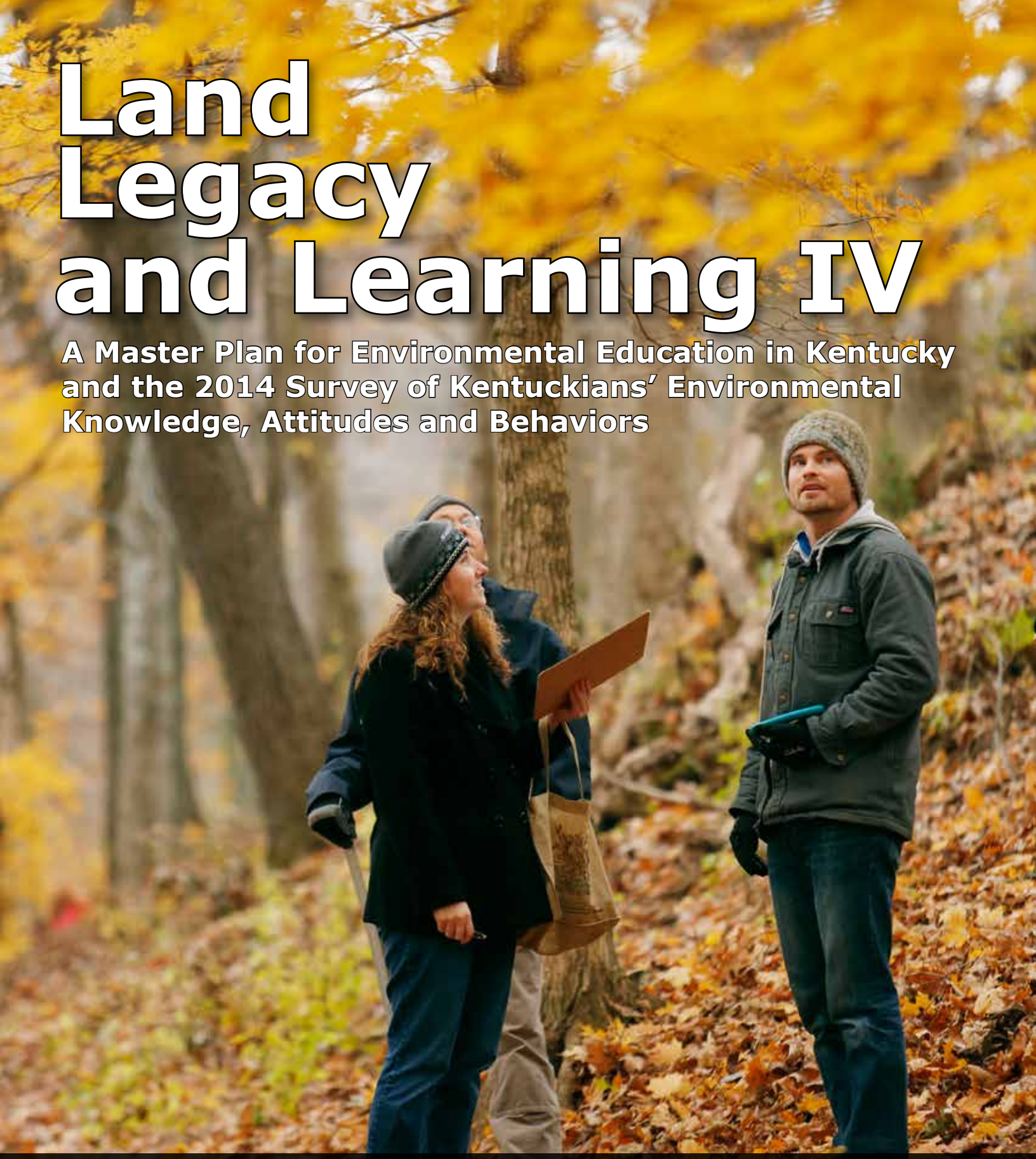
Land Legacy and Learning IV

A Master Plan for Environmental Education in Kentucky and the 2014 Survey of Kentuckians' Environmental Knowledge, Attitudes and Behaviors



Kentucky Environmental Education Council

2015-2020 Environmental Education Master Plan
Kentucky Environmental Education Council

2015 Edition

KENTUCKY ENVIRONMENTAL EDUCATION COUNCIL

An agency of the Education and Workforce Development Cabinet

Steven L. Beshear, Governor

Thomas O. Zawacki, Secretary

Council Members

Horace Brown, KEEC Chair
Cheryl Messenger, KEEC Vice Chair
Lona Brewer
Karin Ceralde
Gordon Garner
Billie Hardin
Greg Higdon
Marc Norton
Karen Reagor

Staff

Elizabeth Schmitz
Michelle Shane
Wesley Bullock
Amy Wallott, photographer, Kentucky Department of Education
Kentucky Education & Workforce Development Cabinet - Office of Communications

Published May, 2015

Table of Contents

KENTUCKY ENVIRONMENTAL EDUCATION COUNCIL

Land, Legacy and Learning IV

A Master Plan for Environmental Education in Kentucky

In the 15 years since the Kentucky Environmental Education Council (KEEC) created the first Land, Legacy and Learning report , the Commonwealth of Kentucky has garnered a national reputation as a leader in the field of environmental education (EE).

The report, published every five years, is the EE master plan for Kentucky and provides guideposts for an exemplary system. In this fourth iteration of the master plan, the council has continued to track changes in environmental knowledge, attitudes and behaviors of Kentuckians through a survey.

Since its inception, the master plan has been developed through a collaborative process. In 2014, more than 175 Kentuckians participated in 13 regional town hall forums held across the Commonwealth, and/or added their input through an online survey. These valuable forums would not have been possible without the support of the Kentucky Association for Environmental Education (KAEE) and the Kentucky University Partnership for Environmental Education (KUPEE) network.

Kentucky Environmental Education Council

Since the release of the most recent master plan in 2009, a number of exciting developments and accomplishments have shifted the landscape of EE in Kentucky and moved the Commonwealth closer to accomplishing many of the recommendations listed in that master plan. Most notably, the KEEC partnered with multiple organizations to develop the Kentucky Environmental Literacy Plan (KELP) for the K-12 public school system.

The KELP contains seven overarching goals combined with state and local strategies that provide students and educators with the tools and resources vital to building environmental literacy in the Commonwealth. In 2011, the Kentucky Board of Education voted to support the KELP in conjunction with the implementation of the new science standards.

Student and teacher participation in green schools programs is a key strategy for achieving the student literacy initiatives listed in the KELP. KEEC runs the Kentucky Green and Healthy Schools (KGHS) program, with more than 260 schools enrolled, up from 74 participant schools at the conclusion of calendar year 2009. In 2009, the program was awarded federal stimulus funds to help students and teachers focus on energy-saving projects. It received the "Excellence in Environmental Education" award from KAEE in 2010. KEEC and KAEE are partnering to align Kentucky's state and national green schools program efforts.

KEEC continues to achieve its statutory mandates. In 2011, the Interagency Subcommittee on Environmental Education (ISEE) was reconvened and meets quarterly to advise the council on EE in the Commonwealth. Since 2004, KEEC has administered the Professional Environmental Educator Certification course, which was designed and implemented as a result of past master plans. Initiated in 2004, the course had 115 graduates in 2009 and has more than 160 graduates to date. In 2014, KEEC applied for national accreditation of the course through the North American Association for Environmental Education (NAAEE).

The Kentucky Environmental Education Council was established per KRS 157.910, and the statutes pertaining to the council are found in KRS 157.900-915.

KRS 157.900, the Statement of Legislative Purpose, states,

"The General Assembly hereby declares that maintaining a clean and healthy environment is a state priority and is the individual and collective responsibility of all citizens of Kentucky. It is therefore in the public interest that a comprehensive environmental education initiative be undertaken to promote an informed and knowledgeable citizenry with the skills and attributes necessary to effectively and constructively solve existing environmental problems, prevent new ones, and maintain a balanced and economically healthy environment for future generations."


The Cycle of Life
Dragonfly

Accomplishments

Recommendation One in all three previous versions of the master plans called for integrating environmental literacy into teacher certification.

- In 2003, the Education Professional Standards Board (EPSB) approved the creation of an endorsement in environmental education. The endorsement means that colleges and universities across Kentucky offer specialized training for in-service teachers wishing to learn better strategies for integrating EE into their classrooms.

- As of 2014, six of the eight state universities offer or have completed the application through the EPSB to offer the EE endorsement to teachers. Eastern Kentucky University offers an EE endorsement program recognized by the National Council for the Accreditation of Teacher Education – one of only two nationally recognized EE endorsement programs in the nation (EKU Center for Environmental Education, www.naturalareas.eku.edu/center-environmental-education).

Recommendation Three in the 2004 plan called for all EE materials, content and programs in the Commonwealth to be based on state and/or national standards for what students should know and be able to do.

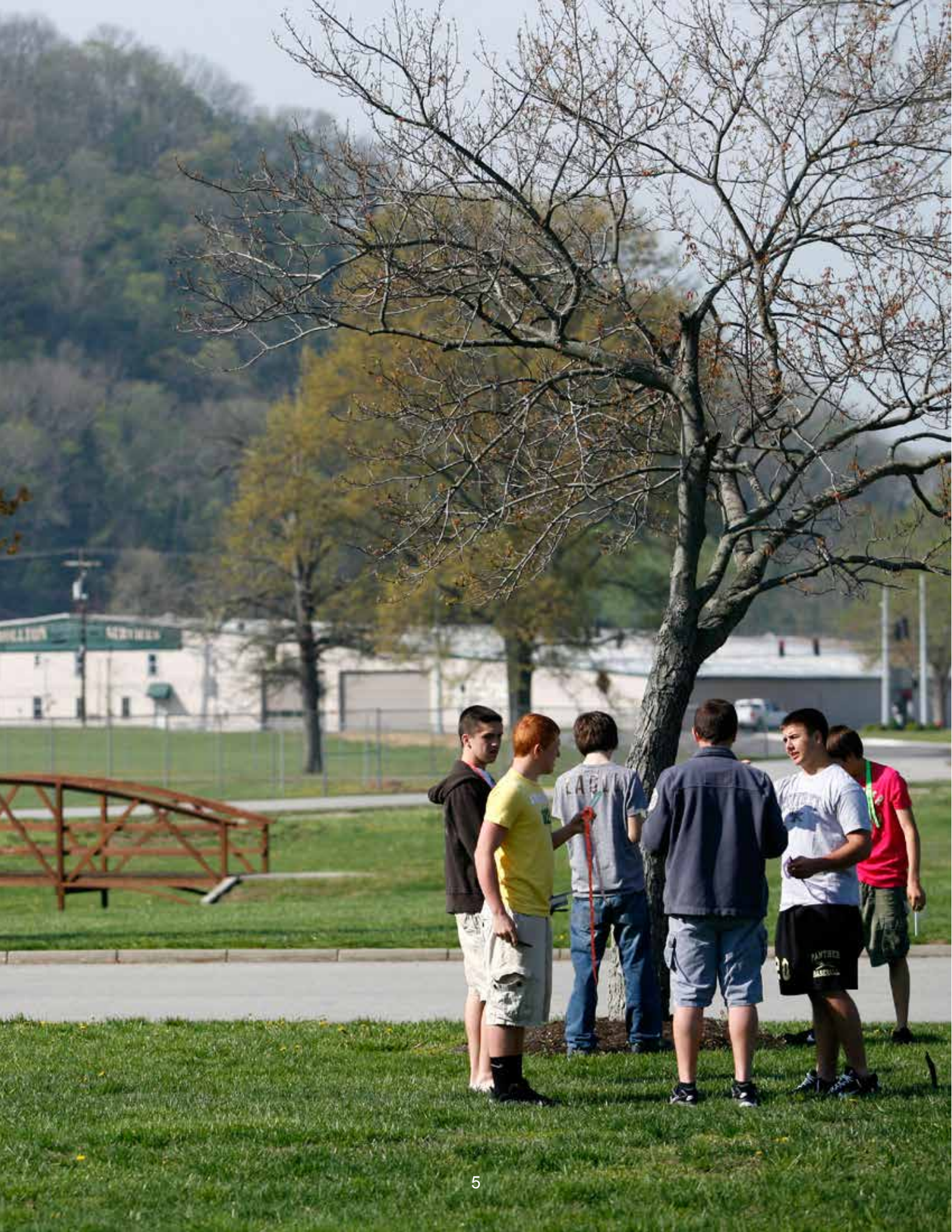
- The EE endorsement for teachers (accomplished under Recommendation One) and the Professional Environmental Educator Certification course are both based on national EE guidelines, produced by the National Project for Excellence in Environmental Education.

Recommendation Three in the 2009 plan encouraged all educators to provide significant outdoor opportunities for children to connect with the natural environments in which they live.

- This is now incorporated into state level policy for public schools through Goal Seven of the KELP.

Environmental education is not the same as environmental advocacy. In Kentucky Revised Statute (KRS 157.905), "'Environmental education' means an education process dealing with the interrelationships among the natural world and its man-made surroundings; is experience-based; 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."

KRS 157.905 also defines environmental literacy as "having adequate knowledge and understanding of environmental information, concepts and processes."



Recommendation Six in the 2004 and 2009 plans called on school districts across the Commonwealth to implement policies and programs that support a healthy learning environment and model appropriate environmental practices.

- This recommendation is represented in Goal Six of the KELP.
- This recommendation is also supported by KRS 157.450-455, passed in 2010, which encourages the construction of new school buildings and the renovation of existing school buildings in a manner that will create a healthy environment for students and teachers while saving energy, resources and operational expenses. The regulation also requires the Kentucky Department of Education (KDE) and the Department of Energy Development and Independence (DEDI) to identify ways that efficient school design and its energy-saving components can be integrated into the school curriculum.
- The number of school gardens is growing every year, and current estimates indicate that at least 167 school gardens or school greenhouses are operational in Kentucky.
- In 2011, KEEC worked with partner organizations to develop correlations between the *NAAEE Guidelines for K-12 Learning* and the Kentucky Academic Standards (KAS) for English language arts and mathematics. Correlations between the *NAAEE Guidelines for K-12 Learning*, the KAS for science, and accompanying lesson plans are under development.
- Since its inaugural year in 2011, KDE has participated in the U.S. Department of Education's Green Ribbon Schools program, and 100 percent of Kentucky's nominees (seven schools total) have been recognized as U.S. Green Ribbon Schools.
- In 2011, KEEC took the lead in developing educational components of the Capitol Education Center, a high performance building that highlights healthy and sustainable building materials, energy conservation, alternative energy and gardening for the 60,000 students and adults that annually visit the Capitol campus in Frankfort.

KRS 157.915 lists the functions of the KEEC, which are to:

(1) Create and update annually a five (5) year management and operational plan to make as effective as possible the coordination, delivery, and marketing of all state environmental education programs;

(2) Establish an interagency subcommittee to advise the council on environmental education matters;

(3) Establish and help coordinate the activities of regional environmental education centers and advisory committees at all state universities and at the central office of the Kentucky Community and Technical College System to serve as networks for the dissemination of environmental education programs, materials, and information across the state;

(4) Establish a competitive system for awarding grants for the establishment and maintenance of regional environmental education centers;

(5) Seek and receive private support to fund state and regional environmental education initiatives;

(6) Assist in the integration and evaluation of environmental education in existing school curricula;

(7) Monitor and report periodically on environmental literacy in Kentucky and continually assess trends and needs in environmental education on a local, state, national, and global basis; and

(8) Make recommendations and seek changes through regulations, legislation, and other means to promote environmental literacy in Kentucky.

Recommendations in previous master plans directed KEEC to conduct a survey of environmental knowledge, attitudes and behaviors every five years and to compare data from those surveys to keep track of how and what Kentuckians think about their environment.

- The results of the 2014 survey, administered by an independent research company, are included in the second half of this document.

Recommendations in previous plans directed KEEC to provide professional development opportunities for nonformal environmental educators (those who teach about the environment but are not employed as classroom teachers).

The result of these recommendations was the development of the Nonformal Environmental Education Certification course, renamed in 2014 as the Professional Environmental Educator Certification course by Kentucky's Certification Advisory Committee, and described in the introduction of this document.

Guidelines for Excellence in Environmental Education

NAAEE (www.naaee.org) initiated the National Project for Excellence in Environmental Education in 1993 to provide systematic guidance for the development of quality environmental education curricula and programs. These guidelines can be accessed online via the hyperlinks. Summaries of the guidelines on pages 23-27.

NAAEE Guidelines for Learning (K-12)

NAAEE Guidelines for the Preparation of Environmental Educators

NAAEE Guidelines for Excellence in Nonformal Environmental Education Programs

NAAEE Guidelines for Excellence in Environmental Education Materials

NAAEE Early Childhood Environmental Education Programs: Guidelines for Excellence

Kentucky has several members of the Guidelines Trainers Bureau. These individuals can provide training for your group in any of the above Guidelines. To find the trainer nearest you, contact the Kentucky Environmental Education Council at 800-882-5271.

A Changing Landscape in Education

KDE has adopted new KAS for English/language arts, mathematics and science. These standards encourage interdisciplinary education, a best practice in EE, by including cross-references to other content standards.

The new science standards are designed to teach science in a way that supports the best practices for EE (see inset, *Best Practices in Environmental Education*, page 12). Teacher preparation is shifting dramatically as the new standards are implemented. EE best practices are a good fit for new approaches to teacher preparation and professional development. Furthermore, education is emphasizing the fields of science, technology, engineering and math (STEM), and 21st-century learning skills and workforce development needs, including problem solving, critical thinking, teamwork and communication – all key elements of quality EE.

BEST PRACTICES IN ENVIRONMENTAL EDUCATION

1. Use place-based instruction.
2. Are interdisciplinary.
3. Include authentic assessments.
4. Use inquiry-based approaches that lead to problem solving and critical thinking.
5. Use scientific processes to study natural and human systems.
6. Serve all students.
7. Address social, cultural, physical, and economic diversity.
8. Support implementation of the Kentucky Academic Standards, including teaching Scientific and Engineering Practices, Crosscutting Concepts, and Disciplinary Core Ideas.

Key Master Plan Partners

Kentucky Association for Environmental Education

KAEE serves as the professional membership organization for EE in Kentucky, with more than 300 individual and organizational members and partners across the Commonwealth. The mission of KAEE is to promote excellence in environmental education by providing support, resources and networking opportunities to Kentucky's community of educators. KAEE's goals over the next several years include: providing quality educational programs and resources for environmental education, building KAEE's organizational effectiveness to support environmental education in Kentucky, building public support for and investment in environmental education in Kentucky and enhancing the capacity and resiliency of the environmental education field in Kentucky and beyond. KAEE serves as the state coordinator for multiple EE curricula projects (Project Learning Tree, Project Underground and the Leopold Education Project). In addition, KAEE is working to build capacity across the region and the continent through its role as a leader in the Southeastern Environmental Education Alliance and the NAAEE Affiliate Network. KAEE also hosts an annual statewide professional development conference.

Kentucky University Partnership for Environmental Education

As of 2014, the Kentucky University Partnership for Environmental Education had six active centers for EE, housed at the following institutions: Eastern Kentucky University, Kentucky State University, Morehead State University, Murray State University, Northern Kentucky University and Western Kentucky University. At publication time, the Kentucky Community and Technical College System was in the process of developing a center for EE.

In 2013-14, KEEC issued $112,000 in statutorily designated funding to support centers for EE at state colleges and universities, and an additional $8,700 will be released during the 2015-16 biennium. These centers for EE continue to increase student, faculty and staff environmental literacy on their campuses through a combination of course offerings, student life programs and grant funded projects. KEEC and the KUPEE network are engaged in efforts to reactivate centers for EE at the University of Kentucky and the University of Louisville.

Master Plan Development

Lead Agency

- Kentucky Environmental Education Council (KEEC)

Key Partners

- Members of the Interagency Subcommittee on Environmental Education (ISEE)
- Kentucky Association for Environmental Education (KAEE), an affiliate of the North American Association for Environmental Education (NAAEE)
- Kentucky Department of Education (KDE)
- Kentucky University Partnership for Environmental Education (KUPEE)

Kentucky Department of Education

KDE is a partner in the implementation of the KELP and the KGHS program. KDE also administers the Green Ribbon Schools program and is responsible for implementing the provisions of KRS 157.450-455.

Interagency Subcommittee on Environmental Education

The Interagency Subcommittee on Environmental Education is composed of a number of state institutions and programs, including representatives of:

1. Adventure Tourism
2. Cabinet for Health and Family Services
3. Department of Education
4. Department of Energy Development and Independence
5. Department of Parks
6. Division for Air Quality
7. Division of Compliance Assistance
8. Division of Conservation
9. Division of Forestry
10. Division of Waste Management
11. Division of Water
12. Energy and Environment Cabinet
13. Environmental Quality Commission
14. Fish and Wildlife Commission
15. Governor's Office of Agricultural Policy/Facilities
16. KUPEE
17. Nature Preserves Commission

KRS 157.910 establishes the Kentucky Environmental Education Council. It states,

(1) There is hereby established the Kentucky Environmental Education Council, referred to hereafter as the council, to provide leadership and planning for environmental education for the population of Kentucky through the cooperative efforts of educators, government agencies, businesses, and public interests. The council shall be an independent agency and be attached to the Education and Workforce Development Cabinet for administrative purposes.

(2) The nine (9) member council shall be appointed to four (4) year terms by the Governor and be composed of a balance of education, government, industry, and environmental interests. Members appointed by the Governor shall have the authority to carry out the provisions of KRS 157.900-157.915.

(3) The council shall hire an executive director, environmental education specialists, and clerical staff to carry out the functions and duties of the council.

(4) The council members shall receive no compensation, but shall be reimbursed for actual expenses incurred in accordance with state procedures and policies.

(5) The council membership shall elect a chairperson to serve a one (1) year term.

Goals of the 2015-2020 Master Plan

Kentucky's previous master plans have listed recommendations grouped by topic. This master plan is organized differently, listing four primary goals and specific objectives for achieving them.

The reason for this shift is to help EE practitioners feel empowered to take action toward accomplishing the goals and objectives. Work on some of the goals and objectives is already underway but needs to continue or expand. The plan will be published online, and updated annually as progress toward the objectives is attained. These goals and objectives are not listed in order of priority.

KEEC strives to build an environmentally literate citizenry by partnering with KAEE, KUPEE and all other interested organizations to accomplish the following goals. In cases where a lead organization is not listed, all three statewide environmental education organizations (KEEC, KAEE, and KUPEE) will share leadership to achieve this work.

GOALS

1. **Integrate EE into the lifelong learning of Kentuckians.**
   - A. Support implementation of the KELP to enhance EE in public and private K-12 schools.
   - B. Model EE methods and assessments by providing pre-service and in-service EE workshops for administrators, teachers and curriculum developers, including how to holistically integrate EE throughout an entire school.
   - C. Support and/or develop programs that encourage lifelong EE for all Kentuckians.
   - D. Provide ongoing training and resources that encourage all existing EE practitioners and programs, for all ages, to follow the *NAAEE Guidelines for Excellence in Environmental Education*, through the active Kentucky members of Kentucky's NAAEE Guidelines Training Bureau.
   - E. Continue to provide professional development training for nonformal environmental educators, e.g., Project WET, Project Learning Tree, Project WILD, Project Underground, Communicating about Environmental Issues.
   - F. Expand the development of pre-K programs that follow the *NAAEE Early Childhood Environmental Education Programs: Guidelines for Excellence*. (Lead organization: KAEE)
   - G. Research and work towards reinstatement of EE as a theme in the pre-service curriculum through the EPSB. (Lead organization: KUPEE)
   - H. Partner with the KDE to develop KAS training for non-formal environmental educators. (Lead organizations: KAEE and KEEC)
   - I. Continue to support EE professional development through the Professional Environmental Educator Certification course. (Lead organization: KEEC)

2. Expand Kentucky's cohesive and diverse network of EE providers.

A. Identify gaps in Kentucky's existing EE networks and build partnerships with new or existing environmental educators, programs or entities in order to further the reach and expertise of the EE field.
B. Identify barriers that prevent underserved audiences from participating in EE efforts, seek to eliminate these barriers, and increase participation from underserved audiences.
C. Increase the flow of information between EE organizations and environmental educators about quality training, resources and programs.
(Lead organizations: KAEE and KEEC)
D. Work with partners around the Commonwealth to establish 3-4 regional communities of practice for EE.
(Lead organization: KAEE)
E. Continue the work of the KAEE Consortium by meeting at least twice per year, to network and provide guidance for diversifying EE in Kentucky.
(Lead organization: KAEE)

3. Increase Kentuckians' awareness of and support for EE.

A. Create and implement a legislative plan to support EE programs.
B. Create and implement a marketing plan to increase public awareness of EE and its mission.
C. Conduct a needs assessment to better facilitate experiences that connect the public with the outdoors.
(Lead organization: KAEE)
D. Continue to assess Kentuckians' environmental knowledge, attitudes and behaviors through a survey or other instrument, and analyze results to share with Kentuckians and identify priorities for the field of EE.
(Lead organization: KEEC)

4. Verify the success of EE in Kentucky through research, development and evaluation of environmental education efforts.

A. Identify and address the top five research priorities to improve delivery and demonstrate the importance of EE in Kentucky.
(Lead organization: KUPEE)
B. Provide training on evaluating programs using the NAAEE *Guidelines for Excellence in Environmental Education*.
C. Survey graduates of the Professional Environmental Educator Certification course to determine the impact of the program for individuals, as required for programs accredited through NAAEE.
(Lead organization: KEEC)

Acronyms

EE: environmental education

EPSB: Education Professional Standards Board

ISEE: Interagency Subcommittee on Environmental Education

KAEE: Kentucky Association for Environmental Education

KAS: Kentucky Academic Standards

KDE: Kentucky Department of Education

KEEC: Kentucky Environmental Education Council

KELP: Kentucky Environmental Literacy Plan

KGHS: Kentucky Green and Healthy Schools

KRS: Kentucky Revised Statutes

KUPEE: Kentucky University Partnership for Environmental Education

NAAEE: North American Association for Environmental Education

Contributors to the 2015-2020 Master Plan included:

More than 175 individuals participated in regional forums to gather input for *Land, Legacy and Learning IV*. Sign in sheets gave participants the "Opt In" opportunity to be listed as a contributor to this document. Those names are listed below. Members of the drafting committee are listed in bold font. If you attended a regional forum and would like to be listed as a contributor, please contact the KEEC at 502-564-5937.

Vic Adams,
Southeast Kentucky Community & Technical College

Jennifer Adler,
Kentucky Association for Environmental Education

Lisa Ahlstedt,
Southeast Kentucky Community & Technical College

David Allen,
Murray State University

Joyce Bender,
Kentucky State Nature Preserves Commission

Billy Bennett,
Eastern Kentucky University

Eleanor Bower,
Sierra Club

Vivian Bowles,
Kit Carson Elementary School

Katie Brandenburg,
Bowling Green Daily News

Lona Brewer,
Department for Energy Development and Independence

Shawn Brown,
Ashland Community & Technical College

Horace Brown,
Kentucky Environmental Education Council

Susan Brown,
Pine Mountain Settlement School

Rebecca Bryant,
Mammoth Cave National Park

Wesley Bullock,
Kentucky Environmental Education Council

Roberta Burnes,
Division for Air Quality

Martha Casher,
Kentucky School Boards Association

David Childress,
Ashland Community & Technical College

Sarah Craighead,
Mammoth Cave National Park

Scott Darst,
Madison County Extension

Rhonda Davis,
Northern Kentucky University

Lisa Deavers,
Kentucky State Parks

Emily DeMoor,
Midway University

Lisa Edmonds,
Ryle High School

John Eisiminger,
Division of Compliance Assistance

Bonnie Embry,
University of Kentucky

Debra Erikson,
Murray State University

Meg Finn,
Warren Central High School

D. James Fox,
Crawford Middle School

Brent Fryrear,
Partnership for a Green City

Ann Fulmer,
Boyd County High School

Nancy Givens

Rebecca Glasscock,
Bluegrass Community & Technical College

Gwen Goffner,
Cane Run Elementary

April Haight,
Morehead State University

Iin Handayani,
Murray State University

Jacqueline Hansen,
Murray State University

Billie Hardin,
Kentucky Community & Technical College System

Eileen Hardy,
Department for Energy Development and Independence

Hannah Helm

Tom Herman,
Environmental Quality Commission

Ashley Hoffman,
Kentucky Association for Environmental Education

Emily Hogue,
Division of Water

Ronn Holmes,
Hazard Community & Technical College

Annie Holt,
Lost River Cave

Jenny Howard Owen,
Kentucky Association for Environmental Education

Jennifer Hubbard-Sánchez,
Kentucky State University

Sarah Hume,
Northern Kentucky University

Jeanine Huss,
Western Kentucky University

Brandi James,
Ashland Community & Technical College

Jesse James,
Ashland Community & Technical College

Josh Johnson,
Mammoth Cave National Park

Tracy Knowles,
Bluegrass Community & Technical College

Isaac Kremer,
Discover Downtown Middlesboro

Jennifer Lynn,
University of Kentucky 4-H

Jason Marion,
Eastern Kentucky University

J. Marshall,
Morehead State University

John McGlone,
Ashland Community & Technical College

Maryanne E. McGowan,
Duke Energy

Cheryl Messenger,
Mammoth Cave National Park

Logan Minter,
Ashland Community & Technical College

William Mitchner,
Murray State University

Maggie Morgan,
Jackson Purchase Foundation

Hilary Neff,
Mountain Garden Initiative

Ashley Osborne,
University of Kentucky Extension

Valerie Osborne,
Pine Mountain Settlement School

Lynn Patterson,
Murray State University

Sadie Peña,
Community Action Council

Rev. David Powers,
The Piarist School

Karen Pratt,
Eastern Kentucky University

Kristyn Presnell,
Eastern Kentucky University

Mim Pride,
Pine Mountain Settlement School

Karen Reagor,
Kentucky National Energy Education Development Project

Brian Reeder,
Morehead State University

Merin Roseman,
Shaker Village of Pleasant Hill

Maxine Rudder,
Bluegrass Greensource

Rosie Santos,
Northern Kentucky University

Elizabeth Schmitz,
Kentucky Environmental Education Council

Michelle Shane,
Kentucky Environmental Education Council

Henrietta Sheffel,
Kentucky Association for Environmental Education

Ray Smith

Amy Sohner,
Bluegrass Greensource

Debra Spillman,
Mammoth Cave National Park

Brenda Stokes,
Jefferson County Public Schools

Shannon Trimboli,
Western Kentucky University

John Walker

Sharon Waltrip,
Land Between the Lakes

Melinda Wilder,
Eastern Kentucky University

Terry Wilson,
Western Kentucky University

Angie Wingfield,
Division of Waste Management

Kim Yates,
Northern Kentucky University

Carroll Young,
Frankfort Parks and Recreation

Jill Young,
Parks Forever Consulting

Mark Young,
Parks Forever Consulting

Greg Zahradnik,
Sullivan College of Technology and Design

Appendix A: Summary of NAAEE Guidelines for Learning (K-12)

Strand 1 - Questioning, Analysis and Interpretation Skills

A. Questioning
B. Designing Investigations
C. Collecting information
D. Evaluating accuracy and reliability
E. Organizing information
F. Working with models and simulations
G. Drawing conclusions and developing explanations

Strand 2 - Knowledge of Environmental Processes and Systems

2.1 The earth as a physical system

A. Processes that shape the earth
B. Changes in matter
C. Energy

2.2 The living environment

A. Organisms, populations, and communities
B. Heredity and evolution
C. Systems and connections
D. Flow of matter and energy

2.3 Humans and their societies

A. Individuals and groups
B. Culture
C. Political and economic systems
D. Global connections
E. Change and conflict

2.4 Environment and society

A. Human/environment interactions
B. Places
C. Resources
D. Technology
E. Environmental Issues

Strand 3 - Skills for Understanding and Addressing Environmental Issues

3.1 Skills for analyzing and investigating environmental issues

A. Identifying and investigating issues
B. Sorting out the consequences of issues
C. Identifying and evaluating alternative solutions and courses of action
D. Working with flexibility, creativity, and openness

3.2 Decision-making and citizenship skills

A. Forming and evaluating personal views
B. Evaluating the need for citizen action
C. Planning and taking action
D. Evaluating the results of actions

Strand 4 - Personal and Civic Responsibility

A. Understanding societal values and principles
B. Recognizing citizen' rights and responsibilities
C. Recognizing efficacy
D. Accepting personal responsibility

Appendix B: Summary of NAAEE Guidelines for the Preparation and Professional Development of Environmental Educators

Theme 1 - Environmental Literacy: Educators must be competent in the skills and understandings outlined in Excellence in Environmental Education-Guidelines for Learning (K-12).

- 1.1 Questioning, analysis, and interpretation skills
- 1.2 Knowledge of environmental processes and systems
- 1.3 Skills for understanding and addressing environmental issues
- 1.4 Personal and civic responsibility

Theme 2 - Foundations of environmental education: Educators must have a basic understanding of the goals, theory, practice, and history of the field of environmental education.

- 2.1 Fundamental characteristics and goals of environmental education
- 2.2 How environmental education is implemented
- 2.3 The evolution of the field

Theme 3 - Professional responsibilities of the environmental educator: Educators must understand and accept the responsibilities associated with practicing environmental education.

- 3.1 Exemplary environmental education practice
- 3.2 Emphasis on education, not advocacy
- 3.3 Ongoing learning and professional development

Theme 4 - Planning and implementing environmental education: Educators must combine the fundamentals of high-quality education with the unique features of environmental education to design and implement effective instruction.

- 4.1 Knowledge of learners
- 4.2 Knowledge of instructional methodologies
- 4.3 Planning for instruction
- 4.4 Knowledge of environmental education materials and resources
- 4.5 Technologies that assist learning
- 4.6 Settings for instruction
- 4.7 Curriculum planning

Theme 5 - Fostering learning: Educators must enable learners to engage in open inquiry and investigation, especially when considering environmental issues that are controversial and require students to seriously reflect on their own and others' perspectives.

- 5.1 A climate for learning about and exploring the environment
- 5.2 An inclusive and collaborative learning environment
- 5.3 Flexible and responsive instruction

Theme 6 - Assessment and evaluation: Environmental educators must possess the knowledge, abilities, and commitment to make assessment and evaluation integral to instruction and programs.

- 6.1 Learners outcomes
- 6.2 Assessment that is part of instruction
- 6.3 Improving instruction
- 6.4 Evaluating programs

Appendix C: Summary of NAAEE Guidelines for Excellence in Nonformal Environmental Education Programs

Key Characteristic 1 - Needs assessment: Nonformal environmental education programs are designed to address identified environmental, educational, and community needs and to produce responsive, responsible benefits that address those identified needs.

- 1.1 Environmental issue or condition
- 1.2 Inventory of existing programs and materials
- 1.3 Audience needs

Key Characteristic 2 - Organizational needs and capacities: Nonformal environmental education programs support and complement their parent organization's mission, purpose, and goals.

- 2.1 Consistent with organizational priorities
- 2.2 Organization's need for the program identified
- 2.3 Organization's existing resources inventoried

Key Characteristic 3 - Program scope and structure: Nonformal environmental education programs should be designed with well-articulated goals and objectives that state how the program will contribute to the development of environmental literacy.

- 3.1 Goals and objectives for the program
- 3.2 Fit with goals and objectives of environmental education
- 3.3 Program format and delivery
- 3.4 Partnerships and collaboration

Key Characteristic 4 - Program delivery resources: Nonformal environmental education programs require careful planning to ensure that well-trained staff, facilities, and support materials are available to accomplish program goals and objectives.

- 4.1 Assessment of resources needs
- 4.2 Quality instructional staff
- 4.3 Facilities management
- 4.4 Provision of support materials
- 4.5 Emergency planning

Key Characteristic 5 - Program quality and appropriateness: Nonformal environmental education programs are built on a foundation of quality instructional materials and thorough planning.

- 5.1 Quality instructional materials and techniques
- 5.2 Field testing
- 5.3 Promotion, marketing, and dissemination
- 5.4 Sustainability

Key Characteristic 6 - Evaluation: Nonformal environmental education programs define and measure results in order to improve current programs, ensure accountability, and maximize the effects of future efforts.

- 6.1 Determination of evaluation strategies
- 6.2 Effective evaluation techniques and criteria
- 6.3 Use of evaluation results

Appendix D: Summary of NAAEE Guidelines for Excellence in Environmental Education Materials

Key Characteristic 1 - Fairness and accuracy: EE materials should be fair and accurate in describing environmental conditions, problems, and issues, and in reflecting the diversity of perspectives on them.

- 1.1 Factual Accuracy
- 1.2 Balanced presentation of differing viewpoints and theories
- 1.3 Openness to inquiry
- 1.4 Reflection of diversity

Key Characteristic 2 - Depth: EE materials should foster an understanding and appreciation of environmental concepts, conditions, and issues, as appropriate for different developmental levels.

- 2.1 Focus on concepts
- 2.2 Concepts in context
- 2.3 Attention to different scales

Key Characteristic 3 - Emphasis on skills building: EE materials should build lifelong skills that enable learners to address environmental issues.

- 3.1 Critical and creative thinking
- 3.2 Applying skills to issues
- 3.3 Action skills

Key Characteristic 4 - Action orientation: EE materials should promote civic responsibility, encouraging learners to use their knowledge, personal skills, and assessments of environmental issues as a basis for action.

- 4.1 Sense of personal stake and responsibility
- 4.2 Self-efficacy

Key Characteristic 5 - Instructional orientation: EE materials should rely on instructional techniques that create an effective learning environment.

- 5.1 Learner-centered instruction
- 5.2 Different ways of learning
- 5.3 Connection to learners' everyday lives
- 5.4 Expanded learning environment
- 5.5 Interdisciplinary
- 5.6 Goals and objectives
- 5.7 Appropriateness for specific learning settings
- 5.8 Assessment

Key Characteristic 6 - Usability: EE materials should be well designed and easy to use.

- 6.1 Clarity and logic
- 6.2 Easy to use
- 6.3 Long lived
- 6.4 Adaptable
- 6.5 Accompanied by instruction and support
- 6.6 Make substantiated claims
- 6.7 Fit with state or local requirements

Appendix E: Summary of NAAEE Early Childhood Environmental Education Programs: Guidelines for Excellence

Key Characteristic 1 - Program Philosophy, Purpose and Development

1.1 Focus on nature and the environment
1.2 Focus on education of young children
1.3 Culturally appropriate goals, objectives, and practices
1.4 Environmental literacy: board, staff, and providers
1.5 Health and safety
1.6 Ongoing evaluation and assessment
1.7 Partnerships
1.8 Interpersonal and intergenerational relationships

Key Characteristic 2 - Developmentally Appropriate Practices

2.1 Based on research and theory
2.2 Authentic experiences
2.3 Child-directed and inquiry-based
2.4 The whole child

Key Characteristic 3 - Play and Exploration

3.1 Use of natural world and natural materials
3.2 Play and the role of adults

Key Characteristic 4 - Curriculum Framework for Environmental Learning

4.1 Social and emotional growth
4.2 Curiosity and questioning
4.3 Development of environmental understandings
4.4 Skills for understanding the environment
4.5 A personal sense of responsibility and caring
4.6 Physical health and development

Key Characteristic 5 - Places and Spaces

5.1 Spaces and places to enhance development
5.2 Natural components
5.3 Comfortable for both children and adults
5.4 Maintenance and usability
5.5 Health, safety, and risk
5.6 Environmental sustainability

Key Characteristic 6 - Educator Preparation

6.1 Foundations of early childhood environmental education
6.2 Professional responsibilities of the educator
6.3 Environmental literacy
6.4 Planning and implementing environmental education
6.5 Fostering learning
6.6 Assessment and evaluation

2014 Survey of Kentuckians' Environmental Knowledge, Attitudes and Behaviors

Survey conducted by Issues & Answers Network, Inc. on behalf of the Kentucky Environmental Education Council

In 1990, the Kentucky Environmental Education Council (KEEC), a state agency, was established to improve environmental education in the Commonwealth. The General Assembly charged the agency with a number of tasks, one of which is to "monitor and report periodically on environmental literacy in Kentucky."

KEEC, working with the University of Kentucky Survey Research Center, completed the first survey of environmental knowledge, attitudes and behaviors in 1999, the second in 2004 and the third in 2009. In 2014, KEEC awarded Issues & Answers Network, Inc. (I&A) the contract to complete a fourth iteration of the study, which was conducted between May 15 and June 1, 2014.

As in the first three versions, this survey does not actually measure the environmental literacy of Kentuckians. Environmental literacy is such a complex concept that it is difficult to define, let alone measure. This survey is simply a snapshot of Kentuckians' basic knowledge, attitudes and behaviors about the environment.

Highlighted 2014 Survey Results

- Kentuckians continue to indicate an overwhelming support (96 percent) for teaching environmental education in schools.
- Almost all Kentuckians (93 percent) believe that it is possible to protect both the environment and have a healthy economy.
- Consistent with their support for environmental education in schools, Kentuckians indicate that knowing about environmental problems is important to them.
- Despite support for environmental education in schools, Kentuckians did not demonstrate high levels of environmental knowledge or understanding of their personal environmental impact.

Environmental Knowledge

The first section of the survey measured Kentuckians' knowledge levels of current environmental topics. The questions were designed at the middle school student level. The majority of respondents gave the correct responses to many, although not all, questions. However, a very significant minority were not able to answer many of these basic questions correctly.

A General Environmental Knowledge Score summarizing the average level of environmental knowledge in the Commonwealth was at 55 percent (See Graph 1). This score indicates that the average Kentuckian is able to answer correctly slightly more than half of the environmental knowledge questions included on the survey. This result leaves ample room for improvement.

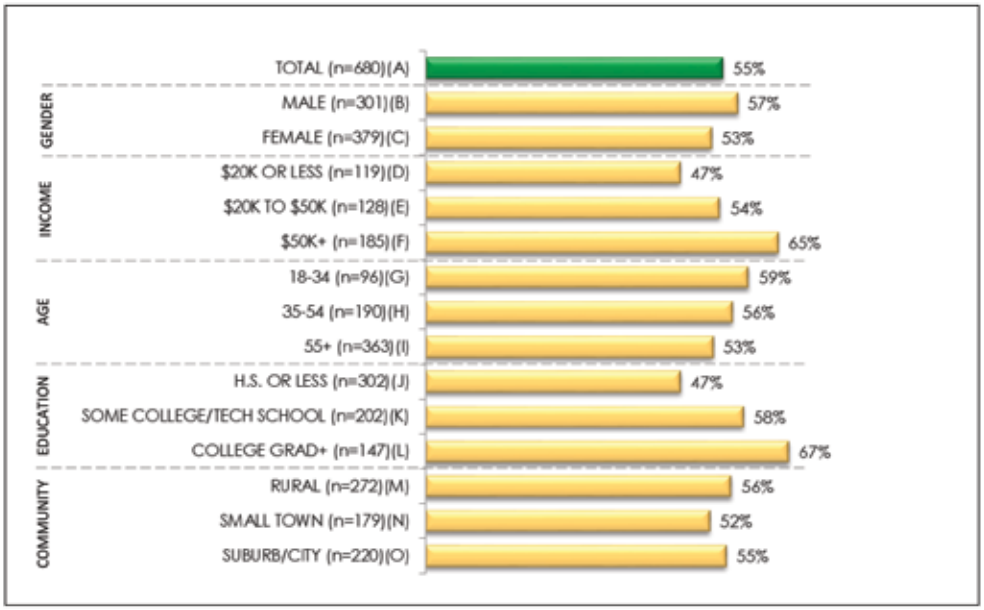
The score revealed several discrepancies in the level of general knowledge, depending on respondents' socio-economic levels. Specifically, the level of respondents' environmental knowledge was directly proportional to their education and income levels. Respondents with the lowest educational attainment and the lowest income also had the lowest general knowledge about the natural world. These patterns were statistically significant.

Even though water pollution and water quality were cited among Kentucky's leading environmental problems (mirroring national and global surveys), almost three-quarters (74 percent) of Kentuckians were unable to identify correctly run-off from lawns and farms as the most common source of water pollution in the Commonwealth. However, the percentage of respondents who answered correctly has increased significantly – from 16 percent in 2004 to 27 percent in 2014.

In 2004, more than one-half of Kentuckians (57 percent) incorrectly identified factory waste as the main source of water pollution. Ten years later, that percentage has fallen to 37 percent, indicating a better understanding of the issue.

Taken together, this also suggests that individuals are beginning to understand better how their personal actions impact the environment, and that industry is not the primary instigator of the Commonwealth's environmental concerns.

Graph 1: General Environmental Knowledge Score



Wetlands

In 2014, almost two-thirds (65 percent) of Kentuckians correctly stated that the primary benefits of wetlands center around their help in cleaning water systems.

It is also important to note that this year more people said they did not know the answer, instead of picking the wrong response. To illustrate, 20 percent in 2014 gave the "don't know" response, as compared 15 percent in 1999.

Electricity Generation

In 2014, almost two-thirds (64 percent) of Kentuckians correctly identified coal-burning power plants as the major source of electricity generation in the U.S. According to the U.S. Energy Information Administration (EIA), in 2013, coal produced 39 percent of the nation's power. These results represent a significant increase over the level of knowledge on this topic on the 1999 survey when 43 percent of Kentuckians answered correctly.

The largest percentage (21 percent) of the remaining respondents continues to identify hydroelectric generation as the major source, even though it actually provides only 7 percent of the nation's electricity, according to the EIA. Only 8 percent correctly cited nuclear power plants which produced 19 percent of the nation's electricity in 2013.

Despite the improvement in knowledge, the current figures are still of some concern in a Commonwealth where electricity costs are relatively low due to Kentucky's proximity to coal, and where coal, the jobs it creates, and the way in which it is mined are major sources of public debate.

Renewable Resources

In 2014, about six in 10 Kentuckians (63 percent) were able to identify correctly renewable resources such as solar energy and trees. This result is consistent with the 2009 findings. Both years showed significant upswings in respondents' knowledge levels in comparison to years 2004 (55 percent) and 1999 (59 percent). However, this still means that over one-third (37 percent) of residents of the Commonwealth either mistakenly believed that coal, oil, iron and other metals were renewable resources or did not know the answer.

Carbon Dioxide

Those surveyed in 2014 were also asked to identify the main source of carbon dioxide in the atmosphere in a multiple choice question. Carbon dioxide is among the greenhouse gases implicated in global climate change. About six in 10 Kentuckians (58 percent) correctly identified emissions from motor vehicles as the highest contributor, which was significantly less than in 1999 (72 percent).

Biodiversity

When asked to choose the best definition of biodiversity, 28 percent in 2014 stated correctly that it was "the many types of plants and animals". This result represents a dramatic and unexpected drop in comparison to the findings noted in previous years, and it is the lowest percentage observed to date.

In 2014, the response that was given most often incorrectly defined biodiversity as the "many differing opinions on the environment". Until 2014, this definition has never been selected more often than the correct one, although, historically, it was always a close second.

Finally, the "don't know" answer was given significantly more often than ever before (18 percent in 2014, as compared to 12 percent in 1999).

In a related question that asked about the most common reason for the extinction of animals and plants, habitat loss was correctly cited by over two-thirds (67 percent) of Kentuckians. This is the highest percentage to date, indicating a significant uptick in respondents' knowledge levels in comparison to previous years.

Litter

In a question added in 2009, Kentuckians were asked to select items which they considered to qualify as litter. In 2014, 9 percent answered this question correctly by choosing all three options: plastic bottles, cigarette butts, as well as banana peels and apple cores. While in both surveys, the majority of individuals automatically cited plastic bottles and cigarette butts as litter, they struggled with biodegradable litter such as remnants of fruit. Only 10 percent in 2014 and 15 percent in 2009 qualified apple cores and banana peels as litter.

Sources of Information about the Environment

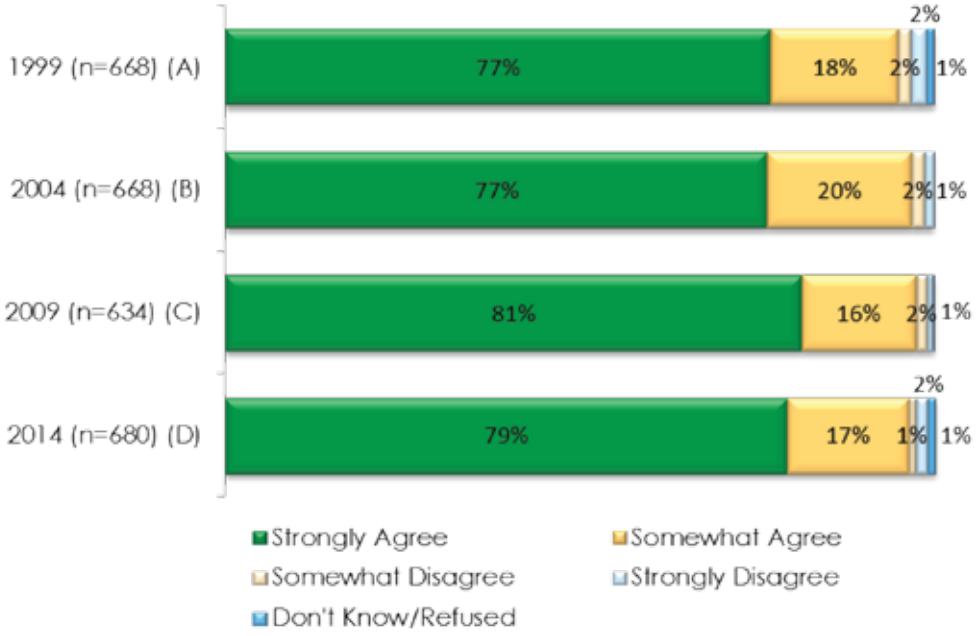
The sources from which Kentuckians got most of their environmental information were gauged for the first time in 2009. Since then, media such as television and radio have been the most often cited source with 50 percent of respondents choosing it this year and only slightly more (54 percent) citing it five years ago. The Internet follows as a distant second with 17 percent of mentions now, and a similar number (14 percent) noted in 2009. In 2014, newspapers were a significantly less cited source of environmental information (20 percent in 2009 vs. 14 percent now). Conversely, friends and family have gained a greater role (4 percent vs. 2 percent) but they still remain a marginal source.

Environmental Attitudes

The next set of survey questions gauged Kentuckians' opinions on various environmental topics. Among them, respondents were asked about their interest in knowing about environmental problems. In 2014, 94 percent reported that knowing about these problems was important to them – a result which was consistent with the 95 percent noted in all three previous surveys.

In a question asked since the first survey in 1999, 96% of survey respondents agreed that environmental education should be taught in schools, a result consistent across all four iterations of this survey (See Graph 2: Environmental Education in Schools).

Graph 2: Environmental Education in Schools



Almost all Kentuckians (93 percent) believed that it was possible to protect both the environment and have a healthy economy (See Graph 3). On an overall basis (considering those who strongly agree and somewhat agree with this perception), this result has been stable across the past 15 years.

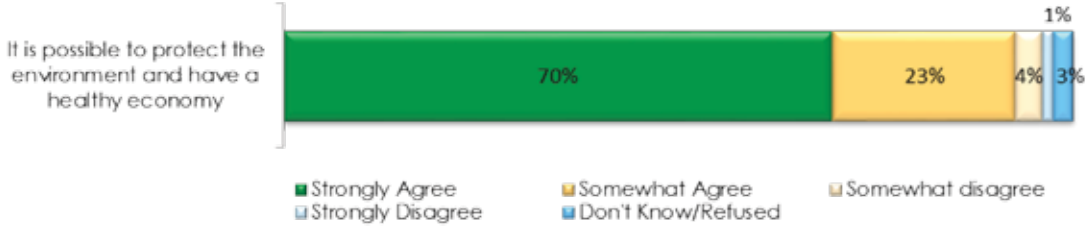
In an open-ended question asking for opinions on Kentucky's top environmental problem, 22 percent of respondents listed water pollution, quality, and/or protection. Kentuckians are also concerned about air pollution (8 percent), coal/surface mining/strip mining/mountaintop removal (8 percent), and pollution in general (7 percent).

In a question that was first included on the 2009 survey, Kentuckians were asked whether or not they agreed that their daily actions impacted the environment. In the 2014 survey, 87 percent agreed (strongly or somewhat) with this statement. The most affluent individuals ($50,000+ income bracket) were the most likely to believe that their daily actions had an impact on the environment at 96 percent. That compares to 87 percent in the $20,000-$50,000 segment and 80 percent in the under $20,000 group.

Perceptions of Water and Air Quality

Despite recurring stated concerns about water quality in Kentucky across all survey years, Kentuckians tended to believe that air and water quality in the areas where they lived was better than air and water quality in the U.S. in general. For example, currently 60 percent rated the local air quality as excellent or good. The average rating was

Graph 3: Environmental Protection and Healthy Economy



2.65, or good, on the 1-to-4 scale (where 1 stood for poor and 4 meant excellent). In comparison, only 39 percent rated the overall air quality in the U.S. as excellent or good with an average rating much closer to fair (2.32 on the 4-point scale). Historical ratings followed similar patterns. (See Graphs 4 and 5.)

Protection of Endangered Species, Wild and Natural Areas, and Wetlands

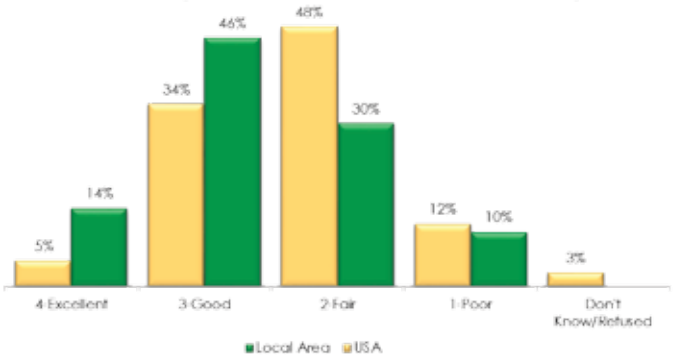
In 2014, just over two-thirds (67 percent) of Kentuckians believed that endangered species of plants and animals were adequately protected in the Commonwealth. Moreover, two-thirds (66 percent) of Kentuckians agreed (strongly or somewhat) that wild and natural areas were adequately protected in the Commonwealth. Even though, just as with the two previous questions, the overall results have remained essentially stable, the strength of respondents' convictions has intensified. In the two most recent surveys, they were significantly more likely to strongly agree with this statement than before. In 2014, 34 percent strongly agreed that wild areas are adequately protected as compared to 13 percent in 1999.

Similarly, when asked if specific areas of the natural environment in Kentucky were adequately protected, respondents' perceptions have not changed much overall across the years. For example, over one-half (55 percent) of Kentuckians agreed (strongly or somewhat) that wetlands were adequately protected. However, respondents in 2014 were significantly more likely to strongly agree with this statement than in any of the previous surveys. Importantly, in the 2014 survey, they were also much more likely to say they did not know whether or not wetlands were adequately protected.

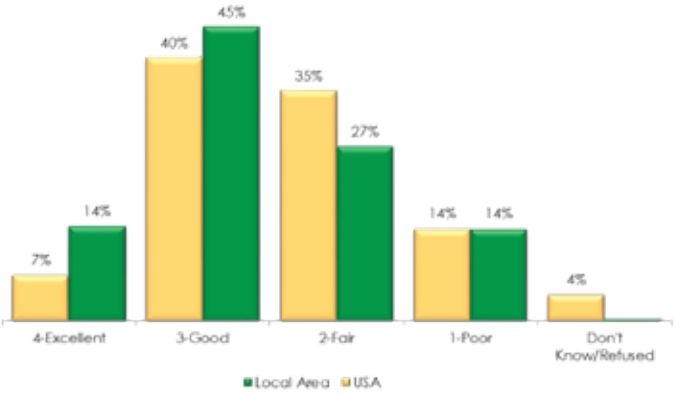
Climate Change

In 2009, respondents were asked for the first time whether or not they agreed that human activity was causing global climate change. A total of 75 percent gave a positive answer to this question. In 2014, the overall result was very similar at 72 percent. Kentuckians were also observably more likely to say they did not know whether or not human activity contributed to climate change.

Graph 4: Overall Water Quality



Graph 5: Overall Air Quality



Kentucky's Energy Future

In a related question, also added to the survey in 2009, respondents were asked to indicate what they thought was the most important strategy in addressing the energy future. In 2014, a total of 42 percent cited developing alternative energy such as solar or wind power, 34 percent mentioned developing technology that would make the mining and burning of coal better for the environment, and

22 percent thought that developing education and incentives to increase conservation would work best.

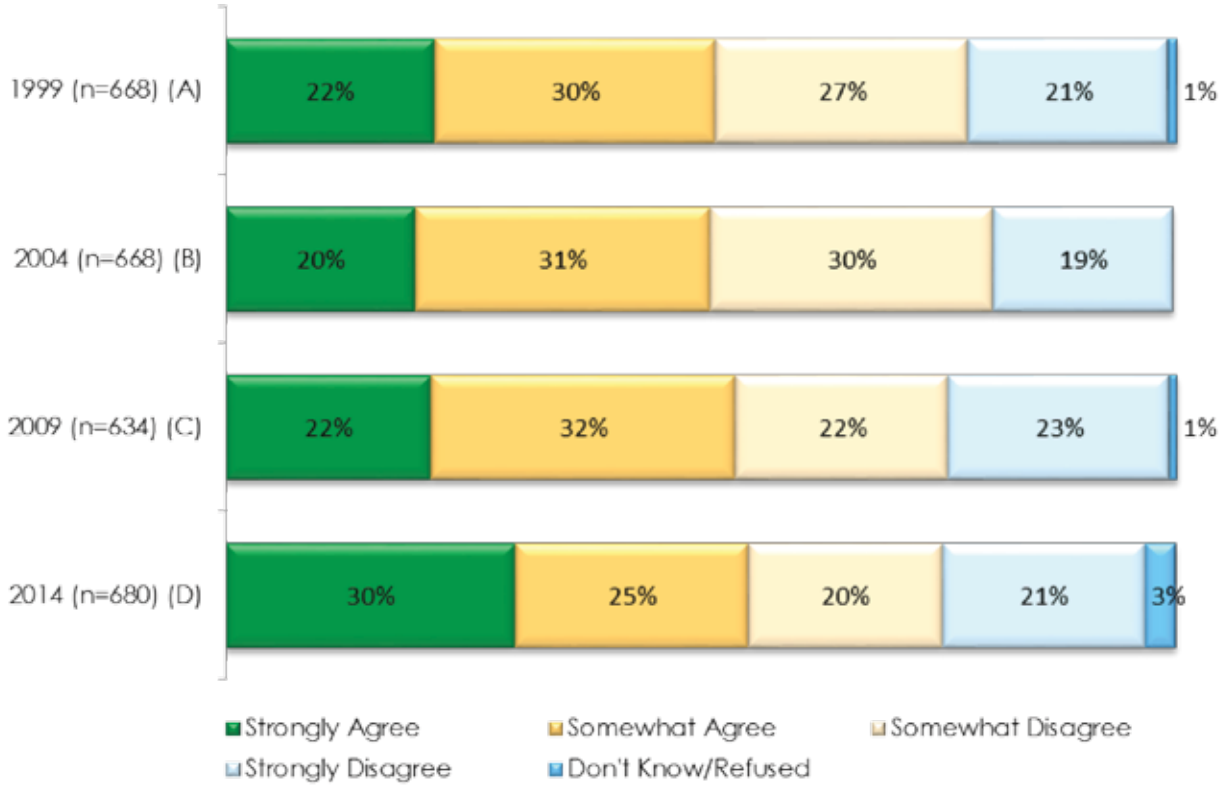
Since 2009, the importance of developing technology to make coal less harmful for the environment has increased significantly from 23 percent to 34 percent. At the same time, the importance of developing alternative energy sources has dropped notably from 52 percent to 42 percent.

Use of Private Land

In perhaps the most controversial question of the survey, respondents were asked to agree or disagree whether private landowners should be able to do whatever they wished with their own land (See Graph 6). As in the previous three surveys, 2014 respondents were polarized in their opinions with 55 percent expressing agreement with this statement and 41 percent expressing disagreement. By comparison, 52 percent agreed with it in 1999, 51 percent in 2004 and 54 percent in 2009.

Currently, the percentage of those who strongly agreed showed a significant lift. In 2014, it was 30 percent as compared to about 22 percent from 1999 - 2009. In 2014, Kentuckians are also much more likely to say they did not have an opinion on this topic.

Graph 6: Private Landowners Should Be Able to Use Their Land in Any Way They See Fit



Environmental Behaviors

The final section of the survey presents a discussion of self-reported behaviors whose goal is to protect the environment. Respondents were asked to cite behaviors or beliefs that would have a positive effect on the natural environment.

Overall, Kentuckians surveyed across all four research years indicated an interest in protecting the environment. However, in 2014, in comparison to previous survey rounds, several metrics showed somewhat lower results. For example, fewer than six in 10 respondents (56 percent) reported donating time or money to support environmental causes. This represents a significant drop as compared to the previous surveys and is the lowest result noted to date. To illustrate, 64 percent gave the same response in 1999, 60 percent in 2004 and 66 percent in 2009.

Recycling and Reducing Waste at Home

Household waste reduction and recycling are some of the most widely recognized ways to protect the environment and a fairly large number reported engaging in these behaviors. Specifically, 90 percent said they frequently or sometimes made an attempt to reduce the amount of waste produced in their household. This result is consistent with previous survey rounds. Additionally, 75 percent separated household waste for recycling. This is comparable to the findings noted in previous years.

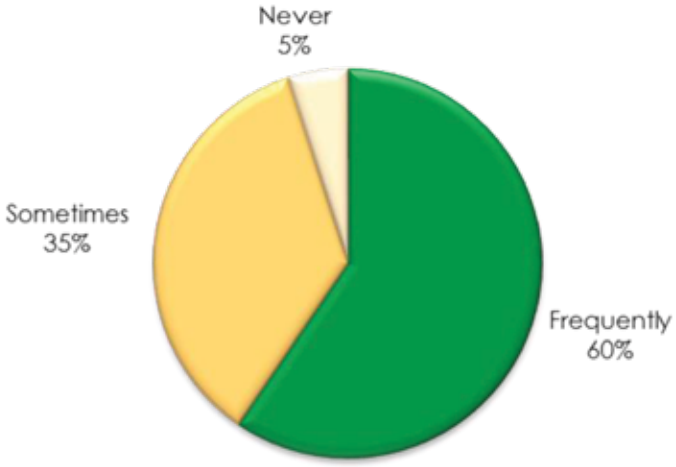
Buying Local

The vast majority of Kentuckians (95 percent) stated that they frequently or sometimes bought locally grown foods and other products (See Graph 7). This result is consistent with the findings of the 2009 survey (95 percent).

Volunteering

Currently, 40 percent of Kentuckians volunteer for environmental projects, such as river clean-ups or tree plantings frequently or sometimes. This is comparable to the 41 percent noted five years ago but both results are significantly lower than the reported participation in environmental projects in 2004 (70 percent) and 1999 (69 percent).

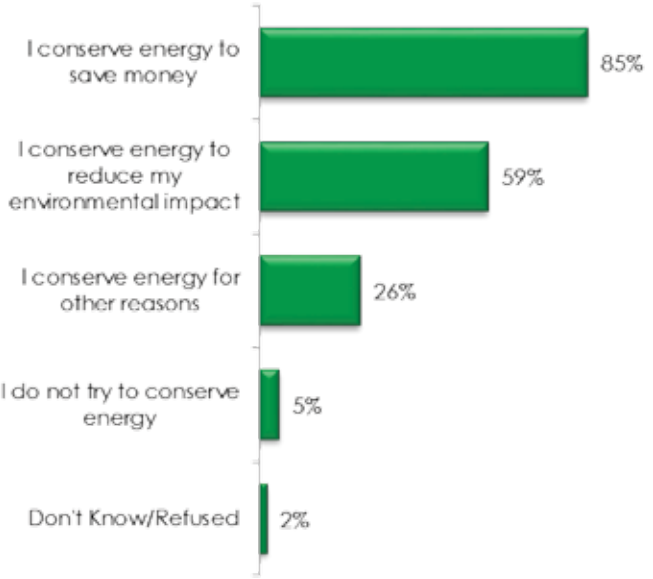
Graph 7: Buying Locally Grown Foods and Other Products



Energy Conservation

In a new question last year, those surveyed were asked about their reasons for energy conservation efforts (see Graph 8). Only 5 percent of Kentuckians did not make any attempt to conserve energy. The majority (85 percent) was motivated mostly by saving money. However, approximately six in 10 (59 percent) conserved energy in a conscious effort to reduce their environmental impact. Respondents were directed to select all answers that applied to them, so the percentage of responses adds up to more than 100.

Graph 8: Reasons for Conserving Energy



Willingness to Pay More for Energy/Services

In the 2014 survey, just over one-half (54 percent) of Kentuckians claimed they would be willing to pay more for energy and/or services if it helped to protect the environment. While the percentage of those willing to pay a premium has been gradually declining ever since the first survey in 1999 (it dropped from 75 percent to 62 percent in 2004 and 59 percent in 2009), the current result is the lowest to date.

Socio-Economic Factors and Their Effect on Environmental Knowledge

Along with the knowledge, attitude and behavior questions, those surveyed were asked to report information such as age, education level, gender, income and type of community in which they lived. For some survey questions, there were statistically significant differences in the way these socio-economic factors affected respondents' answers. For example, women appeared to have slightly lower general environmental knowledge than men, and small-town residents appeared to have slightly lower knowledge than residents of rural areas and suburbia/cities. Moreover, the level of knowledge seemed to be inversely proportional to respondents' ages (i.e., older respondents were somewhat less knowledgeable on environmental topics than younger ones).

In line with their better knowledge of environmental facts, younger respondents were statistically more likely to link their own actions to environmental problems, and be stronger supporters of environmental education in schools. Younger respondent segments were more likely to agree that their daily actions had an impact on the environment. Respondents aged 18-54 were significantly more likely than the older generation to donate time and money to environmental causes. Similarly, younger respondents were more likely to volunteer frequently or sometimes for environmental projects.

However, the older Kentuckians were more likely to report methodical behaviors that required daily effort, such as recycling. Older respondents were less likely to believe that it is possible to protect the environment and have a healthy economy at the same time.

While respondents age 35-54 seemed to put more trust in alternative energy sources, such as solar or wind power, as the solution to the energy crisis, those age 65+ were most likely to cite developing technology that would make the mining and burning of coal better for the environment.

Other than age, the most significant differences on the survey were related to education level and gender. On six of the eight knowledge questions, individuals with more education did statistically better than their counterparts with less education with the likelihood to give correct answers rising steadily in proportion to the level of education. Men were also more likely than women to give correct answers to the knowledge questions, but women were significantly more concerned about the environment. Following the patterns noted in previous surveys, men were significantly more likely to believe that endangered species, wetlands and natural areas are adequately protected in Kentucky.

Survey Methodology

Survey methodology was based on random digit dialing of 680 interviews, 238 (35 percent) via cell phone and 442 (65 percent) via landline. The interviews were sampled proportionally by county, with quotas based on regions established by Kentucky Educational Cooperatives (see Table 1: Survey Quota Breakdown). Interviews averaged 12 minutes in length. Please note that all percentages have been rounded to the nearest whole number for easier reading and that there is a margin of error of +4 percent at a 95 percent confidence interval.

Table 1: Survey Quota Breakdown

REGION	PROPORTION OF ADULT POPULATION	ACTUAL SAMPLE SIZE
Green River	17%	117
Central Kentucky	17%	117
Jefferson / Louisville area	17%	116
Eastern Kentucky	6%	42
Kentucky Valley	5%	36
Northern Kentucky	9%	61
Ohio Valley	7%	45
Southeast / South Central	10%	68
Western Kentucky	12%	78

Published by

25 Years

Kentucky Environmental Education Council

800-882-5271
keec.ky.gov

Printed with funds generously donated by the Institute for Healthy Air, Water + Soil.

INSTITUTE FOR HEALTHY
AIR WATER & SOIL

Kentucky
UNBRIDLED SPIRIT