Use of a Community-University Partnership to Address Environmental Stressors

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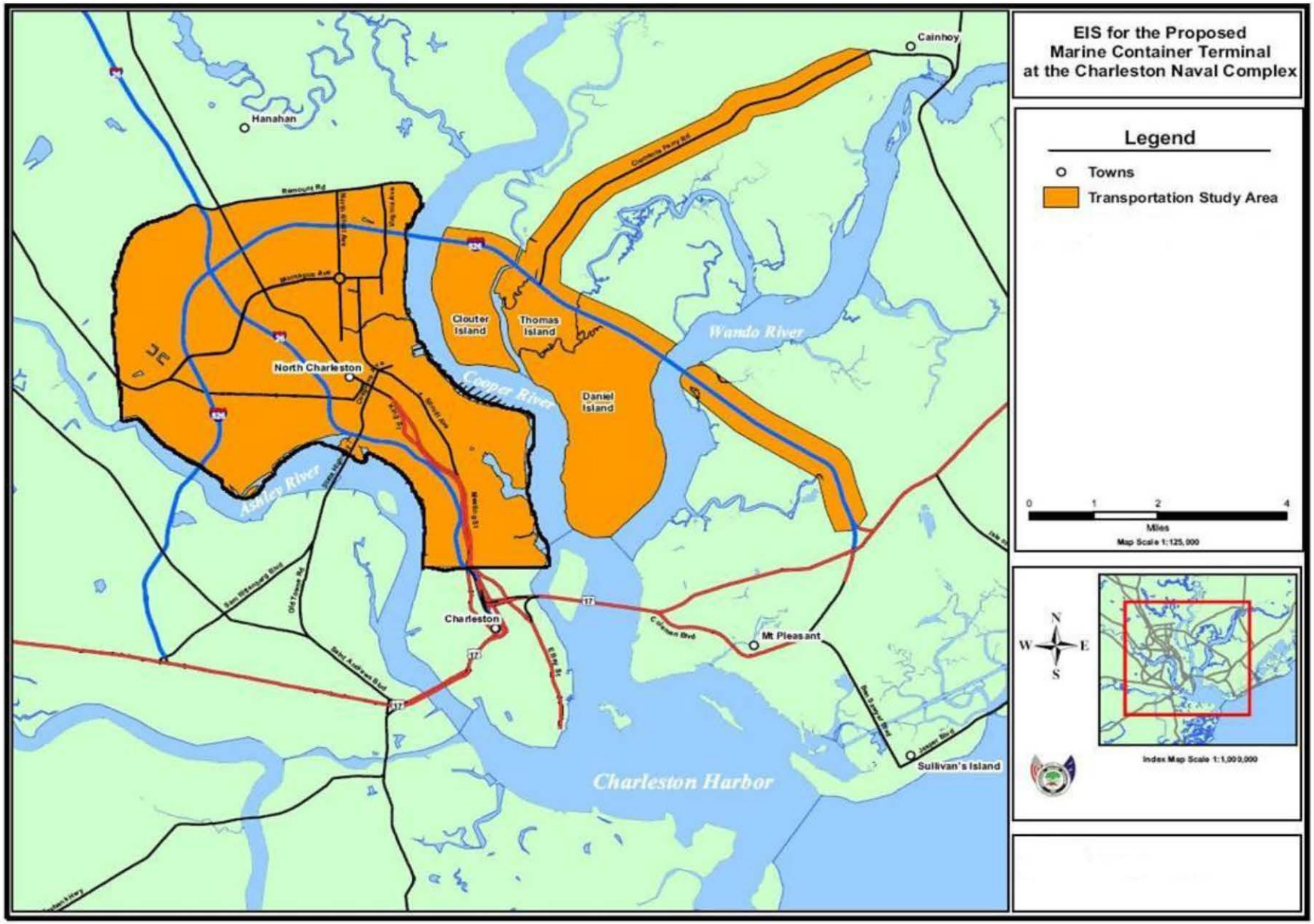
Map of Transportation Study Area for the Port expansion in Charleston, SC



Low Country Alliance for Model Communities

- Low Country Alliance for Model Communities (LAMC) represents seven of the most economically distressed neighborhoods in North Charleston, SC

- LAMC organized to address potential negative impacts of the expansion of the Port of Charleston

- LAMC organized to address the disproportionate burden of environmental hazards, unhealthy land uses, psychosocial stressors (violence, crime, poverty) and limited revitalization efforts in their community

Community Mitigation Plan Agreement

- Community priorities that will be funded through this partnership include:

  1) creation of an affordable housing trust

  2) enhanced community and health facilities

  3) environmental monitoring

  4) scholarships and other support for education

  5) small business development and assistance

  6) development of a community redevelopment plan

- As part of the CMP, the SC States Ports Authority has provided resources to establish a long-term permanent air monitor in the LAMC communities which will be impacted by the Port Expansion.
- LAMC established a partnership with the University of South Carolina, the South Carolina Department of Health and Environmental Control (SC DHEC), and local stakeholders in North Charleston to help address their local EJ and health issues.

Community Mitigation Plan Agreement

- In November 2005, LAMC, SC States Ports Authority, and City of North Charleston met to develop a community mitigation plan that maximizes community benefits and minimizes undesirable impacts from the proposed expansion of the Port of Charleston.

- On February 8, 2006, LAMC formally presented their list of community concerns to the SCSPA and communicated a list of mitigation priorities to offset the most severe negative impacts.

- LAMC, SCSPA, and the City later signed a $4.08 million community mitigation agreement, which was heralded as a new approach to community-based planning and involvement.

Charleston Area Pollution Prevention Partnership (CAPs)

- Our **long-term goal** is to use a community-university partnership between the Low-Country Alliance for Model Communities (LAMC), the University of Maryland-College Park and the University of South Carolina (USC), the community-based participatory research (CBPR) framework, and collaborative-problem solving model (CPSM) principles to address environmental injustice, public health, and revitalization issues in North Charleston, SC.
- Perform a baseline exposure and health assessment before the Port is scheduled to expand in 2017

CAPs Community Kick-Off Event

•LAMC hosted the Community Kick-Off meeting for the NIEHS funded project at the Accabee Community Center on February 4th, 2010.

• Over 30 participants from the LAMC neighborhoods, research team, SC DHEC, and other local stakeholders attended the meeting.

Specific Aims

Specific Aim #1: Assess the geographic distribution of pollution sources in North Charleston, SC

1. There will be a higher distribution of point and non-point sources of pollution in LAMC neighborhoods than other North Charleston and Charleston area neighborhoods

2. There will be an inequitable distribution of pollution sources in census tracts with a higher number of black residents in the Charleston region

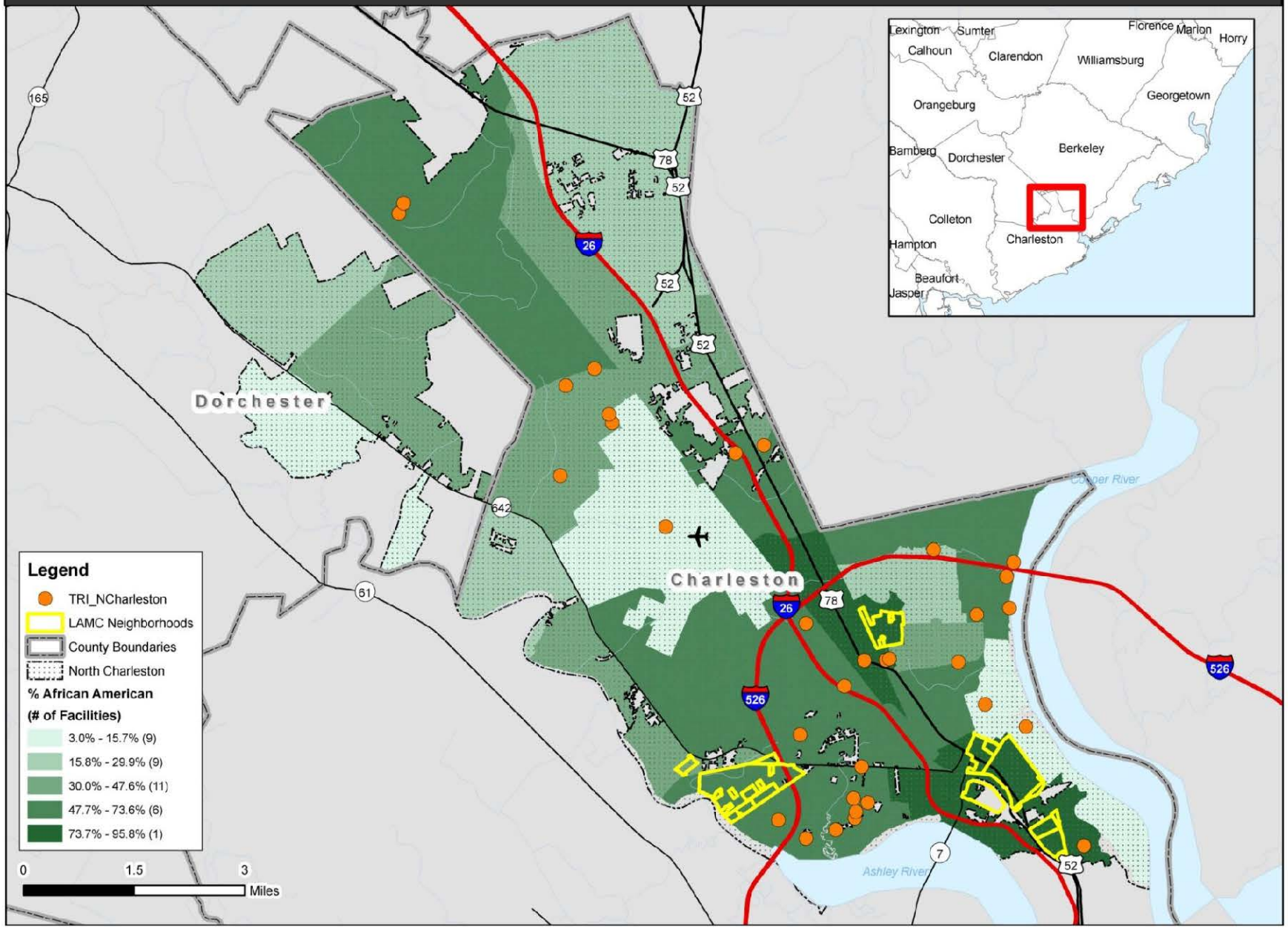
3. There will be an inequitable distribution of pollution sources in census tracts with a higher number of disadvantaged residents in the Charleston region

4. Census tracts with a higher proportion of black and poor residents will have higher hazard risk scores than census tracts with a lower proportion of black and poor residents in the Charleston region

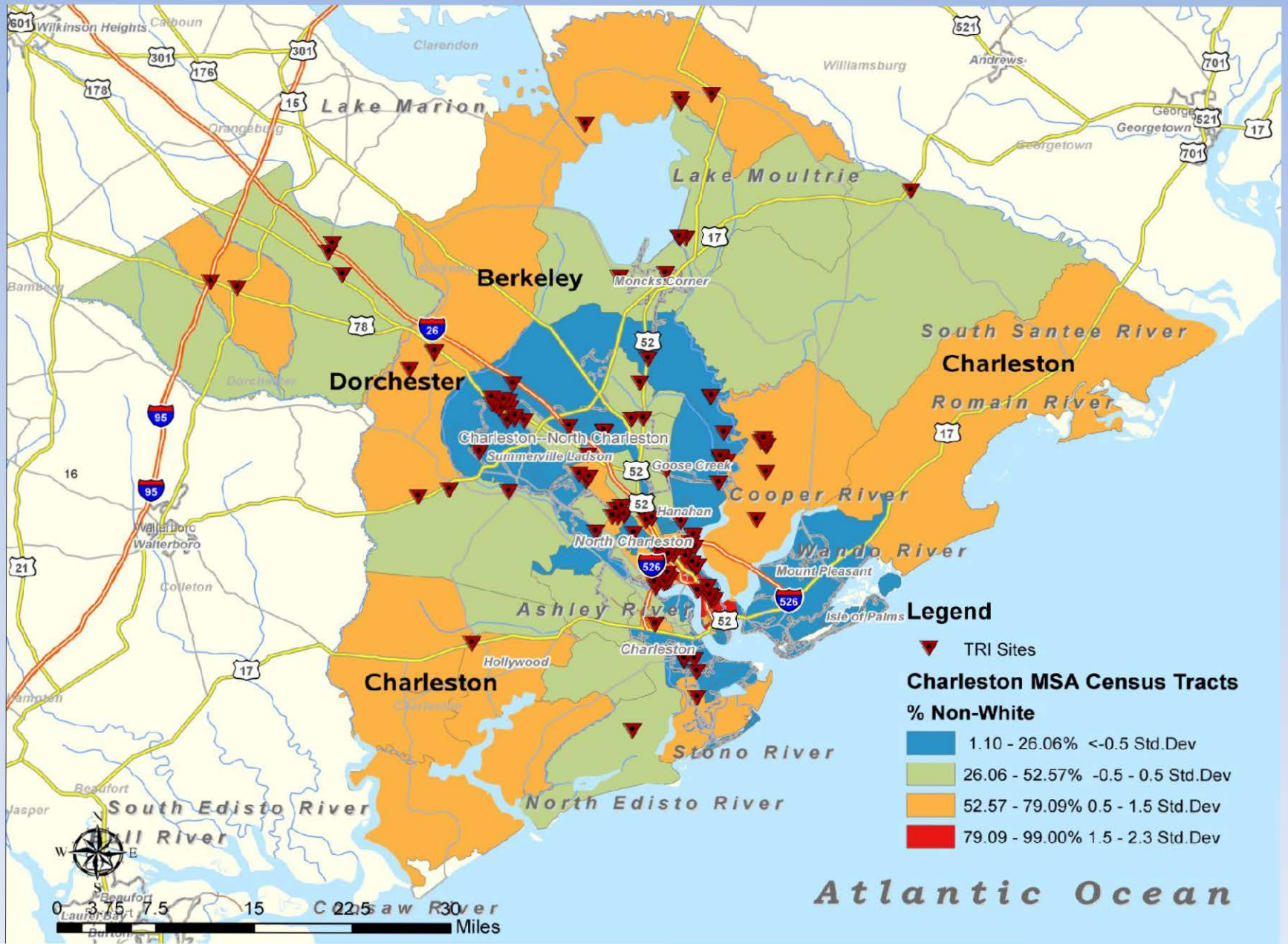
Data Collection

- A spatial database was created for all EPA and SC DHEC regulated facilities
  - Air emitters
  - Toxic Release Inventory (TRI) Facilities
  - Brownfields and LUSTs
  - Landfills
  - Chemical plants
- Data on smaller emitters including auto body shops and laundromats has been obtained
- Pollution data (CAPs, HAPs, RSEI data) from EPA, DHEC, and DENR
- Land use data
- Road layers including traffic counts
- Zoning and Tax Parcel Data
- Salutogens and Pathogens
  - Fast food restaurants, gas stations, convenience stores
  - Pawn Shops, liquor stores, pay day lenders
  - Banks, schools, doctors' offices, social service organizations

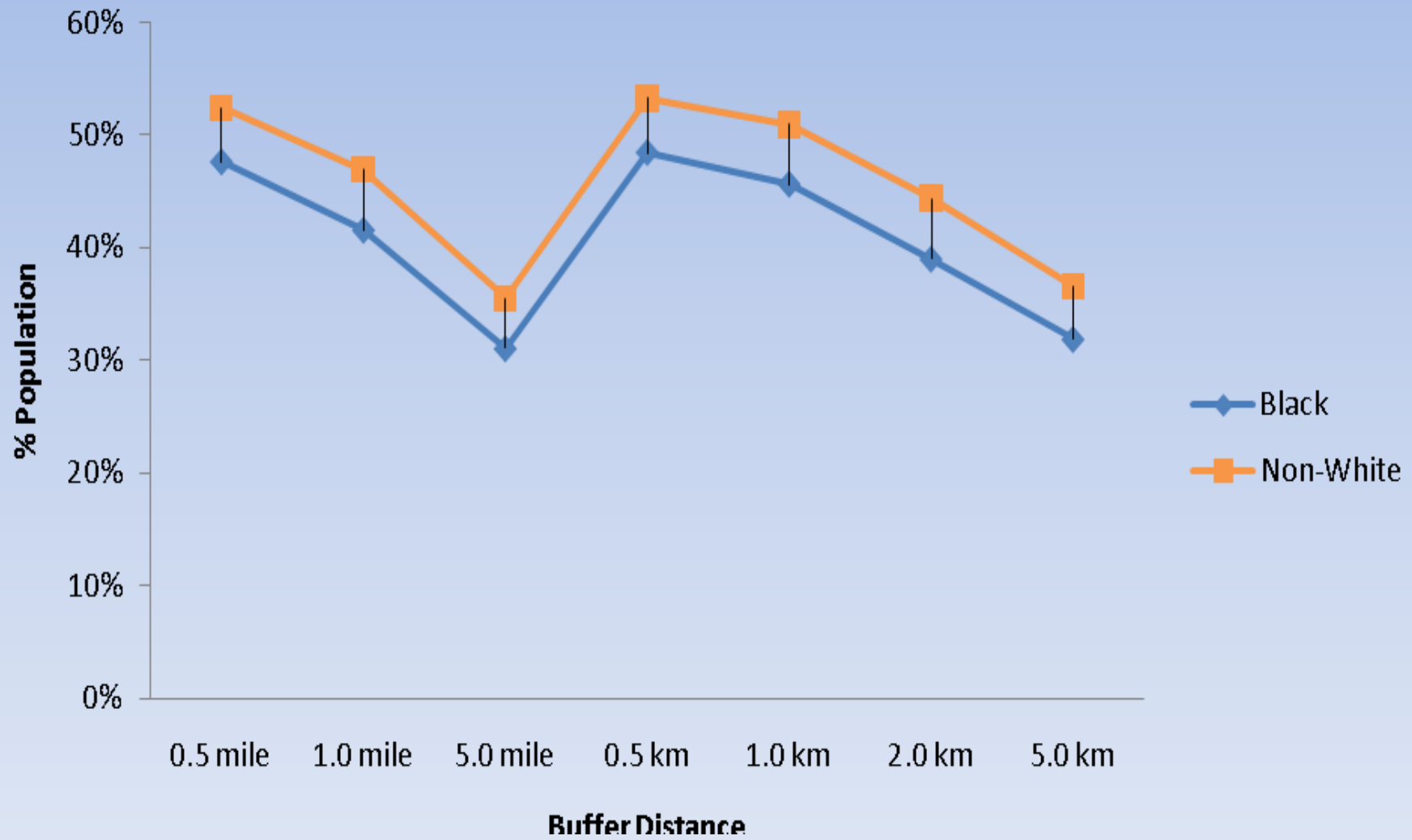
Location of TRI Facilities by Percent African American Population
North Charleston, SC



Charleston TRI Facilities vs % Non-White



Results of Buffer Analysis for TRI Facilities by Percent Black and Non-White Population for Charleston MSA

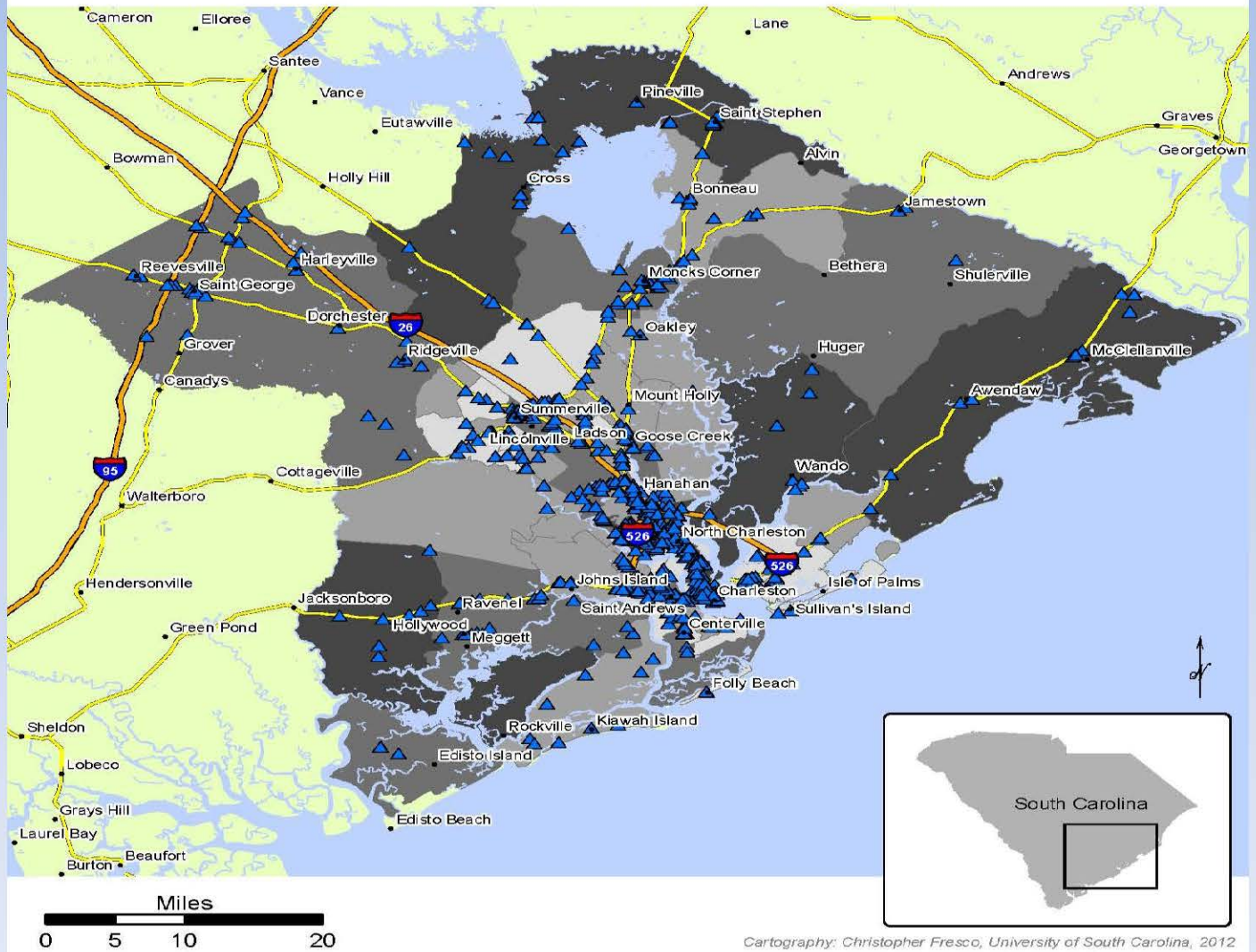


Comparing between host TRI and non-host TRI census tracts based on Chi-square tests

	Prevalence in host tracts	Prevalence in non-host tracts	Ratio (host/non-host)
Non-white	0.606	0.363	1.67*
Owners	0.407	0.497	0.82*
Renters	0.464	0.418	1.11*
Poverty	0.251	0.144	1.74*
Unemployment	0.114	0.061	1.86*
No HS Diploma	0.176	0.297	1.69*

Charleston MSA LUST Site Locations / Percent Non-White Population

Percent Non-White	Standard Deviation	# of LUST Sites	# of Census Tracts
0.57% - 18.36%	< -0.50 Std. Dev.	120	30
18.37% - 34.3%	-0.50 - 0.50 Std. Dev.	148	29
34.31% - 57.89%	0.50 - 1.5 Std. Dev.	211	29
57.9% - 99.41%	1.5 - 2.3 Std. Dev.	225	29



Cartography: Christopher Fresco, University of South Carolina, 2012

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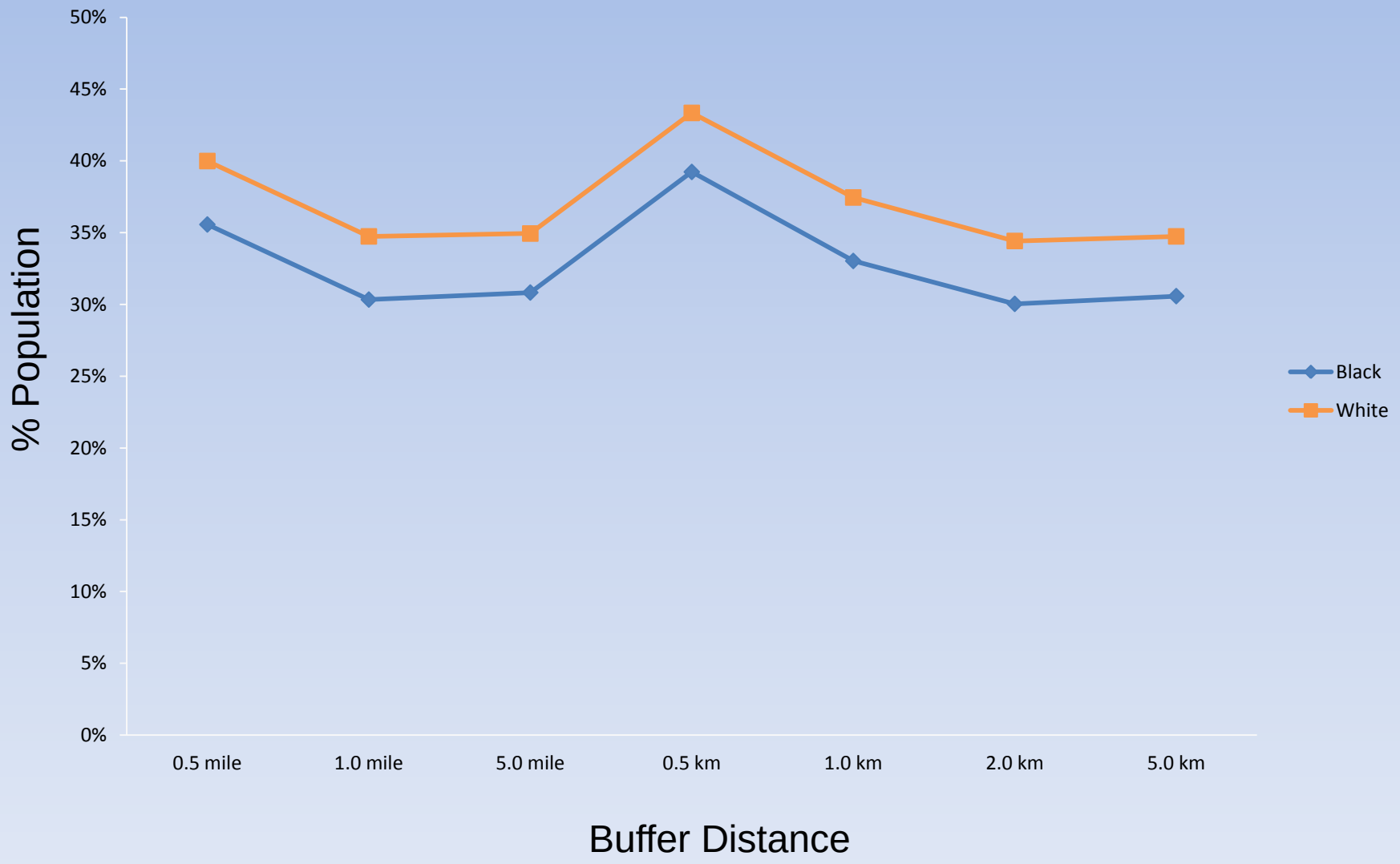


Comparing between host LUST and non-host LUST census tracts based on Chi-square tests

	Prevalence in host tracts	Prevalence in non-host tracts	Ratio (host/non-host)
Non-white	0.610	0.234	2.60*
Owners	0.420	0.527	0.80*
Renters	0.467	0.390	1.20*
Poverty	0.254	0.086	2.96*
Unemployment	0.114	0.061	1.86*
No HS Diploma	0.297	0.115	2.58*

Research Findings

- There is a disparity in the distribution of TRI and LUSTs facilities by host and non-host tracts for race, poverty, income, and education.
- The buffer analysis found 99% of the Blacks and non-Whites in Charleston MSA by a LUST buffer.
- The buffer analysis found 88% of the Blacks and non-Whites in Charleston MSA by a TRI buffer.
- There is a statistically significant difference (p-values<0.05) between TRI and LUSTs host and non-host census tracts on the distributions of race and SES variables (Table 1 and Table 2).
- In census tracts hosting TRI facilities and LUSTs, non-white populations were predominant (61%).
- 59 TRI facilities are located in North Charleston which have a greater percentage of non-whites and Blacks than the rest of the Charleston MSA.

Specific Aim #2: Quantify levels of PM and heavy metals near industrial and non-point sources of pollution in economically disadvantaged neighborhoods in North Charleston, SC

1. Neighborhoods closer to point and non-point sources will have higher levels of PM than neighborhoods that are farther away and background sites

2. Neighborhoods closer to point and non-point sources will have higher levels of heavy metals than neighborhoods that are farther away and background sites

3. Neighborhoods closer to point and non-point sources will experience higher average PM levels than neighborhoods farther away and background sites

4. Neighborhoods closer to point and non-point sources will have soils with higher levels of heavy metals than neighborhoods farther away and background sites

5. Cokriging and linear regression mapping will provide PM and metal exposure surfaces that are more correlated with true measurements and have less prediction error than kriging

Site Assessment for Soil Sampling (Dec 2010)

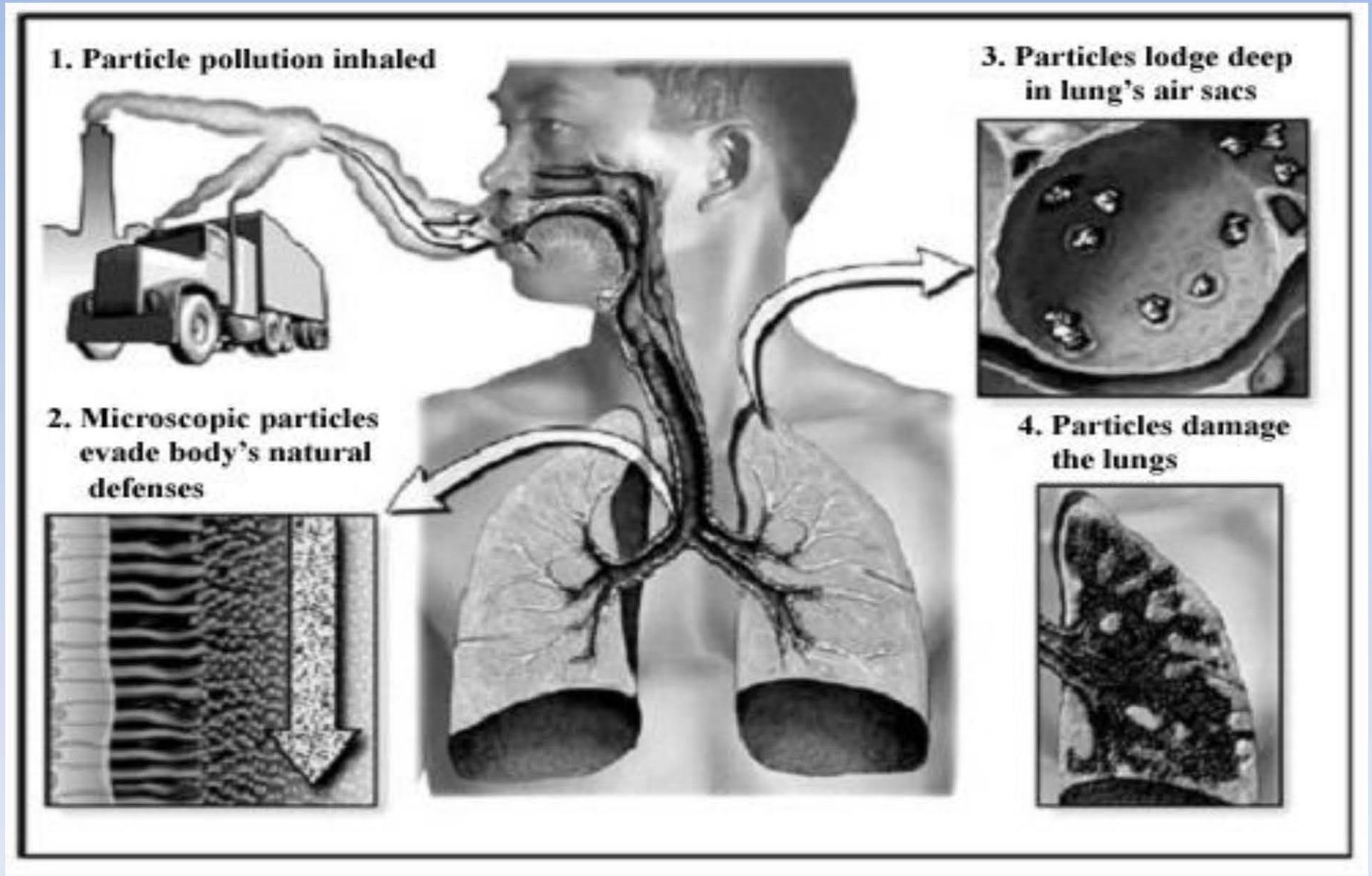
Team evaluation of a local Superfund site

Brownfield site in a LAMC neighborhood

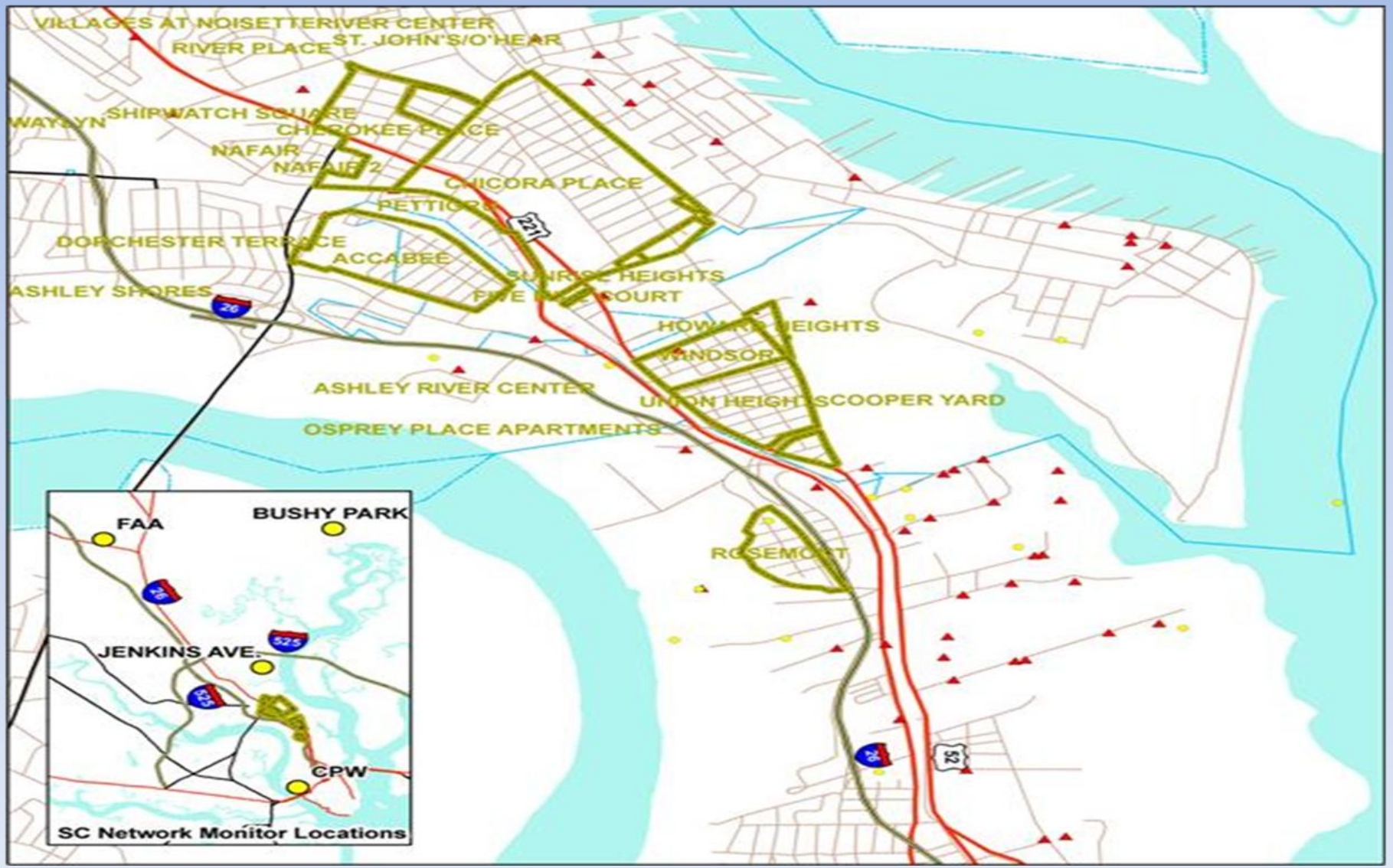
Phase I Soil Sampling (July 2011)

- Primarily sampled in the Union Heights Neighborhood
- Sampled near major industrial sites, Superfund sites, and brownfields
- Sampled near heavily trafficked roadways and background sites
- Sampled in areas that will be impacted by road expansion to support the new Port terminal
- Sampled near schools and community centers
- Noted latitude/longitude coordinates for each location
- Total of 50 sites

Why is Particulate Matter a Health Problem?



DHEC Saturation Study Area in North Charleston, SC



Specific Aim #3: Increase community capacity to reduce exposure, prevent pollution, and improve public health through community-based outreach, education, and training

1. We will observe an increase in the knowledge of local residents on environmental health issues and ways to address these issues after their participation in environmental health workshops

2. We will observe an increase in the knowledge of local residents on the use of community-driven research and collaboration methods after participation in environmental health workshops

Aim #3 Activities

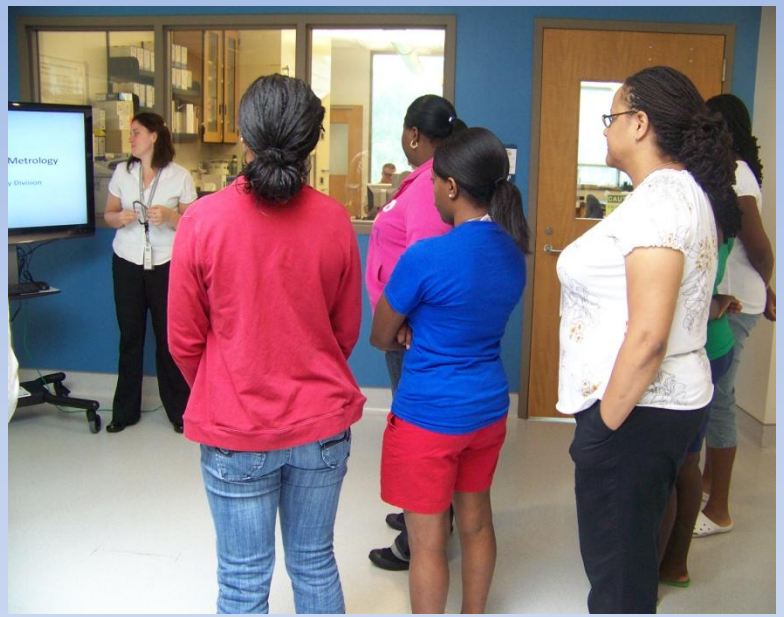
- Community-Driven and Strong Community Involvement
- Host Environmental Education Workshops in LAMC neighborhoods
- Provide training to students from LAMC neighborhoods on environmental health issues through Classroom Presentations and Workshops
- Educate local youth on environmental justice and health issues through Summer Camp Activities
- Created a Community Advisory Board
- Created a Collaborative Problem-Solving Model Team Structure

Project Excellence

- Mission: to promote environmental awareness, literacy, and empowerment in the African-American community.
- Goal: to increase community capacity to address local environmental health issues in North Charleston neighborhoods through community-based outreach, education, and training.
- Community Workshops, Community Advisory Board, Summer Camp Program, School Environmental Health Program, Newsletter, Collaborative Problem-Solving Model Teams

Summer Enrichment Program (2010)

Students participating in a pilot block assessment



Students on a field trip to Hollings Marine Laboratory

- Developed a Summer Enrichment Program for students from underrepresented groups in the sciences (either from a LAMC neighborhood or attend a HBCU)
- Pipeline development
- Participated in workshops on public health
- Attended GIS/GPS training
- Field trip to Hollings Marine Laboratory
- Final paper and presentation on a EJ and health topic (landfills, incinerators, TRI facilities)

Environmental Justice Service Learning Course (Fall 2010)

•Co-developed and taught an environmental justice and health course related to the partnership with Dr. Edith Williams, Co-I on the project
•Students learned about environmental justice and health issues in the community
•Students developed workshop materials and toolkits on soil sampling, brownfields, air pollution, health disparities, goods movement, online mapping tools, and other topics to be used as a part of community education workshops

Community EH Education Workshops (Spring 2011)

- One-Day workshop held on air pollution monitoring and training
- Discussed air pollution issues in the region
- Overview of current air pollution monitoring including different types of monitors
- Training on the use of the partisol for PM monitoring
- Interactive exercises on plans for air monitoring related to the Mitigation Agreement and Port Expansion

Community EH Education Workshops (Spring 2011)

- Dr. David Padgett, a geographer and GIS expert from Tenn State University led a one-day workshop on GIS mapping for residents
- Workshop included a laboratory tutorial on the use of online mapping tools
- Outside field exercise in the use of GPS units for mapping air monitoring locations

Day of Neighborly Needs (July 2011)

- Annual Progress reporting event, health fair and community cookout
- Participants were able to learn about LAMC and CAPs
- Children received a bookbag with the Project Excellence logo and school supplies
- MUSC, DHEC, and other health partners had booths for participants to learn about:
  -Heart disease, high blood pressure, healthy living, lupus, asthma, and cancer
- DNR and other non-health partners had booths as well
- Zumba class for participants
- Healthy Cooking Demonstration
- Fun activities for kids

Day of Neighborly Needs 2011

Community Advisory Board (CAB)

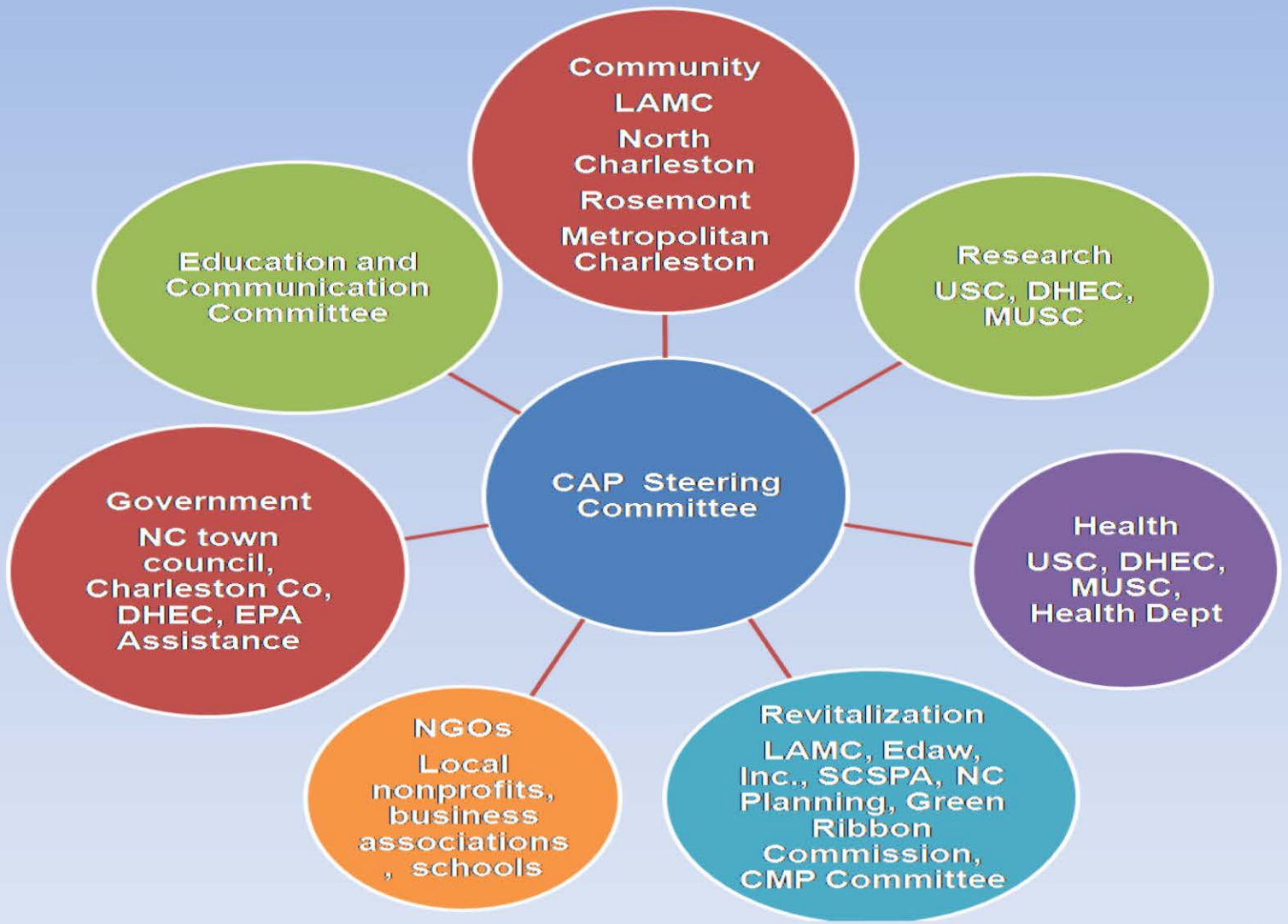
- The CAB serves as a liaison between community members and university faculty to provide continuous and consistent input on the project via conference calls, e-mails, and quarterly meetings

- The Principal Investigator (PI) and research team are meeting with the CAB monthly at a designated location in North Charleston to obtain input from the CAB on study design issues, monitoring sites, use of funds to pay community monitors and participants, confidentiality and privacy issues, dissemination and translation of research results, and any other project-related concern

- We developed a research organizational structure, project workplan, and communications plan to be used by the CAB in its role as liaison between the community-university research team and LAMC residents

- The Community Advisory Board has evolved into a Community Action Board

Collaborative Problem-Solving Model Teams



Challenges

- Capacity of the community-based organization (CBO) has grown slowly
  - Fiduciary capabilities
  - Limited workforce
- Infrastructure differences between partners
  - Administrative/staff support
  - IDCs
- Training and experience of research staff
- Community engagement and outreach has been difficult at times
- Ownership of project
- Tension and conflict between partners
- Communication
  - CAB
  - Communication within organization
- Departure of team members to other institutions
- Maximizing policy impact
- Community fatigue

Lessons Learned

- Develop Mission and Values Statement for partnership in the beginning
  - Do not rely on previous partnership without having guidelines written down in advance
- Provide training for all team members on CBPR in the beginning of the partnership
- Provide training on fundraising and other efforts for sustainability in the beginning
  - Better fundraising plan to continue efforts in community to increase positive impact
- Provide board training and help with the development of policies and procedures for CBO when necessary
- Use outside consultant to address tension through conflict resolution within and between partners
- Ensure that partner has more funding including IDCs
- Use funds for project manager on site- Be creative
- Better community engagement plan and implementation steps
  - Know context better; Go to people, where they are!
- Hire evaluation expert in the beginning of the project
- Leverage available resources more efficiently and effectively (including online training resources)

Impact

- Increased environmental literacy and awareness in the community
- Built community capacity to address environmental health concerns
  - Catalyzed CBO's current development of policies and procedures needed for its operation as a well-organized entity
- Helped residents on efforts with Port expansion
  - Knowledge of negative impacts
  - Permanent air monitor and baseline assessment
- Provided technical assistance on incinerator issue
- Provided technical assistance and environmental health perspective for the Mitigation Agreement Committee
- Expanded partnership to include other communities including the Rosemont Community and universities including UMD-CP and MUSC
- Led to other funding opportunities for LAMC including LEAP grant, ACHIEVE grant, and Community-Engaged Scholars Program (MUSC)
- LAMC obtained an EPA Environmental Justice Achievement Award

Next Steps

- Analysis of Phase I Soil Assessment Data
- Additional Mapping of Hazards, Assessment of Salutogens and Pathogens, and Traffic Assessment
- Community Progress Reporting Meeting (March 23)
- Air Monitoring Site Assessment and Training (March 24)
- 1st Collaborative Problem-Solving Model Team Meeting (March 25)
- Phase II Soil Sampling (May 2012)
- Air Monitoring Begins (May 2012)
- Summer Camp (May-July 2012)
- Day of Neighborly Needs (July 2012)
- Secure Additional Funding for Sustainability (NIH and Foundations)

THANK YOU!

Acknowledgements

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