themes among participants – determine actions for change
- Dissemination exhibit featuring PhotoVoice projects

PhotoVoice – WHO?

Teens (13-18 years old) living in Letcher County, Kentucky

Project Objective:
Using photographs and journal writing, "**What are factors that, you believe, cause or trigger lung disease inside and outside your home?**"

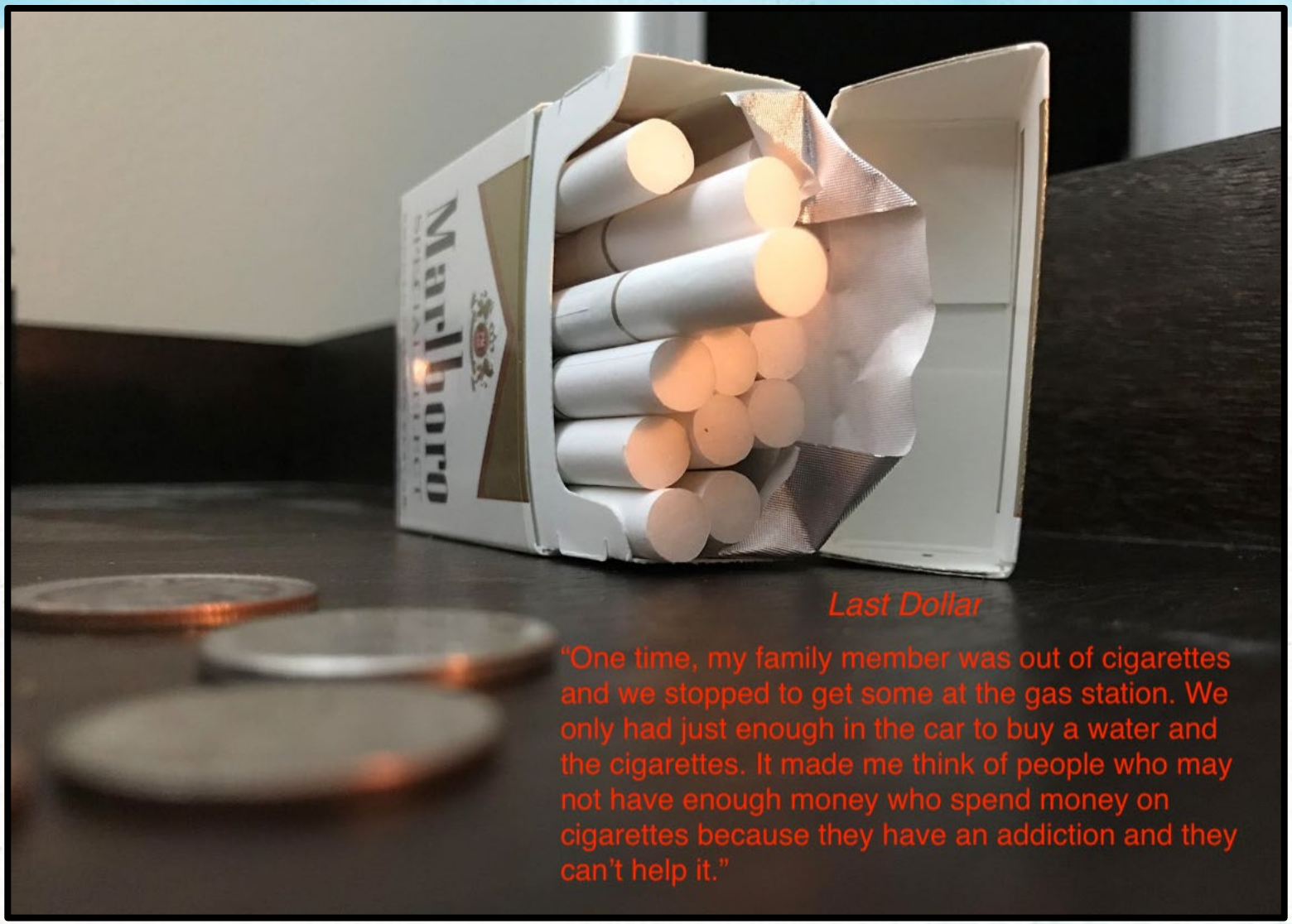
PhotoVoice – WHO?

- Recruit participants
- Inform about environmental determinants of respiratory illness
- Learn to create photographic images with Malcolm J. Wilson- Humans of Central Appalachia
- Learn about journal writing to support photos
- Participate in findings

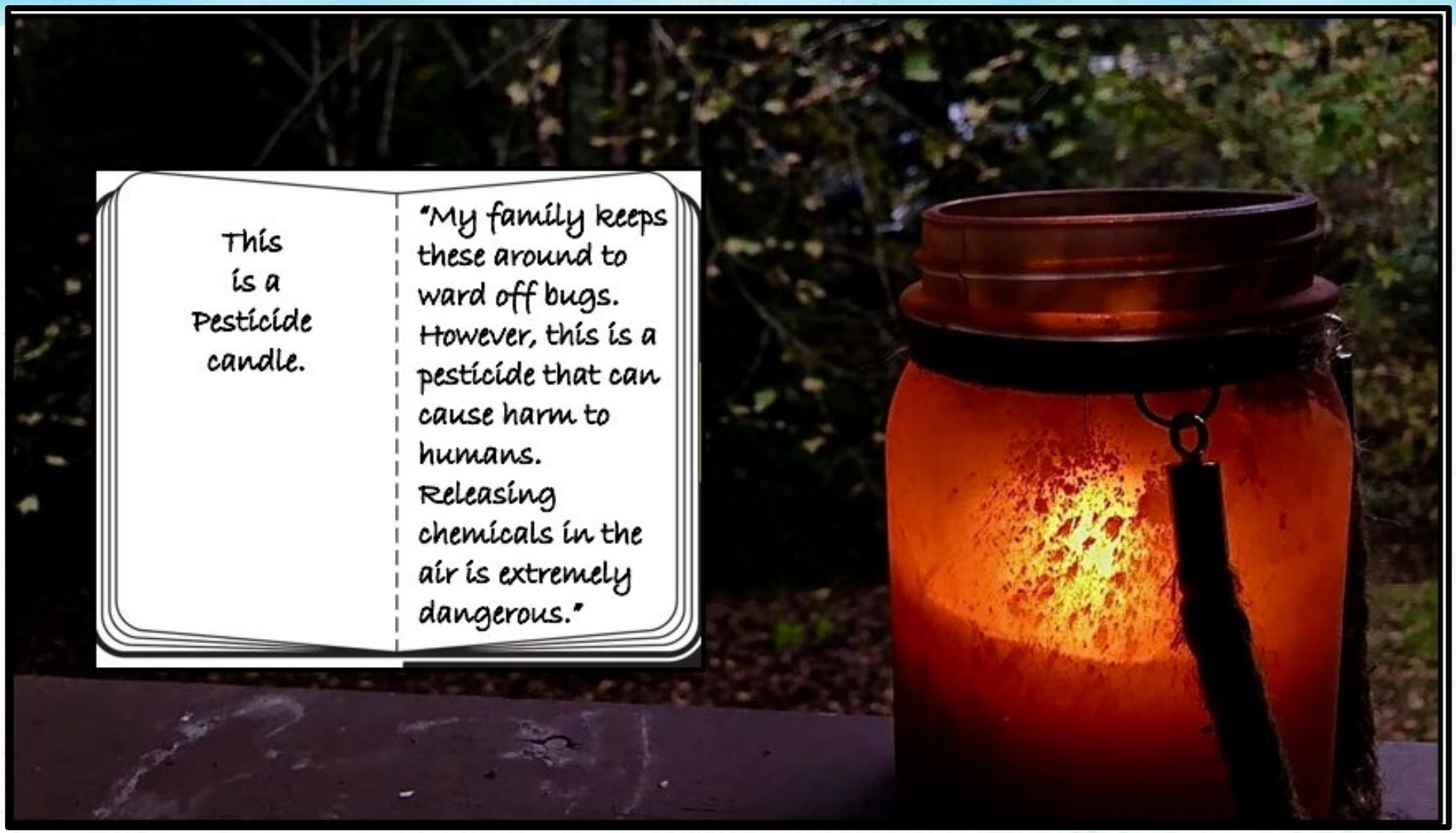
MAP PhotoVoice - Results

- 19 teens (12-18 years old) participated in first of three sessions
- 9 teens completed all three sessions
- Community dissemination exhibit at Appalshop in Whitesburg, KY, Dec. 2018
  - 19 Community members (including participants) attended
  - 6 attendees completed exhibit comment cards
- 24 PhotoVoice pieces included in Exhibit from 10 participants

Photovoice Project Example 1



Photovoice Project Example 2



MAP PhotoVoice – Thematic Results

- My community is important to me
- Many causes of lung disease in our environment
- Everyday items and things can contribute to lung disease
- SMOKING
- Coal dust, propane, dust
- Juxtaposition of exposures related to occupation and everyday necessities
- Grateful for the opportunity to have a voice

Challenges and Lessons Learned

- Engaging teens and sustaining interest
- Establishing and maintaining communication with participants
- Working with the schedules of extra-curricular activities and after-school work
- Gathering participants outside of school

"These are the railroad tracks outside my house. These railroads are used to transport coal and in turn, coal dust moves from place to place…it travels through the air…this photo represents lung disease…and those that may be exposed to the environmental effects."

Conclusion

- Youth have agency
- Increased knowledge of environmental health determinants of respiratory disease among participants
- Was the first environmental health-focused photovoice project with Appalachian youth
- Expanding our citizen science efforts with these youth to continue exploring priority environmental health concerns

Please visit the
Mountain Air PhotoVoice Project
in the exhibit area.

Thank you.

Thank you to all the participants and their families, Malcolm Wilson of Humans of Central Appalachia and Tiffany Scott and Terry Herron for lending their expertise in photography, Appalshop and Lacy Hale for our first exhibit, Rebecca Potter for support, Yanling Zhou for the much needed technical support, and Beverly May, Jennifer Malan, and Nell Fields for their continuous support.

Mountain Air Project

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UK UNIVERSITY OF KENTUCKY College of Public Health

HIGH SCHOOL STUDENTS AS YOUTH CITIZEN SCIENTISTS: AIR AND SOIL RADON VALUES IN RURAL APPALACHIAN HOUSEHOLDS

Craig Wilmhoff, MS; Jeremy Pence; Chloe Williams; Nick Conley, MPH; Mary Kay Rayens, PhD; Monica Mundy, MPH; Emily Morris, MS; Kathy Rademacher, BA; Ellen J. Hahn, PhD, RN, FAAN

PERRY CENTRAL

University of Kentucky College of Nursing

BREATHE
Bridging Research Efforts and Advocacy Toward Healthy Environments

University of Kentucky

Center for Appalachian Research in Environmental Sciences

OVERALL GOALS

1. Adapt a home radon testing toolkit designed for classroom education into a school-based citizen science project.
2. Validate the home radon toolkit using *in situ* soil radon gas measurements
3. **Evaluate the usability and feasibility of the toolkit for radon sampling with high school students and their families.**

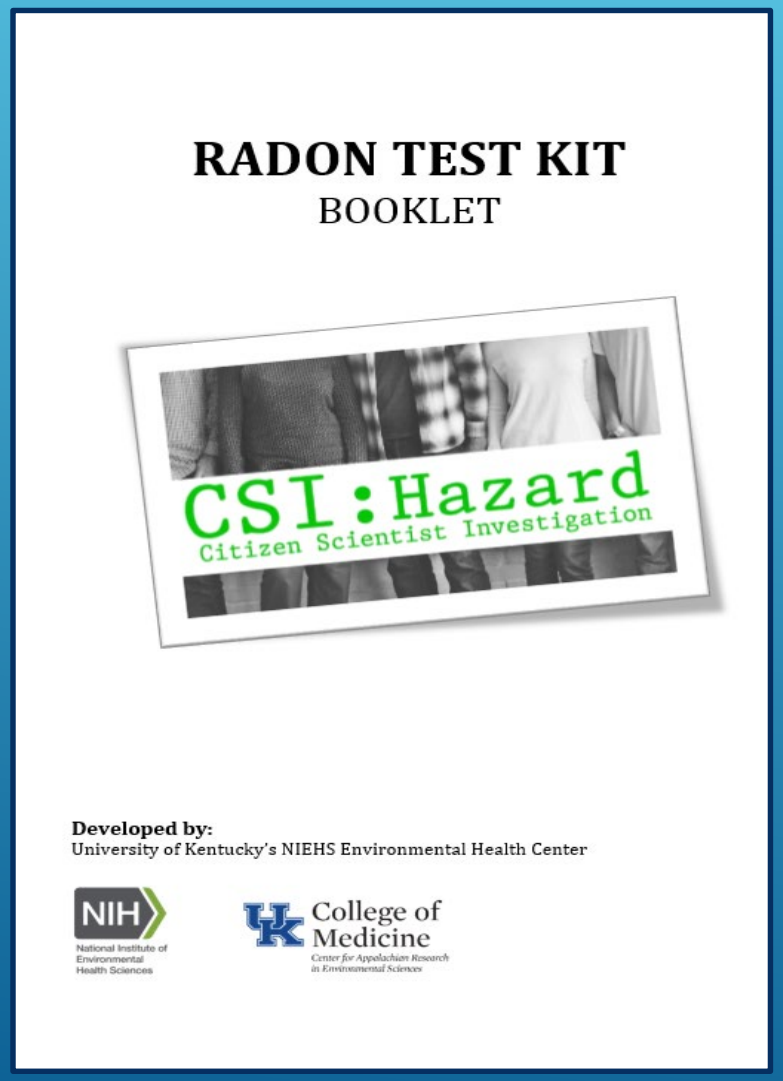
BACKGROUND

- Citizen science projects enable and empower community members to actively participate in multidisciplinary scientific programs and access their own data and the collective data generated by others.
- Community members in Appalachia expressed concern about environmental risks given high rates of lung cancer, high smoking prevalence and secondhand smoke exposure, increase in fracking, and bedrock geology.

METHODS

- Develop/Adapt Radon Toolkit
- Training #1: Human Subjects Protection Training
  - Add Youth (with parent consent) to IRB Key Personnel
- Training #2: Using the Radon Toolkit
  - Parent/Homeowner Survey
  - Youth and Parents Deploy Home Test Kits
  - Geologists Take Soil Samples
- Training #3: Report Back
  - Remediation: Further Testing and/or Mitigation (up to $1,000 voucher)
- Evaluation

RADON TOOLKIT

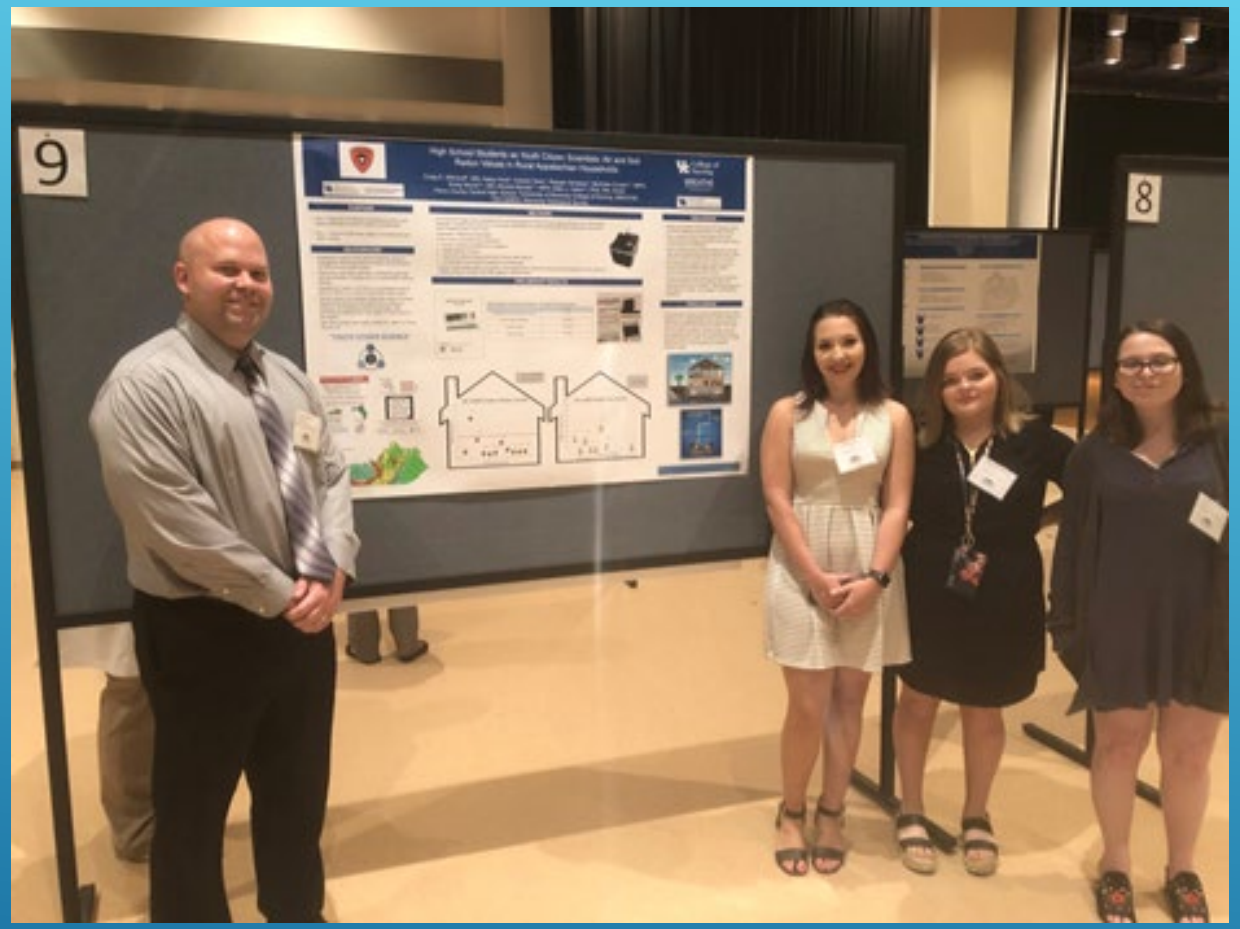


IMPACTS

Table. Sample Size, Study Participation, and Radon Testing Prevalence	
	# (%)
Completed Human Subjects Training	70
Youth Citizen Scientists	19 (27%)
Homes Tested	14 (74%)
Valid Test Kits	11 (79%)

CONCLUSIONS/NEXT STEPS

- Youth very interested and engaged in citizen science
- In process of meeting with those who had high or borderline radon levels
- Evaluate usability and feasibility of toolkit and report back with youth and parents
- Revise and replicate in urban Ohio high school
- Disseminate toolkit and lessons learned



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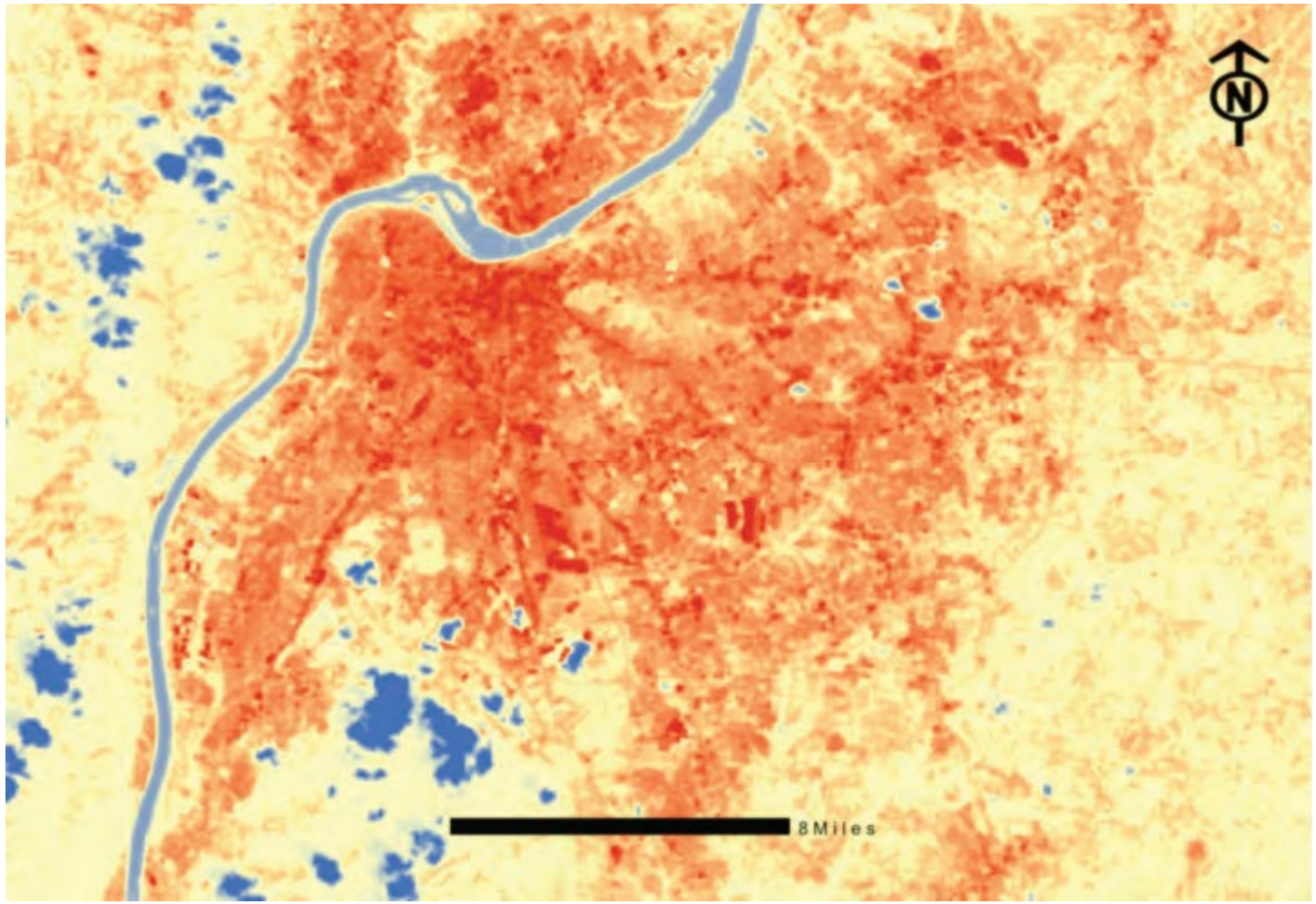
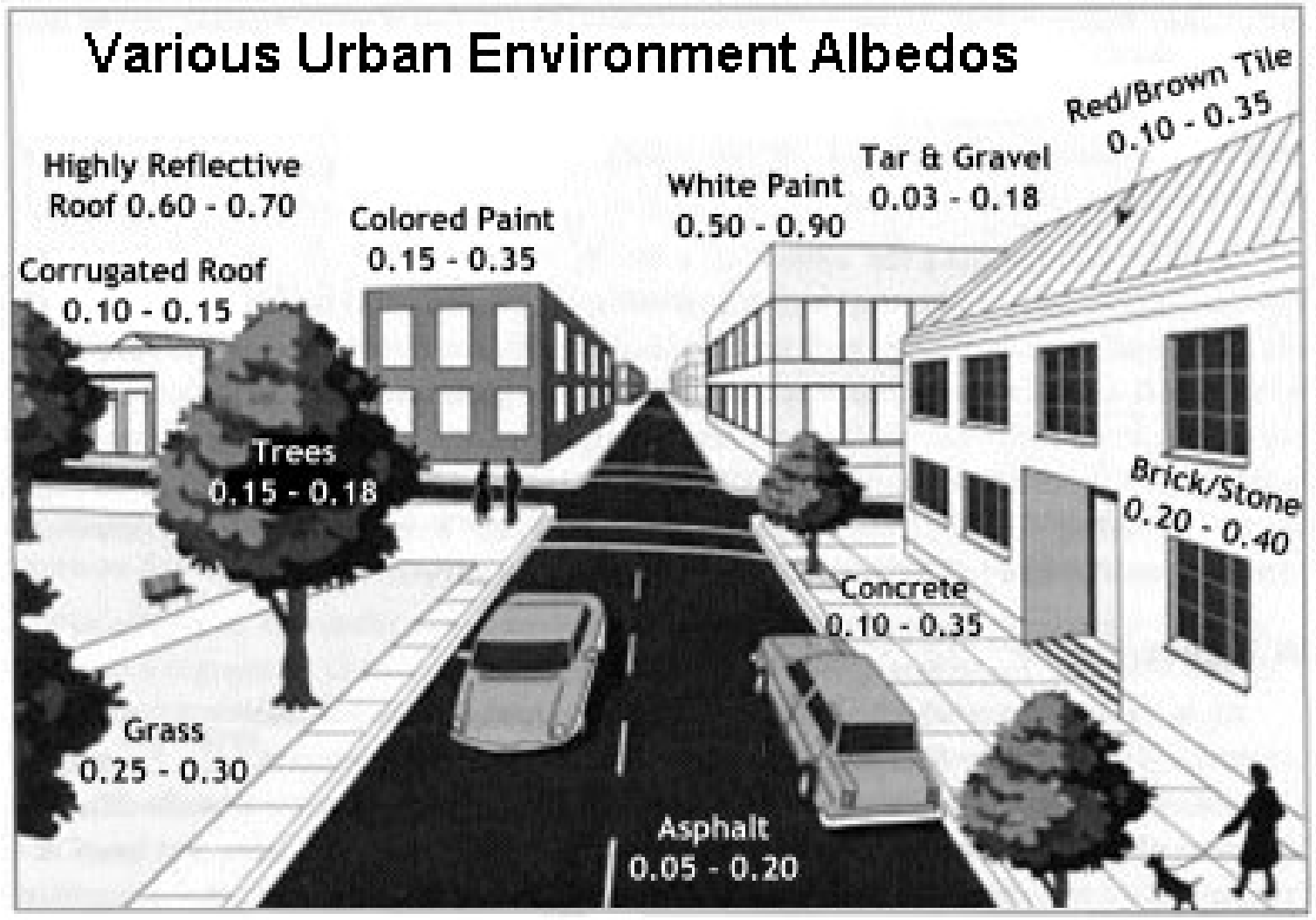
Thermal Infrared Image of Louisville June 6, 2013



Urban materials tend to be less reflective and store heat to be released at night.



JCPS Roofs

- Total of 12 million square feet
- Ballard HS has a 174,000 ft^2 roof
- 155 schools means 6-7 new roofs being installed every year

Student Research on How Their School Campus Can Reduce the Heat Island Effect

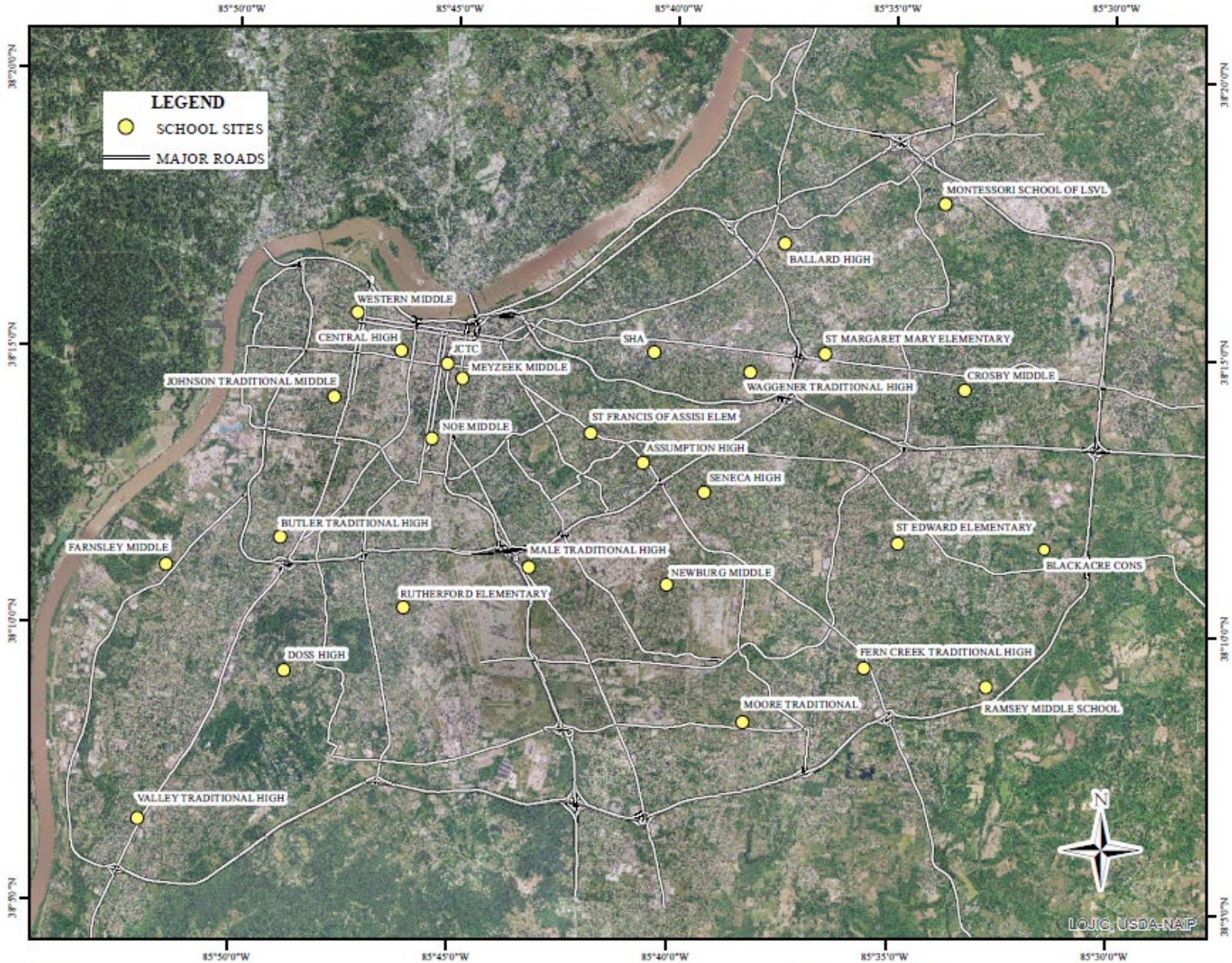
Research

- Research on paint a cool roof at a school can reduce heat absorption
- Research on how school parking lots contribute to heat island
- Research on measuring the heat island

Projects

- Planting trees to reduce heat island
- Planting courtyards
- Building green walls

UOFL/JCPS WEATHER STATION LOCATIONS



Base from LOJIC Data
Cartography by Brandon Ryan

0 2.5 5 10 Miles

Key Considerations in Using Citizen Scientists

- Pick focus areas that are of importance to the community, easy to understand, and have a defined goal
- Create a scientific committee to provide advise and oversight
- Conduct training programs to insure that your citizens scientists have the skill to do the research
- Create administrative support structure to provide resources needed to conduct the research
- Communication is key to success, provide feed-back to volunteers on what we are learning from the resource
- Present your research in public forums, news media, social media, and other formats