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# Use of EPA Collaborative Problem-Solving Model to Obtain Environmental Justice in North Carolina

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## Abstract

**Background:** The West End Revitalization Association (WERA), a community-based organization (CBO) in Mebane, North Carolina, was awarded a Collaborative Problem-Solving (CPS) grant from the U.S. Environmental Protection Agency's Office of Environmental Justice (EPA OEJ).

**Objectives:** The purpose of this paper is to highlight WERA's efforts to bring stakeholders in three low-income African-American communities where environmental hazards created public health risks together for collaboration rather than litigation.

**Methods:** WERA's board and staff organized nine working groups with specific areas of expertise that would facilitate research, identify lack of basic amenities, and encourage funding for corrective action and participation in progress reporting workshops. WERA used consensus building, dispute resolution, and resource mobilization as part of the CPS model to address noncompliance with environmental laws, including the Clean Air Act, Clean Water Act, Safe Drinking Water Act, Toxic Substances Control Act, and Solid Waste Disposal Act.

**Results:** WERA's CPS "Right to Basic Amenities" project produced a framework for (1) grassroots management and ownership of a collaborative problem-solving process; (2) bringing stakeholders together with diverse and conflicting viewpoints; (3) implementation of an innovative community-owned and managed (COMR) research model; and (4) leveraging millions of dollars to fund installation of first-time municipal water/sewer services, street paving, and relocation of the 119-bypass to advance environmental health solutions.

**Conclusion:** The structure and successes of WERA's Right to Basic Amenities project have been discussed at demonstration and training sessions to help others replicate the model in comparable low-income communities of color in North Carolina and across the United States.

## Keywords

Community-based participatory research, collaborative problem-solving model, environmental justice consensus building, partnership, community-owned and -managed research (COMR), disparities

We have seen a recent focus on community-based participatory research (CBPR) as an alternative paradigm to traditional approaches of public health research and practice.[1–14] The shift to a CBPR research paradigm has been beneficial to academic, government, and community-based organizations (CBOs)[2,7] by helping to build trust,[3,5–6,8,15,16,17] overcome traditional barriers to partnerships and communication,[1–2,5–7,13] more effectively address population health problems,[1,2,5,15] develop appropriate and more effective interventions,[1,2,9,16] create a better atmosphere of collaboration,[1–3,5,7,13,15,16,18] cultivate a culture of "reciprocal benefits," and utilize grassroots "know-how" to affect social change.

The Environmental Protection Agency's Office of Environmental Justice (EPA OEJ) has developed Collaborative Problem-Solving (CPS) Grant Program based partially on the



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CBPR model to provide a funding and institutional support framework for CBOs.[19,20] CPS agreements enable CBOs to act as the principal investigator (PI) and project manager on federally funded research projects to address their environmental justice (EJ) problems using a collaborative approach.[19,20] In this article, we describe the EPA CPS program, the "Right to Basic Amenities" CPS project of the West End Revitalization Association (WERA), a CBO located in Mebane, North Carolina, WERA's process of building collaborative workgroups, and outcomes of WERA's CPS project.

## EPA EJ COLLABORATIVE STAKEHOLDER MODEL

The EPA initiated the CPS Grant Program in 2003 to promote corrective action without litigation in communities with EJ issues.[19] The program awards funding to CBOs seeking to address environmental hazards that create public health risks in their communities through constructive and collaborative problem solving with a diverse number of stakeholders including local, state, and federal governments officials, nongovernmental organization representatives, and university researchers.[19] The CPS model fosters a research approach that diverges from the academic CBPR model by making the CBO the program manager and PI, the leader of research projects, and recipient of all grant monies. This community capacity-building process relies on community-driven applied research, conflict resolution, and leveraging of partner resources to affect change and encourage nonlitigious solutions. CPS awardees are empowered by EPA funding to develop a community vision and change agenda that is "for the community, and by the community." The CPS model helps affected communities employ constructive engagement and multistakeholder partnerships to effectively address local EJ concerns.[19] The CPS stakeholder model/framework is intended to achieve improvements in (1) the capacity of affected communities to think strategically and to work with diverse stakeholders and (2) environmental conditions that impact the health of residents living in affected communities.[19]

## WERA

WERA is 1 of 30 CBOs that received a 3-year, $100,000 EPA CPS grant in 2004 to develop its own collaborative problem-solving project.[21–22] WERA was established in 1994 by low-income African-American residents of the West End community and later added White Level and Buckhorn/Perry Hill.[23,24] All are located in Mebane, North Carolina, a small Alamance and Orange County town 20 miles west of Chapel Hill, with approximately 7300 residents (78% white, 18% black per the 2000 U.S. Census). WERA communities are unincorporated postslavery neighborhoods established during Reconstruction. These communities are 85% to 95% Black, primarily elderly and retired citizens; 53% earn less than $20,000 per year.[24] They are located in Mebane's city limits and extraterritorial jurisdiction (ETJ). The ETJ is a zoning designation for areas outside the city limits that is regulated under North Carolina statutes giving the municipality authority to control land use and community development without input of residents who reside in the ETJ.

WERA was founded to address the concerns of residents threatened by the 119-bypass/interstate, a 27-mile four-lane highway connecting Interstate 85 and 40 from Mebane to Danville, Virginia.[25–27] WERA seeks mitigation of risks to public health and quality of life due to the federally funded highway construction project.[23,24] The 119-bypass would negatively impact the health of WERA communities who have suffered for decades from the lack of basic amenities including sewer and water infrastructure, paved roads, and storm water management that depress affordable housing and impede upgrades in housing quality.[28]

WERA formed a board of directors made of impacted residents in 1995 and elected Omega Wilson as the founding board chairperson. WERA's research and management team was established in 2000 to help WERA residents collect data to support legal action that would address the denial of basic amenities and noncompliance with EPA statutes (Figure 1). The WERA research and management team includes partners from WERA and former and current researchers from the University of North Carolina at Chapel Hill (UNC; including authors on this manuscript).

WERA leadership initially sought help from local university faculty, researchers, planners, and other professionals in the late 1990s. Early on, many of WERA's research partners were interested in financial gain through access to research subjects, publication rights, and claims to ownership of existing WERA files, data, and maps. WERA obtained legal assistance to dissolve partnerships and protect against harassment. Finding reliable partners who would follow ethical community

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engagement principles, respect the contextual expertise of WERA members, and employ research skills and leverage resources to help address problems in WERA communities was a tough challenge for WERA leadership. After attending several North Carolina Environmental Justice Summits, where many community activists and scholars discussed efforts to address EJ issues in North Carolina, WERA board members were able to connect with graduate students and some faculty at UNC who fit WERA's criteria for academic/research partners. WERA worked with these core academic/research partners and students—who became members of the WERA CPS project management team—to create a healthy, productive, and sustainable community–academic partnership.

Early in the partnership, the WERA research and management team documented disparities in environmental quality, infrastructure, and plans for corrective action by local and state government agencies through a $15,000 EPA EJ small grant (2001) and a $10,000 health disparities pilot grant from UNC's Project EXPORT (2003).[23] Residents agreed to participate in research designed by WERA's research and management team. Water sampling was performed by community monitors trained by Omega Wilson, Christopher Heaney, and Sacoby Wilson. Analysis of microbial indicators of fecal pollution in water samples was carried out by Christopher Heaney and Sacoby Wilson. This work provided preliminary documentation of fecal contamination present in ground and surface water supplies in these African-American communities lacking a public, regulated drinking water system and failing on-site septic systems.[22,24,29–33] Control water samples revealed evidence of human waste leakage from noncompliant city sewer lines.[22,24,29,32]

WERA members developed community maps and surveys that were reviewed and modified by WERA's research and management team to document human health hazards and measure quality-of-life impacts from carcinogen-leaking underground storage tanks, abandoned landfills, illegal dumps, dilapidated housing, proximity of the wastewater treatment plant to African-American neighborhoods, unpaved

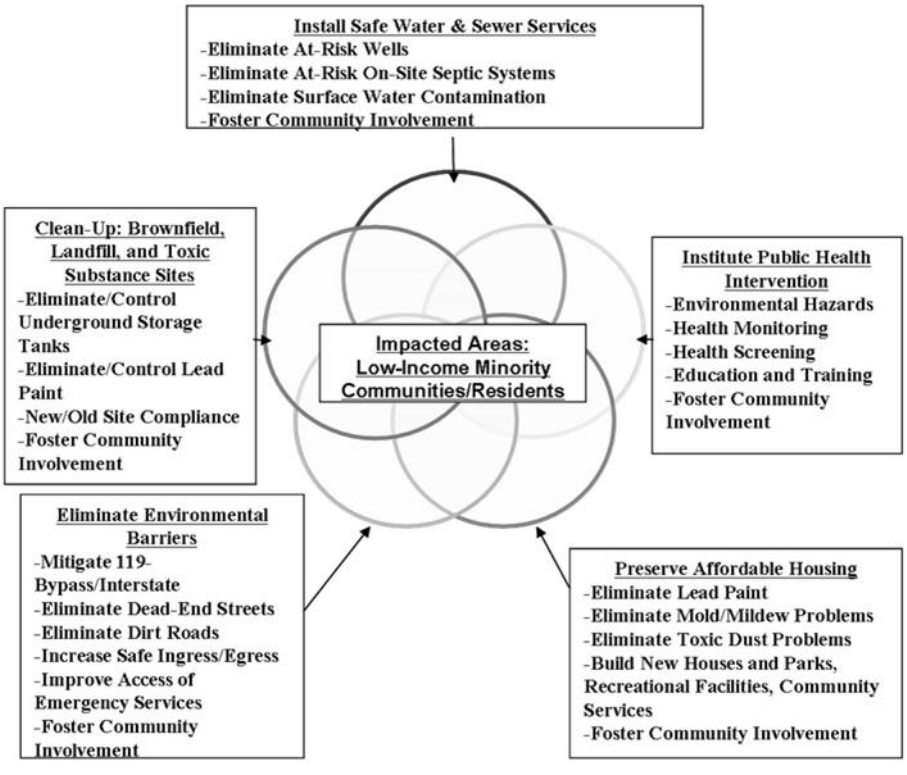


Figure 1. Management and Corrective Actions Conceptual Model

This model shows the five major areas of concern for WERA communities and actions that WERA collaborative partnership has or will take to correct environmental and public health problems in WERA communities.

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streets, and planned destruction of West End/White Level by the 119-bypass without community input.[24]

## WERA'S COLLABORATIVE PROBLEM-SOLVING PROJECT: "RIGHT TO BASIC AMENITIES"

### WERA Collaborative Partnership

The WERA CPS partnership was established based on the EPA's collaborative problem-solving model framework and operationalizes WERA's Community Owned and managed Research (COMR) methods. [28] The WERA CPS partnership consists of nine working groups involved in assessment, management, and corrective action (Figure 2). These working groups include (1) WERA CPS project managing and steering committee; (2) representatives from impacted communities in Mebane; (3) stakeholders from other North Carolina communities; (4) officials experienced with environmental, health, economic, and social issues; (5) legal professionals to lead efforts to receive compliance with environmental statutes; (6) professionals to perform environmental and public health research; (7) experienced professionals in community planning and development; (8) nongovernmental agency representatives; and (9) local, state, and federal government officials to represent the public interest on issues impacting communities and residents.[21,30–31,33]

The collaborative partnership between these nine working groups was established to help WERA design and implement long-term strategies to address the lack of basic amenities in WERA neighborhoods and encourage Mebane officials and other government entities to comply with EPA statutes, including the Safe Drinking Water Act, Clean Water Act, Clean Air Act, Solid Waste Disposal Act, and Toxic Substances Control Act.[21,30-31,33] Figure 3 is a conceptual model of the environmental and public health issues affecting WERA communities and the applicable environmental laws. By leveraging skills from collaborative workgroups to encourage compliance within existing environmental laws, the EPA CPS model provides CBOs a new approach to adapt to increase the effectiveness of grassroots research and leadership to impact policy and mitigate local environmental and public health threats.

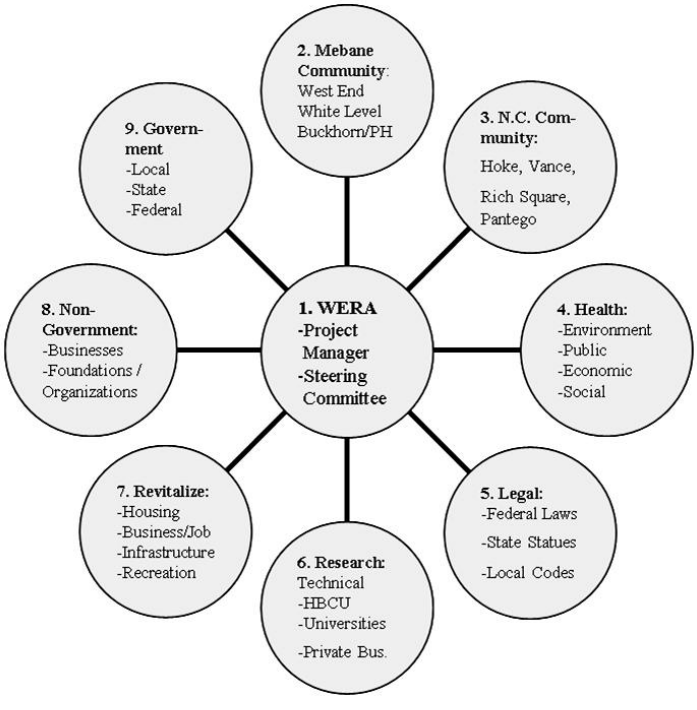


**Figure 2. WERA Collaborative Problem-Solving Model**

This model shows the nine different working groups that make up the WERA collaborative problem-solving model team that was funded by the Environmental Protection Agency.

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### Quality Assurance Project Plan/Quality Management Plan

A CPS management structure was established from the collaborative partners to oversee proper quality assurance and quality management for all project activities. The management structure consisting of the CPS project management team of partners from WERA and UNC; a research steering committee oversaw the implementation of WERA's Quality Assurance Project Plan/Quality Management Plan (QAPP/QMP) for all research activities. The QAPP/QMP management structure was approved by the EPA (Figure 4). The QAPP/QMP is a document that outlines and describes the names, organizational titles, affiliations, qualifications, responsibilities, chain of command, and lines of communication for all persons involved in data collection, management, and analysis, quality assurance, and quality control (QC) activities.

Each CBO funded through the EPA CPS program that created a QAPP/QMP had it reviewed and approved by the EPA OEJ. This office hired Tetra Tech, Inc., an international research consulting firm, to be the third-party screener to oversee the writing of the QAPP/QMP, ensure that all laboratories contributed QA/QC plans to the QAPP/QMP protocol, validate the QAPP/QMP structure, and certify that the QAP was scientifically sound. Challenges arose when WERA attempted to obtain QA/QC protocols from laboratory partners unaccustomed to providing these to CBO clients. Initially, laboratory partners did not agree to provide QA/QC protocols to a small CBO. However, the EPA required that all community data adhere to strict legal and scientific standards and that all laboratory partners submit QA/QC protocols that met EPA standards for laboratory methods. Tetra Tech played a crucial role in mediating between WERA and laboratory partners to ensure that laboratory partners submitted QA/QC plans to be included in WERA's QAPP/QMP. EPA and Tetra Tech's support solidified WERA's authority to manage and control the research process.

The development of the QAPP/QMP was a very important example of how CBOs with organizational capacity can maintain ownership of the research process by managing research partners and training community monitors to collect scientific data. The QAPP/QMP trained community residents to code and collect environmental samples to double-blind university researchers. In addition to helping community members learn how to collect data following strict scientific

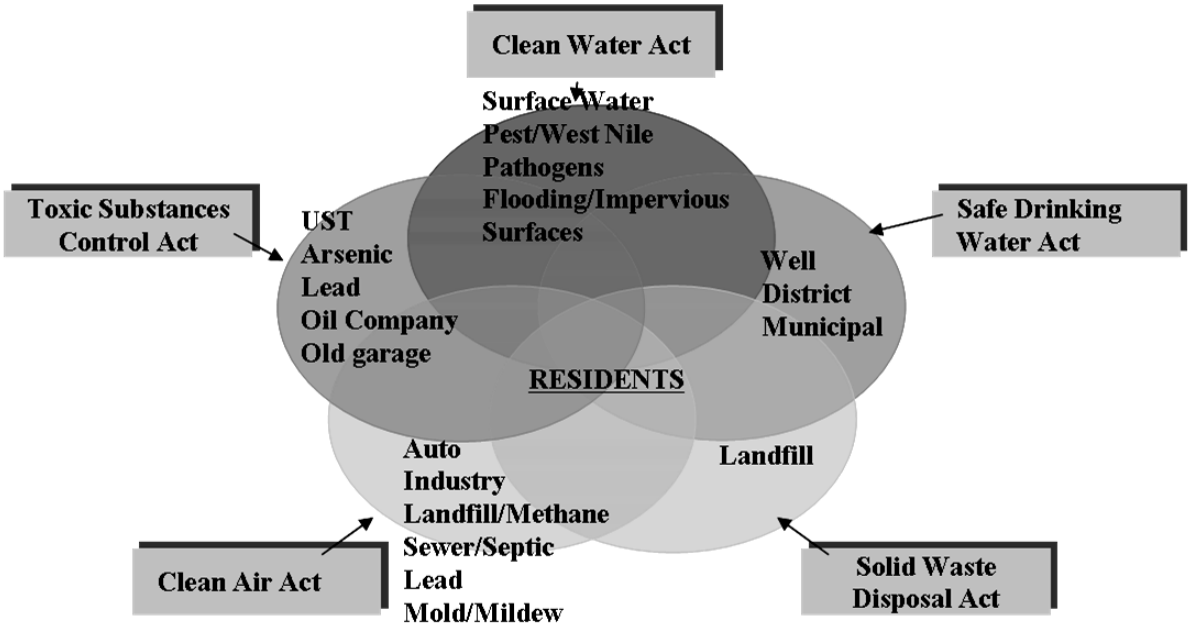


Figure 3. Environmental and Public Issues Conceptual Model

This model developed by WERA presents the environmental statutes that the WERA collaborative partnership is working to receive compliance with by local officials. The model also includes public health issues relevant to each environmental statute.

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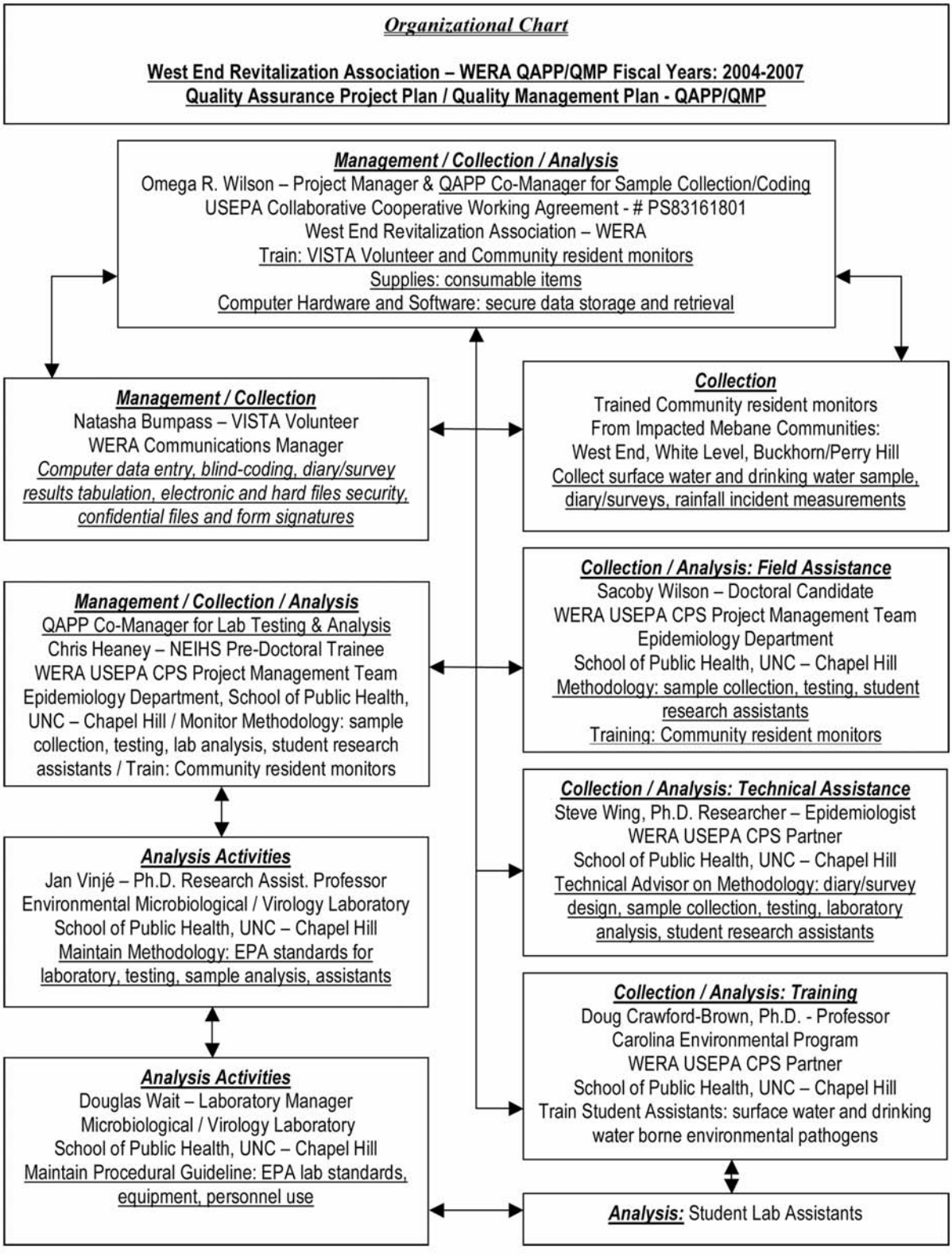


**Figure 4. WERA Quality Assurance Project Plan/Quality Management Plan (QAPP/QMP) Organizational Chart**

This figure shows organizational structure of WERA's QAPP/QMP including the names, affiliations, roles, and responsibilities of management team, key leaders, and personnel.

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standards, the QAPP/QMP helped WERA to obtain better response rates during different stages of its research because it had community monitors who were known and respected in the community collecting data. This maintained trust, confidentiality, and privacy of community data.

### Consensus Building and Meaningful Involvement

To build consensus on the topics to be prioritized, members of each workgroup (Figure 2) completed a questionnaire that requested information on what topics they thought were important to their workgroup and for their organization, what activities addressed these topics, and the expertise and skills that each workgroup partner would contribute to their workgroup and the overall CPS process. The CPS management team and steering committee compiled these data and prioritized the list via in-person meetings, conference calls, and e-mails.

After this process was completed, WERA's president and board developed a Memorandum of Agreement (MOA) specific to the roles and responsibilities designated for partners in each collaborative workgroup (Figure 2). For example, a MOA was developed for academic partners. The MOA included a list of roles and responsibilities for research activities related to human exposure to fecal contamination in well water, quality of surface water supplies, creation of Geographic Information Systems (GIS) maps of sewer and water infrastructure in WERA communities, data collection protocols, and production of deliverables for WERA's use to document and address problems in underserved African-American neighborhoods in Mebane. Partners agreed to complete each activity by checking off a designated box or they used additional space to further specify their role and responsibilities on the CPS project.

The EPA required that each collaborative partner sign a WERA MOA. The MOA acted as a binding contract between WERA and partners and validated that WERA had primary management and control of the research process, ownership of the data, and final decision-making authority over the participating partners. In the words of a WERA board member, the MOA empowered the organization to "hire and fire" collaborative partners who did not adhere to the roles and responsibilities specified in the MOA. This hiring and firing authority helped WERA to avoid problems that had arisen in relationships before WERA's collaborative problem-solving project was established. Over 35 MOAs were received from different collaborative partners who participated in the nine CPS workgroups.

### Resource Mobilization and Leveraging

After each workgroup and individual partner specified what topics they would address for WERA, each developed and implemented a technical assistance plan based on the project's QAPP/QMP and MOAs. These plans provided a structure for each workgroup partner to mobilize and leverage their organization's resources on behalf of WERA. For example, academic partners from UNC developed capstone courses in City and Regional Planning and Environmental Sciences and Engineering. WERA leadership worked with faculty and students to ensure that the field projects followed WERA's guidelines and WERA had final approval on what research activities the students performed. Students in these courses performed field research, including community risk assessments, GIS mapping of environmental hazards, and community infrastructure analyses. Final products from field projects were provided to WERA as deliverables that could bolster its case for mitigation of environmental hazards and more equitable community planning and development efforts by town and county officials. These courses helped WERA to implement the CPS framework and validated that communities had ownership over the process.

Other workgroup partners also provided important technical assistance and support. The revitalization workgroup researched the history of zoning and planning in Mebane, obtained data on the spatial distribution of different land uses throughout Mebane and WERA communities, and analyzed the town's plans for economic growth and development around the 119-bypass highway project. An important effort of the workgroup was to develop a community growth and revitalization plan for WERA communities. This plan detailed community assets such as historical churches, businesses, and daycare centers; community needs such as installation of safe sewer and water services, elimination of dead end roads, paving of dirt roads, building of new houses and parks, increased access to recreational services, and development of other amenities; and strategies to revitalize WERA communities such as working with local foundations to seek funding assistance (e.g., federal community development block

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grants). This revitalization plan forms the vision that WERA residents have for their communities, acts as a framework for empowerment, and is the counterpoint to the city's long-term economic growth and development plan that targets these historic black neighborhoods for elimination.

The legal workgroup performed an uncharacteristically nonlitigious function. The legal team's job was not to sue the City of Mebane on behalf of WERA, a tactic that many CBOs in the EJ arena have used to address their problems. Instead, the legal workgroup acted as WERA's watchdog, providing oversight of how city officials followed legal procedures mandated by the U.S. Department of Justice after a civil rights complaint was filed. The legal workgroup reviewed all of the city documents post-complaint to ensure that officials were adhering to planning rules and guidelines to receive federal block grant funding. The legal workgroup also attended town hall meetings to ensure that officials followed public notice and stakeholder involvement rules, which city officials had broken in the past during the illegal planning of the 119-bypass highway project. One WERA leader states:

> Why have the lawyers and researchers? When we go into a town council meeting, the town officials have their lawyers, engineers, planners, and public health experts.… We would go into the meetings feeling naked.… So we decided to have our own lawyers from national law firms, engineers, and researchers from local universities and other institutions so we could be prepared and be on equal footing with town officials.

Additionally, the legal workgroup compiled data on how the city was out-of-compliance with building codes, environmental laws, and public health statutes in WERA neighborhoods. The legal support for WERA's documentation of noncompliance is forming a case study in an emerging area of civil rights law that governs daily interactions between individuals, businesses, or government agencies known as "transactional law." The workgroup's efforts in transactional law allowed for legal interventions without litigation in WERA communities to address EJ and public health issues.

### Conflict Resolution

Because of the adversarial history between town officials, WERA leadership, and WERA residents, the CPS grant provided a framework for conflict resolution. WERA leaders and residents documented harassment, intimidation, and threats from local and state officials who were (1) supportive of the 119-bypass plan that would destroy WERA communities and (2) opposed to infrastructure improvements in WERA communities. Previous civil rights and EJ complaints to the Department of Justice and the EPA filed in 1999[24,25] did little to persuade local officials to address the concerns of WERA residents. As part of the CPS grant, town officials were encouraged by EPA OEJ officials to participate in WERA's CPS progress report meetings held every 6 months. WERA facilitated meetings to provide opportunities for EPA officials to monitor workgroup outputs and review corrective actions by government officials to address funding and installation schedules of sewer and water infrastructure for impacted residents. These EPA officials acted as mediators between WERA and town officials and provided the federal backing WERA needed to make its basic amenities problem a priority for town officials.

Early during many EJ struggles, CBOs typically do not achieve optimal conflict resolution. This is true in the case of WERA's CPS project. Initially during the CPS project, town officials attended progress report meetings, but over time some officials stopped participating in meetings or did not submit progress reports. WERA's CPS project exemplifies the challenges CBOs face when trying to resolve conflicts, especially when some stakeholders maintain adversarial and obstructive positions. However, WERA communities have benefited from positive outcomes of the conflict resolution process such as improvements in sewer and water services, paving of dirt roads, installation of storm water management infrastructure, and more stakeholder involvement in planning efforts.

## CONCLUSIONS AND LESSONS LEARNED

The establishment of an effective and inclusive process to address EJ concerns is vital to WERA's progress in developing long-term, sustainable, collaborative problem-solving partnerships, innovative tools and techniques, and a community-centered agency for funding and training. The project's greatest strength is the participation of WERA residents in environmental hazards and public health data collection, monitoring, training, and education. The maintenance of a workable partnership between grassroots, community-based individuals and university researchers has helped to reduce

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mistrust and improve the credibility of the research that has been used to mitigate local environmental health risks.

With the support of EPA officials, WERA members and partners have worked to ensure that the CPS "Right to Basic Amenities Model" provides a foundation for future resolution of environmental health and community planning issues. WERA, as a well-organized CBO, was also successful in managing the funding and administrative needs of the EPA CPS grant, which increased its ability to operationalize the COMR model.[28] WERA's experience with the EPA CPS program has demonstrated that long-term strategies and partnerships are necessary to address systemic environmental hazards that create public health risks in low-income communities of color in the City of Mebane and other EJ communities throughout North Carolina and the United States.

There are some key lessons and points to take away from WERA's efforts to address EJ and public health issues in low-income communities of color in Mebane, North Carolina. They include the following:

1. Community ownership and management of research is possible. It is very important that community organizations and their leaders empower themselves with the knowledge and skills needed to drive action and change by acting as PIs and project managers on research projects. Community leaders can facilitate and manage the intricate processes of organizing, data collection, and implementation of strategies that involve government officials, technical experts, and attorneys. Skill building and leadership training helps to overcome the fears associated with managing research projects and working collaboratively with academic and professional partners.
2. Organization must use research to seek compliance with laws and statutes. Community organizations can use research to document the lack of compliance with environmental statutes by local and state officials as a way to encourage funding infrastructure improvements, changes in public health outcomes, and mitigation of major business and government projects that create adverse and disproportionate impacts (e.g., the planned 119-bypass). By focusing on infrastructure disparities and noncompliance with existing building codes, environmental statutes, and civil rights law, communities seeking to improve public health can develop alternatives to the exposure–disease paradigm that places the burden of proof on affected communities.
3. Conflict resolution is a step in, not a solution to, a difficult process. Changing attitudes is not the priority during conflict resolution; however, seeking compliance under legal statutes is the primary objective. When performing conflict resolution, it is important to first bring parties in conflict to the table and then use third-party mediators with statutory authority such as the EPA. In WERA's case, the results were mixed, but the use of the conflict resolution framework empowered WERA's leadership and members as equal partners with town officials.
4. Community leadership and collaborative partnerships are key. WERA's efforts to lead and complete a QAPP/QMP based on accepted EPA research standards for monitoring environmental hazards clearly demonstrates capacity-building opportunities for at-risk stakeholders (i.e., the CBO). Incorporation of collaborative partnerships into WERA's long-term EJ strategic and compliance monitoring plan was instrumental to produce successful policy outcomes.
5. Community expertise is the foundation for successful EJ projects. Community residents must leverage their knowledge with the technical support of partners to investigate, monitor, and report environmental hazards when government and public health agencies fail to comply with existing codes and statutes. Residents trained as WERA community monitors hold increasing influence in local and state government public meetings.
6. Community activism can catalyze positive action by public officials. WERA progress reporting workshops are now lauded by some local public health and planning officials as a key catalyst to allow them to complete job activities to ensure compliance with existing regulations and codes. External pressure from informed taxpayers is a main ingredient to encourage and empower elected and career government officials to take action and establish more effective policies that enhance the quality of life of affected residents.

We believe that WERA's Basic Amenities project is a successful example of the EPA Collaborative Problem-Solving Model program established in 2003 and WERA is a model organization for proponents of community ownership and management of applied action-oriented research. By adapting WERA's organizational structure, QAPP/QMP template, and use of collaborative problem-solving strategies (i.e., consensus building, meaningful involvement, resource leveraging

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and mobilization, conflict resolution), we are confident that other communities burdened by environmental hazards and underserved by health-promoting infrastructure can obtain EJ and improve community health.

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