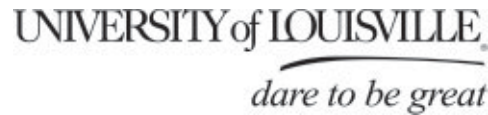


**The Partnership Project**  
*The Partnership for a Green City*

Sponsored by:  
University of Louisville  
Jefferson County Public Schools  
Louisville Metro Government

Fall 2004



August 2004

To Our Employees:

The Partnership for a Green City Project began with a \$51,000 grant for environmental education. Vision has developed a partnership between our three institutions into a project with potential benefits that far outreach the grant's limits.

These benefits include improved environmental education of school children and the broader community; cost savings for the partners due to economies of scale in coordinated purchasing, contracting, and environmental management; more resources for joint studies and research; increased expertise for academic instruction; coordinated grant applications; shared management expertise; and capacity building opportunities.

Our combined institutions represent some 25,900 employees, more than 500 buildings, 7,000 vehicles, 25,000 acres of land, and 120,000 students. There is power in these numbers, and we can channel that power to benefit all our community's citizens.

We call upon our staffs to make realities of the wide-ranging proposals in this report. We need everyone's full cooperation and support to create a greener environment and an ethic that will attract diverse populations and businesses and that will make our young people want to raise their families here, making Louisville a place where we call can work together and enjoy a better life.

Stephen Daeschner


James Ramsey

Jerry E. Abramson

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The Partnership for a Green City (the Partnership Project) began when representatives from three major Louisville entities came together because of shared common interests and concerns. They found that they shared a vision of a greener, more sustainable Louisville. The collaborative dialogue and explorative process among these representatives was named the Partnership for a Green City. The Partnership Project itself was the process through which these representatives began building the foundation for their shared vision. The recommendations contained in this report are the key elements of this shared vision.

## A. INTRODUCTION

The Partnership Project is based on the premise that better collaboration among key Louisville entities could help considerably in addressing Louisville's significant challenges identified by the Beyond Merger report from the Brookings Institute. The health and education of our children and how we reduce waste, use energy, manage our natural resources, and build green infrastructure are the keys to our success as a city.

The sheer magnitude of persons and resources impacted directly by the participating organizations [Louisville Metro Government (Metro Government), The University of Louisville (U of L), and the Jefferson County Public Schools (JCPS)] makes any collaborative project a challenge as well as a real opportunity. These three partners employ 5 percent of the Metro labor market, have more than 75 percent of its students, own 10 percent of the land, and use a significant amount of the energy consumed in the county. While there are excellent environmental efforts taking place in the Metro area, they are isolated, uncoordinated, and diminished in effectiveness by lack of venues for communication and cooperation. The conclusions from considering just these two facts alone are clear: coordination of efforts and cooperation among the participants can greatly magnify the results of current environmental efforts.

Nothing occurs in isolation. While Louisville was working on the Partnership Project, The National Science Foundation (NSF) developed an Environmental Research and Education section and published a ten-year research and action plan ([www.nsf.gov/geo/ere/ereweb](http://www.nsf.gov/geo/ere/ereweb)). The National Environmental Education and Training Foundation (NEETF) released a new, major ten-year assessment on environmental literacy ([www.neetf.org](http://www.neetf.org)), and the California High Performance Schools (CHPS) released a national study ([www.chps.net/index.htm](http://www.chps.net/index.htm)). See Appendix E for an overview. The Kentucky Department of Education (KDE) and the Kentucky Environmental and Public Protection Cabinet (KEPPC) Division of Energy coordinated a series of initiatives around energy-efficient schools. The National Institutes of Health (NIH) launched a major initiative on children's environmental health. The Partnership for a Green City will help position Louisville to take major advantage of these national initiatives.

As the Partnership Project evolved, the linkages among education, the greening of the Metro area, and quality-of-life issues became viewed as opportunities. These opportunities encompass treating the environment as a unifying theme to change current practices for better results, including student test scores and improving the budgets and performance accountability of the three partner organizations.

## Goals

The Partnership Project participants defined three objectives important for Louisville:

- Development of activities and opportunities to further a holistic environmental education curriculum within JCPS
- Identification of research areas to assess the correlation between environmental exposures and health impacts that may affect student cognitive learning abilities or behavior
- Identification of strategies for JCPS, U of L, and Metro Government to create sustainable, green public infrastructures.

## Importance of Environmental Education

Environmental learning layers the sciences, mathematics, history, language arts, and social studies with a hands-on, experiential approach to study. By regarding the outdoors as a learning lab, a variety of subjects become more personally relevant to the students and educators, while teaching and learning become engaging and fun. As demonstrated by several national research initiatives,<sup>1</sup> environmental education improves standardized test scores and prepares young people for the responsibilities of citizenship. These responsibilities increasingly require an understanding of many public issues affecting health and the environment.

The most prized result of environmental education for students is a quality called environmental literacy, which consists of four parts [North American Association for Environmental Education (NAAEE), 2000]:

1. Developing inquiry, investigative, and analytical skills;
2. Acquiring knowledge of environmental processes and human systems;
3. Developing skills for understanding and addressing environmental issues;
4. Practicing personal and civic responsibility for environmental decisions

As Appendix B (Collaborative Programs) indicates, there are numerous opportunities for Jefferson County's teachers and the public to participate in environmental programs that support the core content objectives and assist in building an environmental ethic. However, these experiences are not systemic in nature and only reach a fraction of the students and the community.

The Commonwealth of Kentucky supports environmental education through the KEEC, established by an act of the General Assembly and codified in KRS 157.900 to 157.915.

<sup>1</sup> *Closing the Achievement Gap: Using the Environment as an Integrating Context*, 2000

## ENVIRONMENTAL EDUCATION

Environmental solutions are not only scientific—they include historical, political, economic, and cultural perspectives. This also implies that the environment includes buildings, highways, and ocean tankers as well as pine trees and coyotes.

- Environmental Education (EE) rests on a foundation of knowledge about social and ecological systems.
- Knowledge lays the groundwork for analyzing environmental problems, resolving conflicts, and preventing new problems from arising.
- EE includes the affective domain—the attitudes, values, and commitments necessary to build a sustainable society.
- EE incorporates a human component in exploring environmental problems and their solutions.

The role of educators in addressing the affective domain can be complex. Educators should make it clear that differing personal values exist, that these values can color the facts, and that controversy is often motivated by differing value systems.

EE includes opportunities to build skills that enhance learners' problem-solving abilities in such realms as:

- Communication: listening, public speaking, persuasive writing, and graphic design
- Investigation: survey design, library research, interviewing, and data analysis
- Group process: leadership, decision making, and cooperation

“The Louisville Water Company is committed to environmental education and will be a strong partner participant.”

—John Huber  
Louisville Water Company

According to the Kentucky Energy Education Project:

- U.S. public schools spend more than \$6 billion per year on utilities.
- Nationally, schools spend \$151 per student on electricity, fossil fuels, and water.
- Last year in Kentucky, the average spent was about \$158 per student.
- In California, public schools use about 30 to 40 KBTU/sq ft.
- In Kentucky, this intensity ranges from about 60 to nearly 100 KBTU/sq ft.

**Kentucky Schools can recover up to 25 percent of their energy expenditures by aggressively retraining pupils, teachers, and staff.**

As used in KRS 157.900 to 157.915:

1. Environmental education means an education process dealing with the interrelationships among the natural world and its man-made surroundings; is experience-based; is interdisciplinary in its approach; and is a continuous life-long process that provides the citizenry with the basic knowledge and skills necessary to individually and collectively encourage positive actions for achieving and maintaining a sustainable balance between man and the environment.
2. Environmental literacy means having adequate knowledge and understanding of environmental information, concepts and processes.

Most Americans share an abiding belief that we need environmental education. One can hardly go to a public forum on environmental issues without hearing a passionate call for increased public environmental literacy. NEETF/Roper research reveals that this need is so keenly felt that 95 percent of American adults (96 percent of parents) think environmental education should be taught in the schools, and 90 percent believe that people in the workplace and in other places in adult society also should receive environmental education.<sup>2</sup>

## Importance of Environmental Management

A survey of the combined resources of the three partner organizations reveals the tremendous potential impact of a coordinated effort on Louisville’s environment in terms of resource consumption, resource management, and human resources. The Partnership Project is one of the ways in which Metro Government, U of L, and JCPS can make positive changes and create better outcomes for area students and residents. Not only do these partners influence and control land, buildings, and large fleets, but they also deal directly with students, their parents, and the public. They consume significant amounts of natural resources, energy, and water, and they generate proportionate amounts of liquid and solid waste.

**Table 1**  
**Partners Can Influence Change**  
**Approximate Combined Resources of Metro, U of L, and JCPS**

<b>Employees</b>	<b>25,900</b>
<b>Land (Acres)</b>	<b>25,000</b>
<b>Buildings</b>	<b>500</b>
<b>Students</b>	<b>120,000</b>
<b>Vehicles</b>	<b>7,000</b>
<b>Energy Use (annual)</b>	<b>\$33 million</b>
<b>Gas/Diesel (annual)</b>	<b>&gt; 10,000,000 gallons</b>

The easiest and lowest-cost environmental stewardship practices, if implemented in Louisville with the same enthusiasm as in greener cities, could result in 10 percent or more energy reduction and significant savings for the budgets of the partners. These savings can be achieved solely by individuals changing the way they use fuel and energy. Applying state-of-the-art green building and fuel-efficient fleet technologies to the 500-plus buildings and 7,000 vehicles controlled by the partners can result in another 5 percent to 10 percent savings. In addition to saving money, the three organizations can lead by example to improve Louisville’s quality of life.

## Importance of Public Health

Freedom from unnecessary exposure to environmental pollutants is a basic tenet in defining quality of life. The impacts of exposure manifest themselves in terms of restricted activity, increased susceptibility to and manifestations of illnesses, decreased cognitive capacity, and premature deaths. In addition to the direct impact on individuals, the public health costs for additional health preventive services, lost productivity, and absenteeism pose a significant economic impact on the community.

Louisville has public health risks from environmental contamination:

- The city does not meet national air-quality standards for ozone and fine particulates.<sup>3</sup>
- The metropolitan area has been identified as having some of the highest concentrations of air toxins in the United States.<sup>3</sup>
- None of the city’s streams, or the Ohio River, consistently meet body-contact recreational standards.<sup>4</sup>
- Potentially contaminated land exists throughout the metro area.<sup>5</sup>
- Lead levels in as much as 6 percent to 8 percent of the city’s children are elevated.<sup>6</sup>
- Asthma rates for children within the city are rising.<sup>6</sup>

<sup>3</sup> Louisville Metro Air Pollution Control District

<sup>4</sup> Louisville Metropolitan Sewer District—*Waters Report 2003*

<sup>5</sup> Louisville Metro Brownfields Task Force

<sup>6</sup> Louisville Metro Department of Health

### ACCORDING TO THE KENTUCKY ENVIRONMENTAL QUALITY COMMISSION:

The majority of evidence indicates that now, more than ever, the environment is influencing our health and the health of our children and may be contributing to Kentucky’s:

- Pediatric asthma rates, which are among the highest in the United States.
- Pediatric cancers, the leading cause of death by disease in children.
- Birth defects, the leading cause of child mortality.
- Learning disorders, affecting an estimated one out of four children.

**BEYOND MERGER—A  
COMPETITIVE VISION FOR THE  
REGIONAL CITY OF  
LOUISVILLE**

**THE BROOKINGS INSTITUTE**

**New Vision**

*... The moment has arrived for the new Regional City of Louisville to get it right and establish itself as one of the truly distinctive—and competitive—American cities, thinking and acting anew so as to position the community to compete and flourish in the global economy.*

**Education**

*... the improvement in education and skills of its citizens represents the single most important challenge confronting the new Regional City—and may ultimately determine the ability to achieve the promise of merger. [What is required is] ... an unprecedented commitment to pulling up the lowest-achieving students.*

**Land Management and Planning**

*The Regional City should protect its livability, centrality and efficiency by managing growth on a metro-wide basis. [Louisville] must ...*

- *Lead the wider region toward true metropolitan-scale coordination and planning.*
- *Closely link transportation planning and construction to land-use, development, and housing policies that support metro area vitality.*
- *Improve access to affordable housing throughout the Regional City.*

## Why Louisville Should Strive to Be a Green City

Green cities are successful and prosperous. Studies have shown that cities that advocate for best environmental performance and have a reputation for accomplishing best practices in environmental stewardship are cities with diverse and growing populations and healthier economies. These cities are more attractive to young people and entrepreneurs. Among the greenest of cities is Minneapolis, Minnesota. Minneapolis is green in its governmental practices, in its planning and zoning, and in supporting and encouraging citizen advocacy and participation in environmental decision making. Other green cities of note include Portland, Oregon; Boulder, Colorado; Seattle, Washington; and Austin, Texas—all successful, prosperous, and growing, with reputations that emphasize environmental values and practices.

## The Brookings Report/Cornerstone 2020

The 2004 *Beyond Merger* report has made us aware that with the transition to a Metro government,<sup>7</sup> Louisville has a window of opportunity to become one of the greenest cities in the United States. Protected by slow growth, Louisville has not yet developed many of the situations harmful to the environment and quality of life that other cities have experienced and found so difficult to remediate. With effective planning and leadership, as the Brookings report stresses, Louisville need not develop these problems and, better yet, can become an exceptionally green, attractive, and flourishing city in which to live. Still, without significant changes from current and past practices, Louisville will not attain the success that the merger makes possible.

The Brookings report identifies many examples of environmental excellence by the three partners. Other examples include U of L's 1999 Phoenix Award for Papa John's Stadium Brownfield Restoration and the creation of the Kentucky Pollution Prevention Center; JCPS's reduced energy use, its newly constructed "green building" Shelby Elementary School, and its 25-year relationship with Blackacre State Nature Preserve; and Metro Government's Metropolitan Sewer District's (MSD's) main office, designated an Energy Star Building by the Environmental Protection Agency (EPA), the Brightside In-School Environmental Education Program, and Metro's 2002 Phoenix Award for Waterfront Park and Slugger Field Brownfield Restoration project. Cornerstone 2020, the recently completed update of Louisville's Comprehensive Land Use Plan, provides a template for making significant community-planning changes.

<sup>7</sup> *Beyond Merger - A Competitive Vision for the Regional City of Louisville*

## Benefits of Collaboration

Participants in the project identified many benefits that their organizations could achieve through collaboration:

- Improved education of students and the community
- Economies of scale in coordinated purchasing, contracting, and environmental management
- Joint studies, research, and assistance for academic studies
- Coordinated grant writing and fundraising
- Shared expertise
- Capacity building in each of the three organizations
- Increased research and development

The recommendations in this report address the most significant partnering opportunities.


## Existing Collaborations and Environmental Excellence

In addition to considering what takes place in other cities, participants identified existing environmental partnerships in Louisville that facilitate best practices. They identified numerous examples, and project participants thought that many existing programs or projects could be expanded successfully if all of the partners contributed in a more organized fashion. Some examples of existing programs or projects involving two or more of the partners are detailed in Appendix B.

## Barriers to Collaboration


Project participants identified barriers and constraints to additional collaborations. Major barriers identified include:

- the lack of leadership structure or of a formal partnering agreement.
- the fact that none of the organizations reward collaboration.
- inadequate recognition and incentives for employers or students to work toward protecting the environment.
- the autonomous limits of each entity that make even internal coordination efforts difficult and communication among partners even more difficult.
- the fact that turf-protection behavior is common to all large organizations.
- the sheer size of the three organizations.
- the fact that no budget is identified for collaborative projects.
- the existence of cultural limitations and conflicting organizational priorities.
- the fact that no one has clearly defined desired environmental outcomes.



“By partnering, we get better prices and greener projects. We need to change attitudes and consciousness about the environment. There is more potential now than ever before for successful partnering between Metro Government, JCPS, and U of L.”

—Rick Johnstone  
Metro Government



“We are very concerned about providing a safe environment for our students, teachers, and employees. We have many successes in saving energy and learning how to improve energy efficiency in our school buildings. We would like for all of our buildings to be green buildings.”

—Michael Mulheim  
JCPS

## **B. HOW WE EXECUTED THE PROJECT**

Through a participatory process and project approach, all partner representatives provided input and helped to define future partnering opportunities and priorities.

### **Key Elements of the Partnership Project Process**

#### **Leadership Interviews**

A round of leadership interviews served to communicate project expectations and identify issues that could affect the project outcomes. Additional leadership interviews were conducted to review significant findings and recommendations.

#### **Selection of Participants**

Each partner was asked to identify key managers and other individuals who could effectively represent his or her organization. More than 70 individuals were accordingly invited to participate. Appendix A lists the project participants. Some flexibility was important, as not all invited participants could attend all of the meetings. Representatives or substitutions were allowed.

#### **Orientation**

Project participants attended an orientation meeting where leaders of each partner organization expressed strong expectations for the process and participants defined their own goals. Participants resolved to provide some best-practice examples of successful partnering in advance of the next phase of the project, the cluster meetings.

#### **Facilitated Cluster Meetings**

Participants identified potential projects and collaborative opportunities in a series of all-day facilitated cluster meetings. The three clusters focused on environmental health, environmental education, and environmental management. Each session was led by an outside certified facilitator: Marcelle Gianelloni, Rosane Kruzich, and Marcia Boone. Since overlap between the clusters was common, facilitators encouraged participants in each cluster to define their own approach. The facilitated cluster meetings generated ideas that are the basis for this report’s recommendations. In developing the final recommendations, project facilitators integrated similar recommendations where appropriate.

#### **Draft Report and Feedback**

Key managers identified in the facilitated cluster meetings as project leaders reviewed a draft report prepared by the project facilitators. Project facilitators incorporated those managers’ comments into the report. The project

facilitators sent their draft report to all participants for review and feedback to ensure that the final set of recommendations accurately reflected their input.

## The Partnership Project in Depth

### The Leadership Interviews

Leadership interviews were conducted with the executive leaders and others identified in the box on this page. Leaders answered questions concerning the environmental priorities of their organization, their views on the possibilities for change, and the ways in which they assessed community support for change and partnering. The discussion covered the links among education, quality of life, and economic development. Key findings of these interviews include the following:

#### Support for Partnering

All leaders interviewed expressed strong support for partnering with the other organizations, consistent with the project goals. Many had examples of current efforts intended to increase partnering and communication. Most were very open about identifying the current strengths and weaknesses in their organizations' approach to environmental issues.

#### Strengths

The interviews revealed that all three organizations can present examples of partnering, environmental education, and management that have been recognized at the highest levels. Leaders showed positive support and enthusiasm for improvement. There was a general confidence that the community would support changes, especially if those changes were likely to result in better services, a cleaner environment, and improved educational outcomes. All of the leaders thought that they had people within their organizations with the talent and desire to do things better. Probably the most significant shared value was a universal vision of a better Louisville.

#### Weaknesses

Leaders were asked about their organization's environmental practices and policies, as compared to a theoretical green ideal. All interviewees were open and reflective about how they assessed their organizations, and similar weaknesses emerged in all the interviews:

1. All three partners have dedicated personnel at some level committed to environmental programming and regulatory compliance; however, in general, these efforts are not focused and are not integrated with executive management.
2. None of the three had a strategic organizational plan focused on environmental issues.

## LEADERSHIP INTERVIEWS

### University of Louisville

Dr. James Ramsey  
Dr. Nancy Martin  
Dr. Robert Felner  
Dr. David Tollerud  
Larry Detherage  
Ken Dietz  
Larry Owsley  
Cam Metcalf

### Jefferson County Public Schools

Dr. Steven Daeschner  
Pat Todd  
Michael Mulheim  
Jacque Austin  
Marty Bell

### Louisville Metro Government

Joan Riehm  
Rick Johnstone  
Rudy Davidson  
Bruce Traughber  
Bud Schardein  
John Huber  
Dr. Adewale Troutman  
Cynthia Knappek  
Bob Schindler  
Sheila Andersen  
Mike Heitz  
Jody Hamilton

3. None of the three had a clearly articulated (written) set of environmental principles and policies that could be shared with employees and the public.
4. None of the three had publicly accessible performance indicators and measures at a level that promote best environmental practices.
5. There was no focal point for communication among the partners, and there was no way to identify environmental issues common to each partner, although the discussion necessary for creating a partnering office is under way.

All of the partners were aware of some activity going on within their organizations to address some of these weaknesses, but none had a current commitment to address all of them. All of the interviewees expressed some interest, and most expressed strong interest, in improving their organization's environmental performance. All view the Partnership for a Green City as an opportunity to foster change.

## How Green Do Our Leaders Think We Are?

The leadership interviews included questions asking how green they view their organizations, their city, and themselves. The responses provided a good indication of the current situation and of the potential for positive change.

In general, but with a few notable exceptions, the leadership among all three partners viewed their current environmental practice as average or slightly below average. They agreed that this reflected the current community standard. The leaders saw themselves as generally being greener than the organizations they represented. None of them viewed this project and related efforts to make their organizations greener in a negative way. A few people identified potential barriers and constraints, but, over all, nothing was identified that would limit success if the partners committed to change.

The general message emerging from the leadership interviews for the project participants can be summarized as follows:

- At best, we are average in our environmental performance. (Many did, however, note their best environmental accomplishments.)
- We can do better, and partnering is a way for us to do better.
- We (the leaders) want our organizations to do better.
- We recognize that being green can help us to achieve community goals that relate to education, quality of life, and economic development.

“We are very green and want to do our share as part of Metro Government to make the partnering project a success.”

—Bud Schardein  
MSD

## C. COMMON THEMES FROM THE FACILITATED SESSIONS

The three partner group meetings (Health, Education, and Management) exhibited high energy, and the participants appreciated the challenge of identifying possible projects. Common themes emerged from each group:

1. Coordinated purchasing and contracting to obtain economies of scale
2. Research and research funding (e.g., Congressional earmarks, grants)
3. Collaborative efforts to educate students and the community
4. Collaborative environmental management programs to obtain economies of scale (cheaper to buy in larger quantities) and to share expertise
5. Development of an annual environmental strategy and budget
6. Development of performance indicators to promote best environmental practices
7. Formal partnering structures and staff to facilitate and coordinate collaborative projects

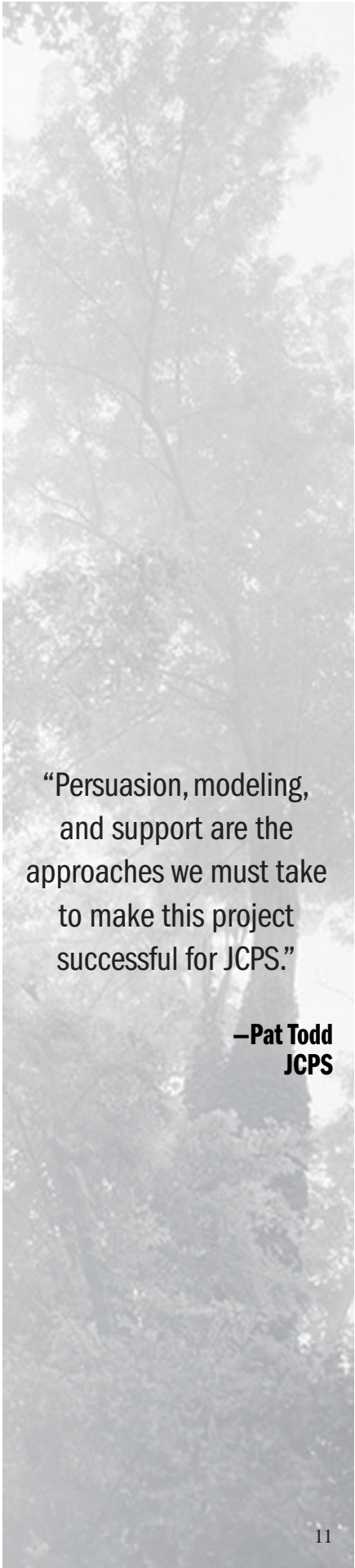
## D. FOUNDATION FOR A SUCCESSFUL PARTNERSHIP

Two recommendations were so important that they were identified in some form within each group. These two recommendations are critical to successful implementation of the project goals:

### 1. Interagency Coordinating Committee

A high-level, cross-functioning team of partner representatives can take the Partnership Project through the implementation phase, can champion projects and programs, and can help secure permission and funding for recommended initiatives. All three partner organizations have huge responsibilities, are large and complex, and ultimately are governed by elected officials and legislative priorities. Commitment and communication must be continually renewed.

The leaders of each organization, by creating and supporting a Partnership Project oversight committee, can do much to make possible the implementation of many of the green city initiatives described in this report. The form of this interagency coordinating committee was not specified, but all agreed that executive-level



“Persuasion, modeling, and support are the approaches we must take to make this project successful for JCPS.”

—Pat Todd  
JCPS



“I think it’s great. We will give this project a high priority and look at it as a way to expand our success at U of L in environmental management.”

–Larry Owsley  
U of L

support is essential. There are existing partnerships that could be expanded to fill this need such as: The Metro Environmental Task Force, The JCPS Center for Environmental Education (Center for EE), U of L’s KIESD, and the joint U of L/Metro Partnership Office.

## 2. Commitment and Incentives

The success of efforts to improve the environmental performance of each of the organizations will require both top-down commitment and bottom-up participation. Interviews with key leaders from each of the three organizations indicated that general support, at the least, existed for improved environmental performance within each organization. There must be specific support and commitment from the upper management of each organization for improved collaboration. Even with upper leadership support, the recommendations contained within are not likely to succeed without the broad support of the organizations’ employees, midlevel managers, students, and the public. Each organization already is implementing innovative environmental programs, but they are isolated and incomplete.

The recycling program may best exemplify this phenomenon. The programs are being universally implemented in all agencies. However, employees and students receive no feedback on how much is being recycled or on the value of recycling. The potential expansion of the programs to cover additional recyclables is often ignored because it is no one’s responsibility to oversee efforts to minimize the waste being generated by the entire organization.

To obtain the support of employees, midlevel managers, students, and the general public, each organization must find ways to:

- Maintain continued awareness of environmental programs.
- Provide incentives for full participation.
- Ensure accountability in implementing programs.
- Improve access to programs.
- Position to get grants and other funding and resources.

## E. PRIORITY PROJECTS

These recommendations emerged as priorities identified by the participants. The table below is a summary of the recommendations from the work group.

Title	Description	Lead contact information
Interagency Coordinating Committee	A high-level, cross-functioning team of partner representatives can take the Partnership Project through the implementation phase, champion projects and programs, and help secure permission and funding for recommended initiatives.	New U of L/Metro Government/JCPS Partnership Office, Metropolitan Center
Environmental Standards and Principles	Adopt mutually agreeable principles and standards.	Metro Environmental Division, KIESD, JCPS
Energy Use Partnership	Use proven strategies to reduce energy use and result in budget savings and a larger level of environmental stewardship.	Kentucky Pollution Prevention Center (KPPC)
Communitywide Recycling Project	Combine partner resources and expertise and efforts to recycle, reuse, and reduce waste.	Metro Solid Waste Management Dept.
Buy Green/Centralize Environmentally Preferable Purchasing	Pool and jointly purchase green products and services cost-effectively.	KPPC; purchasing directors of each institution
Environmental Education Collaboration	Develop a comprehensive, long-term focus for environmental education both in the schools and in the community.	Center for Environmental Education
Outdoor Classrooms	Every school should have access to an outdoor classroom.	JCPS Center for EE, Brightside, Metro Parks
Green Issues Orientation and Professional Development	Connect and implement partner resources to improve and enhance professional development and training for teachers and informal educators; incorporate environmental priorities and partnership goals into employee and student orientation; and support employee exchanges and/or participation in education.	Human resources offices of each institution
Registry for Environmental Public Health Issues	Close information gaps that thwart effective public health programs. Assess linkages among health and school attendance and academic performance.	Metro Department of Health
Asthma Project	A coordinated community attempt to address and manage asthma will enhance quality of life and reduce hospital admissions/emergency room visits, and missed school days.	U of L School of Public Health

“The Jefferson County Teachers Association strongly supports making Louisville a Green City. More than ever before, environmental education is essential to the future of our society.”

**–Brent McKim  
JCTA President**

“This is a great project. All of these recommendations fit our mission and our goal for a healthy community. Partnerships are very important to us.”

**–Dr. Adewale Troutman  
Metro Health Department**

**Table 2**  
**CERES Principles**  
([www.ceres.org](http://www.ceres.org))

Principle No. 1  
Protection of the biosphere

Principle No. 2  
Sustainable use of natural resources

Principle No. 3  
Reduction and recycling of waste

Principle No. 4  
Energy conservation

Principle No. 5  
Risk reduction

Principle No. 6  
Safe services

Principle No. 7  
Environmental restoration

Principle No. 8  
Informing the public

Principle No. 9  
Management commitment

Principle No. 10  
Audits and reports

## **Recommendation: Adoption of Environmental Standards and Principles**

### **Purpose**

Participants and project leaders identified the need for common standards and environmental principles to guide employees, students, and members of the community in implementing the recommendations of this report.

### **Implementation**

Create an interagency work group to develop or adopt mutually acceptable environmental principles and standards to be used to guide policy decisions and programs in each of the organizations. One possible set of standards that could be adopted is the CERES Principles (see Table 2), already in use by MSD.

More than 80 major companies, including General Motors, Ford, Sunoco, and Coca-Cola, have formally adopted the CERES Principles. Another approach would be for the partners to develop and adopt a unique set of standards that includes priorities identified by the project participants, including:

- Models for sustainable living
- Healthy city
- Continuous learning and improvement
- Sound land stewardship
- Standards for energy conservation and use of renewable energy
- Social justice
- Pollution prevention
- Sound and growing economy

It was not possible to develop the standards as part of the first phase of this project. However, it is very important to the success of the project that the partners develop and adopt common standards and principles to insure the most successful implementation of the recommendations in this report.

### **Potential Benefits**

The development of written environmental principles and standards would meet the need for a clearly articulated set of environmental principles and policies that could be shared with employees and the public.

### **Funding**

A limited amount of funding is required to develop environmental principles and standards.

## Recommendation: Create an Energy Use Partnership

### Purpose

Reduced energy use results in budget savings and a larger level of environmental stewardship.

### Implementation:

An energy use task force will be formed with representatives from each partner's operations divisions. This task force will develop strategies to conduct energy audits and to share information and experience among partners. It will conduct energy/green building audits in locations the partners propose. Student involvement will be encouraged, and attempts will be made to train, supervise, and use student audit teams at school buildings. If successful, these teams could audit JCPS, Metro Government, and U of L buildings. Strategies used will be both structural and nonstructural. Using proven, energy-saving technologies and changing employee and student energy-use behavior will result in significant savings. The team will also develop performance contracting and shared purchasing and contracting approaches.

- **First Six Months:** The task force will be formed and will identify collaborative strategies and priorities for partner initiatives.
- **Five-Year Goal:** All U of L, JCPS, and Metro Government buildings will be audited and scheduled for green building retrofits. Employee and student training on energy savings will have been implemented and reinforced. Energy savings will be documented.

### Potential Benefits

All partners can easily achieve a 10 percent to 20 percent energy cost reduction in building operations, which will result in millions saved for partner energy conservation initiatives and other purposes.

### Funding


Cost savings in the years after the audit will offset initial expense. Savings over time should be at least 10 percent to 20 percent of current costs.

Payback for green building initiatives often takes fewer than three years. JCPS already has used performance service contracting successfully. MSD has paid back investments many times over for retrofitting all of its buildings with energy-efficient lighting and for applying other energy-saving strategies.

“If we ever hope to have less energy dependence in America, buildings must be a big part of the deal. The country has 5 million commercial structures, 76 million residential. They account for two-fifths of total national energy use.

And we keep building them at a furious pace—an estimated 38 million new buildings by the end of this decade. The environmental stakes are immense. Buildings generate a third of our carbon dioxide emissions (a chief culprit in global warming). They're responsible for half our sulfur dioxide emissions, a quarter of nitrous oxide emissions, major acid rain and smog problems, according to a Progressive Policy Institute roundup.”

—Neal Price  
2004 Washington Post  
Writers Group



*“You have our 100-  
percent support. This is  
an exciting project.”*

**—Rudolph Davidson  
Metro Public Works Secretary**

## **Recommendation: Communitywide Recycling Project**

### **Purpose**

Combine partner resources and expertise. Recharge efforts to reduce, reuse, and recycle waste. In a parallel and related activity, engage schools and students to recycle consumer goods.

### **Justification**

Partner participants all have ongoing recycling and re-use programs that have languished during periods of conflicting budget and organizational priorities. All have commitments including some regulatory obligations to reduce, reuse, and recycle waste. All have identified significant opportunities to improve but have difficulty obtaining organizational commitments. In addition, some waste streams are subject to economy-of-scale and market issues that may limit their individual potential but could be enhanced if the partners coordinated their efforts. Partners working together have the opportunity to build markets and achieve savings.

### **Implementation**

The Metro Department of Solid Waste Management will convene a partner working group, with U of L’s KPPC as a significant resource. The working group will:

1. Assess and evaluate existing recycling programs and contracts.
2. Inventory waste streams and identify current and potential markets for recycled and potentially recycled materials.
3. Develop any needed Request for Proposals (RFP) to contract delivery of services to effectively recycle on a partnership basis.
4. Develop a long-term strategic plan to evaluate, improve, and expand items recycled by JCPS, Metro Government, and U of L.
5. Create a means of reporting to employees and students the level of recycling and success of the program within individual buildings.

Initial efforts will include paper and paperboard, plastics, aluminum cans, corrugated cardboard, scrap metal, and obsolete electronics. A sub-team with construction expertise will focus on the re-use of construction material, which participants identified as a special waste stream inadequately recycled now. Partners could have immediate impact by approaching the issue on a partnership basis. This waste stream includes clean fill dirt, gravel, mulch, and construction debris (bricks, asphalt, lumber, concrete, and other waste from demolition and/or partner construction projects). Partners identified sharing stockpile locations,

reprocessing contracts, and pick-up/delivery resources as a means of improving construction material reuse.

- **First Six Months:** Form a working group. Develop a long-term strategic plan. Issue RFPs. Identify construction material stockpile locations.
- **Long Term:** Implement a long-term plan. Monitor process, and report results.

### **Potential Benefits**

Partners agree that small initial costs can be converted to savings. The partners believe markets can be created or enhanced over time and that other public and private sector companies can also benefit.

### **Funding**

Initial costs are mostly staff costs, from staff dedicated to waste-management issues within the partner organizations. Savings will offset some of the long-term costs, with a potential for significant savings over time.

### **WHY RECYCLE?**

Recycling conserves landfill space, energy, and natural resources. Recyclables are easily marketed and find their way quickly into new, usable products. Recycling sparks a powerful cycle of events that saves our environment and makes our community a better place to live.

## **WHY PURCHASE ENVIRONMENTALLY PREFERABLE PRODUCTS AND SERVICES?**

Did you know that the United States consumes approximately 25% of the world's resources with only 5% of the world's population?

Did you know that the U.S. federal government is the single largest consumer of goods and services in the U.S., and probably, in the world - spending more than \$200 billion annually on goods and services? The federal government also spends an additional \$240 billion a year, indirectly, through grant disbursements.

EPA recognizes the influence the United States, and in particular, the U.S. government, has on what products and services are produced due to this tremendous purchasing power. EPP works to leverage that influence to minimize environmental burdens.

## **THE BENEFITS OF ENVIRONMENTALLY PREFERABLE PURCHASING**

- Improved ability to meet existing environmental goals
- Improved worker safety and health
- Reduced liabilities
- Reduced health and disposal costs

**From: [www.epa.gov/epp](http://www.epa.gov/epp)**

## **Recommendation: Buy Green/Centralize Environmentally Preferable Purchasing**

### **Purpose**

Partners can use the ability to pool and jointly purchase green products and services cost-effectively.

### **Justification**

In the past, buying green was hampered by a lack of choice among competitive green alternatives. This has changed, as more large governmental units and corporations have committed to environmentally preferable purchasing. More products and green options now exist. Partners have not taken advantage of the opportunities to purchase goods jointly using economies of scale and a more focused assessment of green products and services. Partners jointly use huge quantities of fuel, energy, consumables, and durable goods and services, and all partners have significant waste-disposal budgets that could be reduced.

### **Implementation**

Partners will form a purchasing consortium (not limited solely to buying green but committed to doing so when favorable options can be found) with representatives from purchasing and facilities management departments from each partner. Units of Metro Government with independent purchasing authority will also be invited to participate. The consortium will define the mission and assign responsibility/leads to:

1. Inventory current purchasing practices and policies.
2. Develop "buy green" policies and procedures (as well as potential green products and services lists) that can be used by all three partners.
3. Conduct training of purchasing staff with each of the partners to acquaint them with the importance of green purchasing and using green products and services lists, and to communicate new purchasing policies.
4. Measure and monitor an increase in green products and services use and a reduction in costs.
5. Communicate "buy green" success to employees, students, and the community.
6. Conduct green product testing and specification development as needed.

- First Six Months: Form consortium, identify partner representatives, and provide training.
- Long Term: Begin inventory of current practices and policies. Draft “buy green” policy and procedures. Identify potential green products and services. Implement “buy green” policy and joint-purchasing initiative. Measure and monitor progress and success. Communicate success with employees, students, and the community.

### **Potential Benefits**

The partner participants, including those familiar with current practice, were enthusiastic about the potential for their organizations to buy green and purchase jointly as a means to reduce costs and move towards more sustainable purchasing and use of goods and services. Health benefits can occur through the reduction of chemical exposures and risks to students, employees, and the general public.

### **Funding**

Start-up costs are small and involve more partner commitment to the effort than dollars. While ongoing costs are insignificant, ongoing savings are potentially large.



“This is a perfect time for us to be involved.”

—Dean Robert Felner  
U of L College of Education and  
Human Development

“It is important to make the connections between environmental education and learning. There are no conflicts between meeting educational goals for our students, including improved test scores, and having good environmental education opportunities for every student and having access to outdoor classrooms at every school. Making real-life connections results in more successful students.”

—Jacque Austin  
JCPS

## **Recommendation: Environmental Education Collaboration**

### **Purpose**

A coordinated approach to environmental education is needed to develop and expand programs, professional development, research, and evaluation. Every student and citizen should be able to apply informed decision making to maintain a sustainable lifestyle and develop a fundamental understanding of environmental processes. A coordinated approach will be spearheaded by expanding the existing U of L/JCPS Center for EE to include Metro Government.

### **Justification**

As evidenced by the extensive list of their collaborative educational projects (Appendix B), all three partners currently are working together, but there is a need for better coordination, planning, and research. The Center for EE has been a collaborative effort of U of L and JCPS for the past ten years. Although the Center for EE has worked collaboratively with a number of Metro Government agencies on individual projects, to date there has been no formal agreement with Metro Government. Formal participation in the Center for EE by Metro Government would strengthen the existing center as well as the various Metro Government agencies implementing environmental education programs.

The strengthened center will develop grant applications, engage in cooperative training, ensure that environmental education curricula meet JCPS scope and sequence, create an interdisciplinary network through the KIESD and Metro Government agencies, and conduct research. The Center for EE will help the U of L College of Education and Human Development meet two new requirements of the Kentucky Educational Professional Standards Board (EPSB). In 2002, EPSB developed a new requirement that environmental education be infused into preservice teacher-preparation programs. On May 19, 2004, the EPSB approved an endorsement program for environmental education, which will need to be developed and implemented.

### **Implementation**

There will be three codirectors of the Center for EE, representing Metro Government, JCPS, and U of L.

JCPS: The director of the JCPS Center for EE in the Department of Curriculum and Assessment

U of L: A full-time, tenure-track faculty member with an appointment in the U of L College of Education and Human

Development with a specialization and research interest in environmental education

Metro Government: A joint appointment of Metro Government and U of L focusing on coordinating Metro Government agencies' environmental education programs for schools and the community

For administrative and grant support, the Center for EE will be attached to KIESD, which is part of the U of L Office for Research.

Key tasks for the Center for EE will include:

1. Adopting the environmental education standards developed by KEEC and working with the U of L College of Education and Human Development to incorporate the standards into their preservice training program.
2. Seeking approval for an environmental education endorsement at U of L through the Kentucky Professional Standards Board. This endorsement would be developed and administered through a collaborative effort between the JCPS Gheens Academy and the U of L College of Education and Human Development.
3. Linking existing and future environmental education curricula to the JCPS Core Content guides. Coordinating Metro Government education programs to ensure that they support the JCPS scope and sequence and, with the help of Metro Government agencies, developing future environmental education curricula.
4. Professional Development—Developing and implementing a program for certified staff in JCPS to teach environmental education curricula identified above. Professional Development (PD) courses will be conducted using resources of U of L, JCPS, and Metro Government. Schools will be linked with community-based educators and Metro Government agencies.
5. Providing U of L graduate and undergraduate students with environmental education experiences in local schools, environmental education organizations, and Metro Parks through graduate assistantships, internships, and in-class observations.
6. Creating a position for a school-based environmental leader to promote environmental education, energy reduction, recycling, outdoor classrooms, and environmental clubs at every JCPS school.
7. Conducting and disseminating environmental education research on the impact of environmental education on student performance and on the impact of environmental toxins on cognitive learning.

## **SERVICE-LEARNING OPPORTUNITIES INHERENT IN THE PARTNERSHIP PROJECT**

Service learning is an instructional, knowledge-work strategy actively involving students in the application of academic knowledge and critical-thinking skills to address community needs. If all JCPS students availed themselves of service-learning opportunities, more than one million hours of community service would result. Students want meaningful service-learning and environmental projects, and those that are included in the Partnership Project are exactly what is needed.

Service-learning projects have three components (preparation, action, and reflection) that match the environmental literacy goals (page 3). Most of the recommendations and the additional projects listed in the Appendix offer significant service-learning opportunities including outdoor classrooms, energy-use partnership, and communitywide recycling. Many potential Science Fair/Research/Senior Capstone Projects with a service-learning focus can evolve from initiatives of the Partnership Project.

It is intended that service learning be incorporated into implementation plans for each recommendation as appropriate and that JCPS and U of L students and teachers be included in every aspect of planning and implementation.

## **ENVIRONMENTAL CORE KNOWLEDGE**

1. How do the natural and social systems interact?
2. How are human attitudes and behavior and environmental quality interdependent?
3. How does one best manage renewable and nonrenewable resources?
4. What are the economics of environmental quality?
5. Do I know the community in which I live?
6. Am I able to logically evaluate alternative responses to environmental issues?
7. Do I know the effects of multiple uses of the environment?

According to the KDE and the KEEC, environmental education content, materials, and programs should:

- Be standards-based.
- Include hands-on activities that lead to problem solving and critical thinking.
- Include community-based instruction.
- Be interdisciplinary.
- Include authentic assessments.
- Be age-appropriate.
- Be inquiry-based.
- Use scientific processes to study interactive systems.
- Serve all students.
- Promote independent thinking.
- Address social, cultural, and physical diversity.

## **Potential Benefits**

Using the environment as an integrating context for learning has been shown to improve student performance. The environment provides a framework for education that is interdisciplinary, collaborative, student-centered, and hands-on. It employs schools, as well as the surrounding community, as a framework within which students conduct their own learning guided by JCPS teachers, U of L, and Metro Government professionals. The observed benefits of using the environment as the context for learning have been:

- Better academic performance in reading, writing, mathematics, science, and social studies, particularly with lower-performing students.
- Reduced discipline and classroom-management problems.
- Increased engagement and enthusiasm for learning.
- Greater pride and ownership in accomplishments.

Curricula currently being promoted by Metro Government agencies are not tightly aligned with the educational standards and the core content that local schools are required to teach. Often educational programs are delivered directly to classrooms without teacher professional development. This approach is costly, reaches only limited numbers of students and—without integration into overall teaching—is of limited value. An expanded center that includes Metro Government would provide a mechanism for efficiently coordinating and ensuring systemic coverage to all public school classrooms at the appropriate grade level.

## **Funding**

The revised Center for EE will require the creation of two new faculty lines in U of L's College of Education and Human Development. One of the lines will be a joint appointment with Metro Government, which will pick up 50 percent of the cost of the position. Partial funding may be available from the state. In the 2002 regular session, the General Assembly passed KRS 224.43-505, which created a bond issue whose funds would be used to clean up abandoned landfills. The interest from that bond issue was directed to the KEEC to implement the environmental education center component of the Environmental Education Master Plan. In January 2004, monies began accumulating in this fund.

The General Assembly mandated the creation of environmental education centers in 1990 with KRS 157.915(3), which states that one of the functions of the KEEC is to establish and help coordinate the activities of regional environmental education centers and advisory committees at all state universities to serve as networks for the dissemination of environmental education programs, materials, and information across the state. These centers will serve as catalysts to improve the way college and university students, elementary and secondary teachers, and the public learn about their environment.

## **Recommendation: All Schools Should Have Access to Outdoor Classrooms**

### **Purpose**

The Center for EE will help schools develop outdoor classrooms through the identification of open spaces, development of site-based learning potential, and provision of professional development necessary for teachers to be able to use the local environment as a context for learning. Contexts beyond the four walls of a single classroom would include school buildings and campuses, neighborhood parks, and other community public lands and facilities within walking distance of the school. To provide a consistent message, the partners will jointly adopt land-stewardship principles and approaches and best-management strategies that emphasize green practices and sustainability.

### **Justification**

Experiential education using schools and outdoor classrooms as learning contexts has been shown to improve student academic performance and test scores. However, only a small number of students are currently afforded outdoor and experiential education opportunities because of lack of funding, lack of access to place, or other constraints. Outdoor classrooms are powerful vehicles to achieve educational goals. They motivate young people to learn, building on what Rachel Carson calls the “sense of wonder.” Natural places are rich learning environments, which provide a multitude of hands-on experiences grounded in real-life learning. Outdoor classrooms support curriculum objectives in all content areas, including science, mathematics, social studies, language arts, health, physical education, and other subjects. The JCPS Center for EE has developed an elementary outdoor classroom curriculum matrix to provide educators with an idea of the academic uses of outdoor classrooms (see Appendix D).

Partners’ resources are vast, and all partner participants expressed interest in helping and using community facilities for learning. Engaging students in real-world learning and helping partners become better managers and land stewards can have profound impacts.

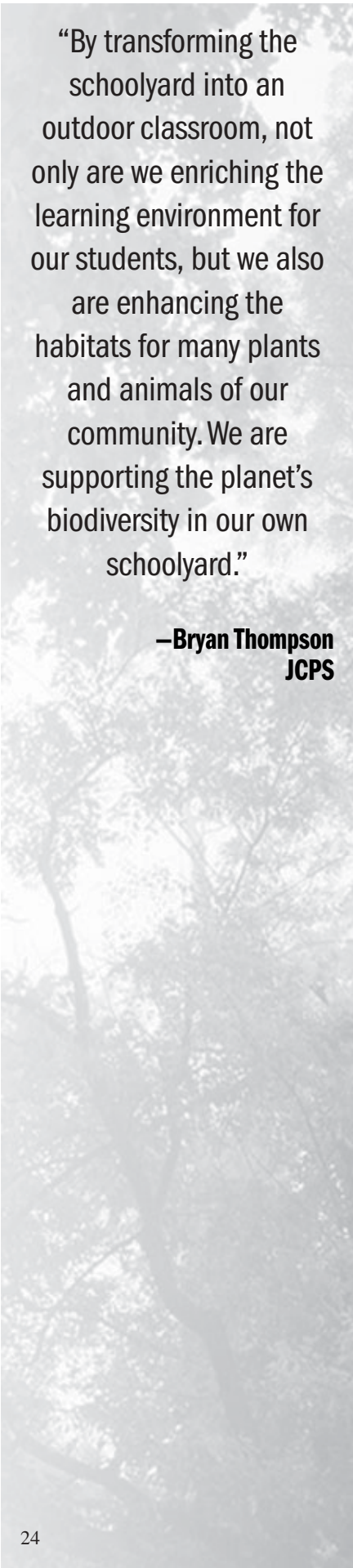
Metro Parks has 122 parks covering more than 13,500 acres. Louisville Metro Government has more than 850 vacant lots that could be used as outdoor classrooms. Schools will be encouraged to adopt as outdoor classrooms individual public lands to which pupils can walk, so that they will have significant opportunity to explore their local community and to

“We’re on board with this project. It brings home the message that the city is a park and supports the mayor’s initiative of citizens and groups adopting parks.”

**—Michael Heitz  
Metro Parks Department  
Director**

“I see very significant opportunities for involving JCPS and U of L students in research projects involving urban and suburban ecology in Louisville. Many good things will come from this partnering project.”

**—Dr. Margaret M. Carreiro  
U of L**



“By transforming the schoolyard into an outdoor classroom, not only are we enriching the learning environment for our students, but we also are enhancing the habitats for many plants and animals of our community. We are supporting the planet’s biodiversity in our own schoolyard.”

–Bryan Thompson  
JCPS

develop service-learning opportunities. If local schools adopted some of the vacant lots in their neighborhoods, much could be accomplished to clean up blighted neighborhoods while students learn basic skills that will help them be academically successful.

### **Implementation**

The implementation of the communitywide outdoor-classroom approach at the level envisioned by the participants is complex and crosses organizational and cultural boundaries for all of the partners. An interagency group will oversee this activity. School-based initiatives will focus on bringing outside resources to the campus and will help use the campus and the surrounding neighborhood as a more effective learning environment linked to specific curriculum objectives that are consistent with core content requirements.

A model for implementation could include:

1. A GIS analysis of schools, Metro Parks, and vacant lots to identify parks and open spaces that schools could adopt as an outdoor classroom; a survey of all principals and environmental education contacts to determine interest in developing their own land and/or adopting a local park or open space.
2. The creation of school-based environmental teams ideally comprised of an administrator, teachers, a plant operator, parents, students, a community land manager, and an environmental researcher.
3. The development of a resource guide to help teachers connect their classroom work with an outdoor classroom; cataloguing existing projects and evaluating existing resources with the intention of linking every school to communitywide resources such as Blackacre State Nature Preserve, Jefferson County Memorial Forest, Louisville Nature Center, the Louisville Zoo, Bernheim Forest, the Louisville Science Center, and Metro Parks.
4. Encouraging schools to adopt a Metro Government park as a community outdoor classroom.
5. Developing relationships with health-promotion schools of excellence to encourage students to walk one mile three times a week in their outdoor classrooms.
6. JCPS, U of L, and Metro Government staff offering professional development for teachers.
7. Developing a common and consistent message among entities; the Center for EE working with the three partners to develop a

statement of land management (by linking partner lands with land stewardship, learning, and research). Facility managers from each of the partners will develop best-management practices for public lands. These will offer students opportunities for education and outdoor learning, service-learning projects, and research. This component of the project will build upon and expand successful partner efforts identified as part of the project by formalizing relationships and developing standardized approaches that will strengthen the existing school/community partnerships.

- Six-Month Goals: Establish the task force, conduct a survey, and create curriculum correlations.
- Five-Year Goals: Affirm ongoing partner commitments. All schools will have access to outdoor classrooms and opportunities for students to experience meaningful out-of-classroom learning. Teacher training will include instruction in the use of outdoor/out-of-classroom tools and curricula. Curricula will be available for all schools at all learning levels and will be linked to core content and learning expectations. Partner resources available to teachers and schools will be identified and will be easily accessible. Evaluation criteria will be identified, and evaluation of the effectiveness of programs will be embedded in the implementation.

### **Potential Benefits**

Based upon a study of 70 schools nationwide, including several JCPS schools, test scores at schools that emphasize environmental and experiential education showed an increase over those from traditional in-classroom learning approaches. Environmental education includes stewardship and citizenship consistent with local, state, and federal emphasis on clean water, clean air, recycling, conservation of resources, and the impact of individual and societal behaviors on the environment and the community. Green cities result in a better living and learning environment, as well as in a more vigorous local economy that attracts and retains an educated workforce and a higher quality of life.

### **Funding**

Funding for the six-month goals can be found within the resources of the partners. Most of the recommendations build upon existing successful efforts of the partners. Significant funds could be required to develop walking paths, transform public landscapes, and plant native species.



“In an age of rapid urban development, creating a land ethic to manage green space is essential for preservation.”

–Carolyn Cromer  
Blackacre Foundation Inc.



## **Recommendation: Conduct Regular Green Issues Orientations/Professional Development for Employees**

### **Purpose**

Regular environmental awareness programs are needed to enhance compliance with the partners' environmental goals of energy conservation, material reduction, reusing and recycling, improving air and water quality, and promoting a healthier lifestyle. The partners' environmental goals will be included in employee and student orientation by supporting employee exchanges and participation in environmental education. A recognition/award program will be developed to encourage and identify outstanding environmental employees. One hopeful outcome is for the partners to develop a common language and set of goals for the green-city initiatives.

### **Justification**

Collectively, the partners employ more than 25,000 people, and many of the recommendations made in this report to promote a green city will require their support and action. To ensure a consistent message and to efficiently convey information, a collaborative effort will be needed to inform and educate employees of actions that they can and must take to ensure a green city. The adoption of environmental principles, wise energy use, recycling, environmentally preferable purchasing, environmental education, and health priorities will require action by all employees. Partners can engage employees and others in this process only if they proactively support employee participation in learning and show them how to use that knowledge to improve the environment. The learning process will require a range of training programs, ranging from improving awareness to professional development.

### **Implementation**

Environmental educators within each of the three organizations will work to prepare an educational program to provide preservice training and professional development.

- **First Six Months:** The committee will inventory environmental education programs for employees, including determining who is leading these programs and what their goals are. The committee will propose a systematic, well-coordinated scheme for environmental education among and across the partners. It will identify who will take primary responsibility for each educational program, how often it will be conducted, and the nature of the educational program.

- Long-Term Goals: Conduct orientations for existing and new employees on new policies and programs that occur as a result of recommendations of this report (e.g., buying green, new recycling policies, adoption of environmental principles, energy conservation measures). These orientations could be conducted jointly so that employees from all three organizations would receive the same information. Additional professional development will be needed for some programs to be effectively implemented (e.g., purchasing officers knowing how to identify green products, plant managers understanding energy-efficiency measures to be implemented, health registries and asthma education being implemented).

### **Potential Benefits**

A key piece of the foundation for creating a green city will be the support and participation by the employees of the three organizations. That support and leadership will translate into communitywide support and participation, engaged students, and improvements in the quality of life in the Metro area.

### **Funding**

Funding needs for some of these programs are generally small. For employees, the focus is on integration with existing initiatives and training (such as employee orientation). Funds will be needed for the recognition program.



## Children at Risk

Exposure to lead can affect anyone, but children age 6 and younger face special hazards. According to the Kentucky Health and Family Services Cabinet's Lead Program, lead, which children often consume as paint chips or paint dust, can impair the development of infants' brains, lowering intelligence, reducing attention spans, and causing children to become hyperactive.

—*The Courier-Journal*  
Feb. 11, 2004

## Recommendation: Develop a Registry for Environmental Public Health Issues

### Purpose

To fill information gaps that thwart effective delivery of public health programs, including assessing linkages between health, school attendance, and academic performance.

### Justification

Better data is needed to understand public health issues, especially those related to children and academic performance. Asthma, cancer, birth defects, sleep apnea, immunization effectiveness, and toxic exposures, including lead, are examples of community and professional public health concerns of the partners. Within the past several years, community groups have been increasingly vocal about the information gaps that exist on local environmental health issues. Asthma is the number-one cause of student absenteeism, and lead poisoning has a major impact upon children and is a significant cause of attention deficit disorders.

### Implementation

The Louisville Metro Health Department will take the lead on this initiative. The U of L School of Public Health and the JCPS Student Safety and Relations Office (containing both the Attendance Office and the Health Office) have agreed to be active partners. Private-sector and local, state, and federal participation will be solicited.

- Six-Month Goal: The working group would be formed and would begin an inventory of existing data, problems, and data gaps related to priorities.
- Five-Year Goals: Identify additional registries needed, and implement the creation and maintenance of the registries.

### Potential Benefits

Significant funding for research, the testing of all preschool children for lead and asthma, increased attendance, and improved test scores

### Funding

Long-term funding costs are unknown and will vary according to the findings and recommendations of the registry assessment group. Short-term funding costs are low and consist primarily of organizational commitments from the partners.

## **Recommendation: Focus on Asthma**

### **Purpose**

To create a task force for surveillance and evaluation that will lead to the education of our community regarding asthma.

### **Justification**


The Center for Disease Control notes that asthma is a leading cause of student absenteeism nationwide and in JCPS particularly and is an increasing health risk locally and nationally, a risk that has doubled in the last 20 years. The Metro Health Department reports data that shows higher instances of asthma among African-American and other minority populations. One survey showed 10.5 percent of all those surveyed (not just minorities) had been told by a physician that they have asthma. The Metro Health Department is currently studying hospital discharge data for asthma incidence. While asthma may be effectively treated with inhaled corticosteroids and bronchodilators, the cost of absenteeism is considerable. Research has shown that poorer-performing schools have higher percentages of students with unrecognized symptoms of asthma. Considerable attention has been given to asthma in the general news media, and a more coordinated community response is recommended.

### **Implementation**

A task force would be jointly appointed by the Partnership Project. The task force would evaluate community asthma issues and current responses and recommend a long-term agenda. This agenda would include:

- Improved patient and community asthma awareness and education.
- Increased monitoring of lung function to diagnose asthma prevalence.
- Improved access to and improved quality of clinical care.
- Reduced exposure to environmental triggers.
- Improved coordination among schools, health care providers, insurers, community-based agencies, local health departments, parents, and caregivers.

JCPS has already initiated school-based education and audit programs to identify potential triggers of asthma. This effort can be expanded to include Metro Government and U of L participation. To improve coordination among health-care providers, an asthma center will be established to provide a central point for patients and parents to seek assistance.



“Nothing is linked more to environmental causes than asthma and lead. The key to the success of the registry is how much information on acute and chronic diseases can be gathered.”

—Dr. David Tollerud  
U of L



The Partnership for a Green City Project has shown us on a small scale what is possible for Louisville on a much larger scale. The process of collaboration for the project has itself been beneficial. The project has built links and dialogue and increased enthusiasm and creativity. As the seed for a new beginning, The Partnership for a Green City Project shows us our potential for growth. Louisville provides fertile ground in which to nurture this seed.

### **Potential Benefits**

Asthma rates in Louisville have a significant impact on the quality of life of children and adults. Asthma hits poorer, inner-city residents hardest and disproportionately but impacts students at all socioeconomic levels.

Increased education, health-care assistance, and diagnosis can succeed in managing this public health problem. Managing asthma will enhance the quality of life of asthma sufferers, reduce hospital admissions/emergency room visits that impose significant costs on the community, and reduce the number of missed school days.

### **Funding**

Funding from the Centers for Disease Control and Prevention (CDC), the U.S. Environmental Protection Agency (EPA), the National Institute for Environmental Health Science (NIEHS), other federal agencies, private foundations, pharmaceutical corporations, and health-care providers is available to address this public-health issue. The University of Louisville School of Public Health will take a leadership role in obtaining funding.

## **F. FUTURE ACTIVITIES**

The three partners will commit to support these recommendations. They will solicit funding and participation to implement them. Some funding options have already been identified. Other partners (the state and federal governments; the private sector; environmental nongovernmental organizations) may be recruited as partner initiatives evolve. Formal approval of the project recommendations is desirable but not necessary for progress to be made. The community's leadership and the leaders of the three partners, who together are making this project possible, will be instrumental in helping the promise of this effort reach its highest level of success, resulting in the realization of substantial benefits for the entire community.

# Appendix A

## THE PARTNERSHIP FOR A GREEN CITY

### METRO GOVERNMENT PARTICIPANT LIST

Sheila Anderson .....	Metro Health Department
Bonnie Biemer .....	Metro Development Authority
Jim Brammell .....	Louisville Water Company
Marie Burnett .....	Waste Management District
Sarah Lynn Cunningham .....	Metropolitan Sewer District
Rudolph Davidson .....	Secretary for Public Works
Kelly Dearing-Smith .....	Louisville Water Company
Terry Dunn .....	Waste Management District
Phyllis Fitzgerald .....	Air Pollution Control District
Marcelle Gianelloni .....	Louisville Zoo
Jody Hamilton .....	Metro Parks
Cass Harris .....	Waste Management District
Lisa Hite .....	Metro Parks
Mike Heitz .....	Metro Parks
Susan Hamilton .....	Metro Development Authority
Dr. Kraig Humbaugh .....	Metro Health Department
James Hunt .....	Metropolitan Sewer District
Cynthia Knapek .....	Brightside
Doug McCoy .....	Louisville Zoo
Theresa Mattei .....	Louisville Science Center
Dennis Minks .....	Metro Development Authority
Fred Nett .....	Metro Development Authority
Judy Nielsen .....	Metro Health Department
Beth Nolte .....	Louisville Science Center
Susan Rademaker .....	Metro Parks
Joan Riehm .....	Deputy Mayor
Bob Schindler .....	Solid Waste Management—Director
Julie Shinton .....	Brightside
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# THE PARTNERSHIP FOR A GREEN CITY

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Aaron Wilson ..... Service Learning

Marianne Wunderlin ..... Service Learning

## Appendix B

### Collaborative Environmental Education, Management, and Health Programs

#### SPONSORED BY U OF L, JCPS, AND METRO GOVERNMENT

There are many other environmental education initiatives in the Louisville area sponsored by the state as well as nongovernmental programs. This list only contains the programs that are a result of or that are sustained by cooperation between two or more of the partnership participants (April 2004).

Adventures in Water	An award-winning water curriculum and Web site	Kelly Dearing-Smith Louisville Water Company 550 South Third St. Louisville, KY 40202 (502) 583-6610 <a href="http://www.lwcky.com">www.lwcky.com</a>
Beargrass Creek Task Force	Involves schools and students in watershed projects/watershed protection/environmental monitoring	Phyllis Croce MSD P.O. Box 740011 Louisville, KY 40201-7411 (502) 540-6000 <a href="http://www.msdlouky.org">www.msdlouky.org</a>
Blackacre State Nature Preserve	Environmental education professional development and programs for students	Carolyn Cromer Blackacre Foundation Inc. 3200 Tucker Station Road Louisville, KY 40299 <a href="http://www.blackacrefoundationinc.org">www.blackacrefoundationinc.org</a>  Donna Griffin/Bryan Thompson JCPS Center for EE - Gheens Academy 4425 Preston Highway Louisville, KY 40213 (502) 485-3437 <a href="http://www.jcpsky.net/ee">www.jcpsky.net/ee</a>
Brightside School Programs	Fred Wiche Award, support for cleanups, and the third grade Stage One weeklong drama and environmental class	Julie Shinton 400 South First Street Louisville, KY 40202 (502) 574-2702 <a href="http://www.loukymetro.org/Department/Brightside">www.loukymetro.org/Department/Brightside</a>
GIS Education Committee	A coalition to support four JCPS high schools in developing four-year GIS programs at Eastern, Doss, Jeffersontown, and Central high schools	Dr. Sheree Koppel JCPS School-to-Career Office VanHoose Education Center 3332 Newburg Road Louisville, KY 40218 (502) 485-3122
Health Promotion Schools of Excellence	Professional development, curriculum, and support for 55 schools in a comprehensive health education program	Bonnie Ciarroccki 546 South First Street Louisville, KY 40202 (502) 485-7920 <a href="http://apps.jefferson.k12.ky.us/hpse">http://apps.jefferson.k12.ky.us/hpse</a>

Indoor Air and Asthma Coalition	Improved Air Quality through EPS program IAQ–Tools for Schools, asthma education, and secondhand tobacco smoke	Jim Vaughn JCPS Environmental and Safety Services C.B. Young Jr. Service Center 3001 Crittenden Drive Louisville, KY 40209 (502) 485-3698
Jefferson County Conservation District	Long-time sponsor of essay and poster contest, Food Farming and Environment Teachers Conference, Natural Resource Field Days, in-school science experiments, and the Envirothon Competition	Cheryl Bersaglia Jefferson County Soil and Water Conservation District 4233 Bardstown Road, Suite 100-A Louisville, KY 40218-3280 (502) 499-1900 <a href="http://jeffcd.org">http://jeffcd.org</a>
KAIRE and Ozone Action Days model	Environmental education initiatives that focus on air quality and transportation issues	Air Pollution Control District 850 Barrett Avenue Louisville, KY 40204-1745 (502) 574-6000 <a href="http://www.apcd.org/kaire">www.apcd.org/kaire</a>
Kentucky Pollution Prevention Center	Pollution-prevention education and professional development	Cam Metcalf Kentucky Pollution Prevention Center University of Louisville 420 Lutz Hall Louisville, KY 40292 (502) 852-0965 <a href="http://www.kppc.org">www.kppc.org</a>
Louisville Brownfield Working Group	Strategy group to forward environmental assessments and cleanups of land for redevelopment	Bonnie Biemer Metro Development Authority Environmental Division (502) 574-2512
Louisville Zoo and Louisville Nature Center	Conservation teacher training and programs at the Zoo focus on biodiversity and habitat. Backyard educational series and exhibits on Beargrass Creek and Wetlands. With Rod Goforth, the Zoo and Nature Center direct activities at Beargrass Creek State Nature Preserve and the Louisville Nature Center.	Marcelle Gianelloni Louisville Zoo P.O. Box 37250 Louisville, KY 40233-7250 (502) 459-2181 <a href="http://www.louisvillezoo.org">www.louisvillezoo.org</a>
Metro Parks	Offers community programs and environmental education sites at all of its parks, with a dedicated naturalist staff at Otter Creek and Jefferson County Forest. This summer, Brightside is offering an environmental component for all Metro Park summer programs.	Jody Hamilton Metro Parks 1297 Trevilian Way P. O. Box 37280 Louisville, KY 40233 <a href="http://www.loukymetro.org/department/metroparks">www.loukymetro.org/department/metroparks</a>
MSD–Ellen Swallow Richards Ecology Learning Center	“After We Flush” Off-Site Program for JCPS fifth graders—professional-development opportunities for educators and citizen groups	Sarah Lynn Cunningham MSD 700 West Liberty Street Louisville, KY 40202 (502) 540-6000 <a href="http://www.msdlouky.org/education.htm">www.msdlouky.org/education.htm</a>

SUSTAIN-An Environmental Journal	A quarterly academic and community-oriented research journal that investigates environmental issues of interest to Kentucky	Allan Dittmer U of L Center for EE College of Education and Human Development Louisville, KY 40292 (502) 852-0791
Salt River Watershed Watch	Support, coordination, and professional development for citizen water-monitoring programs in the Salt River Watershed	Russ Barnett KIESD Patterson Hall University of Louisville Louisville, KY 40292 (502) 852-1851 <a href="http://kywater.org/watch/salt">http://kywater.org/watch/salt</a>
Service-Learning Initiatives	Coordination and development of service-learning opportunities in the Louisville Metro Area	Marianne Wunderland Volunteer Talent Center 330 So. Hubbards Lane Louisville, KY 40207 (502) 485-7047
The World Around Us	The Louisville Science Center's <i>The World Around Us</i> exhibit [and the accompanying multimillion-dollar National Science Foundation (NSF) budget and large educational staff] will provide leadership, professional development, and in-depth, inquiry-based environmental science opportunities.	Theresa Mattei Louisville Science Center 727 West Main Street Louisville, KY 40202 (502) 561-6100 <a href="http://www.louisvillescience.org">www.louisvillescience.org</a>
ToxRAP: Environmental Health	A month-long environmental health curriculum implemented in eighth grade science/practical living classrooms—professional development and supplies provided by U of L.	Steve Meyers U of L Medical School Department of Toxicology
Urban Forest Research	Ecological and participatory research on urban forests and their impacts on local and global environmental trends.	Margaret Carreiro U of L Biology Department Louisville, KY 40292 (502) 852-2093
Urban Watershed	Middle school investigation of Jefferson County watersheds	David Wicks JCPS Center for Environmental Education 4425 Preston Highway Louisville, KY 40213 (502) 485-3295 <a href="http://www.jcpsky.net/ee">www.jcpsky.net/ee</a>
Waterfront Development Corporation	Educational curriculum that connects the Ohio River, the Waterfront, and Metro Government	Ashley Cox Louisville Waterfront Development Corporation 129 East River Road Louisville, KY 40202 (502) 574-3768 <a href="http://www.louisvillewaterfront.com">www.louisvillewaterfront.com</a>
West Jefferson County Community Task Force	A partnership of nine neighborhoods, U of L, and Metro Government to serve as a forum for environmental issues that affect Louisville's West End	Arnita Gadson West County Task Force U of L - KIESD <a href="http://www.louisville.edu/org/wjcctf">www.louisville.edu/org/wjcctf</a>

## Appendix C

### Additional Potential Projects

At each of the facilitated sessions, participants brainstormed collaborative initiatives that could build on existing projects or that were new initiatives. Some of the projects were combined and/or expanded, and then the participants voted on their top priorities. Projects not on the priority list are still important and might be pursued as funding allows.

#### ENVIRONMENTAL HEALTH PROJECTS

Service-Learning Research Project	Create new and build on current service-learning project, and tie into all three organizations. Conduct applied research.
Evaluating Your Environment (EYE)	Assessment/Audit of Work and Learning Spaces: There is a need for objective, not just observational, information. Create a test for measurement: How healthy are our work and learning spaces?
Environmental Health Fitness for All	Conduct a fitness survey, and then encourage all partners to have an aggressive fitness program for all staff and students.
Indoor Air Project (Involving children, but experts needed)	Sample air in occupied buildings (Metro Government, U of L, JCPS). Set priorities regarding what should be tested and when. Test inside school buses. How much testing is needed? Are new buildings toxic? There may be bad rooms in good buildings. Should testing be random?
Biomarker Project (Lead, Tobacco, Trichlor, Per Chlor)	Urine/Blood Samples—Focus on lead long term: voluntary studies of students, employees, etc. This could form the basis for long-term medical research. There are many privacy issues. Other Concerns—HeadStart has tested 1,500 people, and 10,000 children have been screened. One fourth of total private physicians don't test.

#### ENVIRONMENTAL MANAGEMENT

Land Stewardship	(1) Jointly develop best management practices (BMPs) for public land. BMPs will cover at least plant selection; control of noxious plants; selection, appropriate use, storage, and disposal of chemicals; integrated pest management; erosion and sedimentation control; irrigation and maintenance; runoff control and water quality; riparian area vegetation. (2) Develop method and criteria for evaluating success of landscaping and land restoration projects. (3) Develop or contract training of operation and maintenance personnel in the stewardship practices. (4) Develop service-learning and classroom activities focused on the stewardship practices.
Urban Transportation Center	Develop transportation policy short-term (\$\$) <ul style="list-style-type: none"> <li>· Examine existing fuels and use by three organizations.</li> <li>· Review use of alternative fuels/vehicles.</li> <li>· Examine personal/organizations' travel patterns. Long-term (\$\$\$)</li> <li>· Integrate alternative fuel vehicles into three organizations' use.</li> <li>· Develop long-term plan for a green transportation network, synergistic effects.</li> <li>· Develop IT tools for fleet use for service delivery (route minimization, scheduling efficiency, etc.).</li> <li>· Examine long-term health effects from transportation on children.</li> <li>· Develop transportation demand management recommendations to promote carpooling, transit usage, etc., among three organizations' employees.</li> </ul>

Bicycles United for Fun (BUFF)	<p>Encourage more bike riding among partners (employees and children/students).</p> <ul style="list-style-type: none"> <li>· Identify comprehensive plan encompassing workplaces, schools, and businesses.</li> <li>· Encourage the development of bike lanes and restricted bike-only areas.</li> <li>· Market and educate to promote concept and use.</li> </ul>
Joint Procurement and Use of Cleaner Fuels	<p>Develop partnerships for procurement. Identify preferred clean fuels. Enhance Kentucky clean fuels coalition curriculum. Identify representative/Fleet Managers Committee.</p> <ul style="list-style-type: none"> <li>· Research alternatives.</li> <li>· Evaluate current purchasing procedures for partners (identify barriers to overcome).</li> <li>· Develop/Adopt joint partner purchasing procedure.</li> <li>· Identify quantitative measures for benefits of clean fuels.</li> <li>· Track cost-saving/emission reductions.</li> <li>· Promote/market use and results (use student involvement).</li> <li>· Teachers use Kentucky Clean Fuels Coalition (KCFC) curriculum in classroom.</li> </ul>

## ENVIRONMENTAL EDUCATION

Food for Thought	<p>Connect kids to their stomachs via on-site farmers markets, intergenerational school/community gardens, and locally raised food in their school cafeterias, with interdisciplinary core content connections.</p> <ul style="list-style-type: none"> <li>· Select school document baseline nutrition data and assess nutrition data.</li> <li>· Connect with the Cooperative Extension Service, farmers markets, and school/community gardens.</li> <li>· Increase nutrition training for cafeteria workers and other involved staff.</li> </ul>
Grow the Green in You!	<p>Lifelong experience, classroom, and community partners, cradle to grave, an integrated curriculum and experience</p> <ul style="list-style-type: none"> <li>· Professional development (create a resource guide for educators that is coordinated with the curriculum).</li> <li>· Sponsor a pilot expanded Environmental Summit.</li> <li>· Green-In-You Bus, fleet, or Enviro-Mobile outfitted to visit schools (funded through private donations, sponsors). Training high school students to mentor; staff the bus (service-learning); children at the Kentucky State Fair (with admission)</li> </ul>
Clean Air Kids	<p>Projects that would enhance student learning, resulting in improved math skills, better environmental health, reduced fuel consumption, and cost savings.</p> <ul style="list-style-type: none"> <li>· Select school (baseline data on current fuel consumption).</li> <li>· Select feeder school to personalize (with art) backside of visor.</li> <li>· Students develop a persuasive letter to vehicle operator(s) asking for their participation.</li> </ul>
Economics for Environmental Responsibility	<p>Show future decisions that are sustainable, teaching students and community members how to become informed consumers and how to make responsible, informed decisions about energy use and natural resource conservation through existing local models. Format might include workshops and case studies.</p> <ul style="list-style-type: none"> <li>· Establish a brainstorming/advisory group of the three partners with Council for Economic Education to identify models for economics and sustainability; create or find interactive learning materials, locally based videos, Web sites or field trips highlighting these model projects.</li> </ul>

Community Environment Fair	<p>County fair format to highlight environmental partnerships on hot topics, such as mass transit, health issues, water resources, asthma, solid waste, wildlife resources, etc. Partner with Metro Government’s Neighborhood Summit. Involve Youth Summit with a booth at the fair. Choose issue based on need—piggyback on Mayor’s Community Conversations.</p> <ul style="list-style-type: none"> <li>· Pilot gatherings in schools highlighting environmental issues such as water quality. Continuous cycle of fairs highlighting different issues</li> </ul>
Environmental Yellow Pages (Online)	<p>Environmental Yellow Pages (Online)/Manual of Community Resources  Description: Online database including identification of community resources, contacts, research studies about Louisville’s environment, curriculum/lesson plans/ service-learning ideas, grant request for proposals, free resources with student-friendly research agenda. Student ideas for capstone or science fair, service-learning projects. Annual conference for sharing ongoing research and identifying research agenda</p>
Center for K-12 GIS (Geographic Information Systems)	<p>To develop the GIS capacity to support all environmental education field trip sites and outdoor classrooms and to support investigations into local, national, and global environmental and community issues:</p> <ul style="list-style-type: none"> <li>· Develop an Arc IMS site to create Internet mapping of all Metro Government parks.</li> <li>· Continue developing with Doss, Eastern, Jeffersontown, and Central high schools GIS career pathway.</li> <li>· Support class-based projects and internships that link environmental projects that the three agencies need.</li> <li>· GIS reference center hosted by students, to develop maps for the entire kindergarten through grade twelve (K-12) core content.</li> </ul>
Environmental Science Fair Projects	<p>Local, state, national, and international science fairs have added environmental science to their category list. Intel, the largest of all science fairs, uses the following description: Environmental Science—Study of pollution (air, water, and land) sources and their control; ecology.</p> <ul style="list-style-type: none"> <li>· Create a booklet describing environmental research that is needed in Jefferson County, with a list of individuals who could support, guide, and help students who choose these projects.</li> <li>· Conduct an annual conference at U of L highlighting the environmental research that goes on at the university.</li> <li>· Present awards/recognition for students participating in and winning the environmental science fair divisions.</li> </ul>

# Appendix D

## Outdoor Classroom Curriculum Matrix

Visit the JCPS Center for Environmental Education Web site [www.jcpsky.net/ee](http://www.jcpsky.net/ee) for in-depth explanations.

Grade	Weeks 1- 6	Weeks 7-12	Weeks 13-18	Weeks 19-24	Weeks 25-30	Weeks 31- 36
P1	Plants and Animals: The World Around Us	Exploring Our Community	What's Happening on the Earth and in the Sky?	Changes	Using Our Senses	Objects: Natural, Historical, Mathematical
P2	Exploring the Outdoors Together	Comparing Environments	Seasons	It Happened in America	Places Where We Live	Measurement
P3	Animal Evidence	People and Animals Sharing the World	Diversity	Community Timelines	Experiencing Our Environment	Using Natural Resources
P4	Classifying Plants and Animals in the Schoolyard	Using Original Documents and Timelines	Earth Materials and Resources	The History of Louisville and Jefferson County	Rural, Urban, and Suburban Environments	Properties of Light, Heat, Electricity, and Sound
4	Mapping	Food Webs in your Community: Who Eats Whom?	Kentucky's Physical Environment	Kentucky Culture	How Much Energy Do We Use?	Inquiry: Let's Be Curious
5	Geography: Tools to Explore Our World	A Patchwork of People, Places, and Living Things	Water!	Adapting and Modifying Our Environment	Collecting and Understanding Data	Energy: Getting Jobs Done

## Appendix E

### Placing this Report in National Context

#### **From the National Science Foundation's 2003 report *Complex Environmental Systems: Synthesis for Earth, Life, and Society in the 21st Century*, a report summarizing a ten-year outlook in environmental research and education for the National Science Foundation**

As the global footprint of human activity continues to expand, environmental science and engineering problems will provide great challenges and opportunities in the next decade. Because of the complex relationships among people, ecosystems, and the biosphere, human health and well-being are closely linked to the integrity of local, regional, and global ecosystems. Therefore, environmental research and education are central elements of local, national, and global security, health, and prosperity.

New instrumentation, data-handling, and methodological capabilities have expanded the horizons of what we can study and understand about the environment. These advances create the demand for collaborative teams of engineers and natural and social scientists that go beyond current disciplinary research and educational frameworks. Imagination, diversity, and the capacity to adapt quickly have become essential qualities for both institutions and individuals, not only to facilitate research, but to ensure the immediate and broad-based application of research results related to the environment.

To meet these complex challenges as well as urgent human needs, we need to develop environmental synthesis to:

- frame questions or problems for investigation,
- integrate research activity,
- conduct meta-analyses (the synthesis of existing data sets from diverse fields and sources) to define the state of knowledge, and
- make the resulting scientific data, models, and conclusions publicly accessible.

Research must integrate spatial, temporal, and organizational scales, draw from many disciplines, and facilitate the synergy that results from partnerships among governmental, academic, and private organizations. This research must use diverse data sets and approaches and be effectively communicated among researchers, educators, students, resource and industrial managers, policy makers, and the public.

#### **From the National Environmental Education and Training Foundation: *Understanding Environmental Literacy in America: And Making it a Reality—2004***

If the leaders of America's top environmental education organizations and programs were ever assembled in a room and asked what they most wanted, you would hear many different responses. There would, however, be some common themes. For example, they might suggest that a percentage of the billions of dollars of public resources that are spent each year on environmental information campaigns be re-directed from pushing simple awareness to a focus on real learning and skill development. Most might also tell you that they want a fairer shake from America's opinion leaders. Quit blaming the professional EE community for the digressions of over-zealous publishers, public interest groups, companies or even individual teachers who step over the line in pushing their own agenda. They would appreciate it if environmental education could be seen for what it really is—a bona-fide effort to bring important, balanced, and useful learning about the world and how people affect it to children and adults.

**CHPS – California High Performance Schools—High-performance design can impact a district from the classroom to the boardroom. [www.chps.net/index.htm](http://www.chps.net/index.htm)**  
**The primary benefits include:**

**Higher Test Scores.** A growing number of studies are confirming the relationship between a school’s physical condition, especially its lighting and indoor air quality, and student performance. One recent study of school districts in California, Washington, and Colorado strongly indicates a correlation between increased daylight and improved student performance. In the California district, for example, students with the most daylight progressed 20 percent faster on mathematics tests and 26 percent faster on reading tests in one year than did those with the least amount of daylight. These results echo findings in a similar study conducted with schools in North Carolina.

The message is clear, and it confirms what teachers, students, and parents have known anecdotally for years: a better facility—one with great acoustics, lighting, indoor air quality, and other high-performance features—will deliver better student outcomes. *(For more information, read the National Clearinghouse for Educational Facilities report on how school facilities affect academic outcome.)*

**Increased Average Daily Attendance (ADA).** A high-performance school provides superior indoor air quality by controlling sources of contaminants, providing adequate ventilation, and preventing moisture accumulation. As a consequence, pollutants are kept out of the classroom, stale air is eliminated, and mold growth is eliminated—all tactics designed to reduce the sources of health problems and inhibit the spread of airborne infections. The result will be fewer sick days for students and teachers, especially those suffering from asthma or other respiratory

problems. The majority of a school’s operating budget is directly dependent on ADA, so even a small increase can significantly boost the operating budget.

**Reduced Operation Costs.** High-performance schools are specifically designed—using life-cycle cost methods—to minimize the long-term costs of ownership. They use less energy and water than standard schools and are easy to maintain. As a consequence, overall operating costs are low and will remain so for the life of the facility. Savings can be used to supplement other budgets, such as special education, computers, books, and salaries.

**Increased Teacher Satisfaction and Retention.** High-performance classrooms are designed to be pleasant and effective places to work. Visual and thermal comfort are high, acoustics are good, and the indoor air is fresh and clean. Such environments become positive factors in recruiting and retaining teachers and in improving their overall satisfaction with their positions.

**Reduced Liability Exposure.** Because they are healthy and emphasize superior indoor environmental quality, high-performance school buildings reduce a district’s exposure to health-related lawsuits.

**Reduced Environmental Impacts.** High-performance school buildings are consciously designed to respond to and positively impact the environment. They are energy and water efficient. They use durable, nontoxic materials that are high in recycled content and are themselves easily recycled. They preserve pristine natural areas on their sites and restore damaged ones. And they use nonpolluting, renewable energy to the greatest extent possible. As a consequence, high performance school buildings are good environmental citizens and they are designed to stay that way throughout their entire life cycles.