



The National Environmental Education Advisory Council



2015 Report to the U.S. Environmental Protection Agency Administrator



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Acronyms

AFWA	Association of Fish and Wildlife Agencies
C&NN	Children and Nature Network
CEQ	White House Council on Environmental Quality
CLEAN	Climate Literacy and Energy Awareness Network
CREEC	California Regional Environmental Education Community
DPI	Decorative Panels International
ED-GRS	U.S. Department of Education Green Ribbon Schools
EE	environmental education
EEAP	environmental education action plan
ELP	environmental literacy plan
EPA	U.S. Environmental Protection Agency
FWS	U.S. Fish and Wildlife Service
LEED	Leadership in Energy and Environmental Design
NAAEE	North American Association for Environmental Education
NASA	National Aeronautics and Space Administration
NCLI	No Child Left Inside
NEEA	National Environmental Education Act
NEEAC	National Environmental Education Advisory Council
NEEF	National Environmental Education Foundation
NEON	National Ecological Observatory Network
NGO	nongovernmental organization
NOAA	National Oceanic and Atmospheric Administration
NPS	U.S. National Park Service
NSF	National Science Foundation
NWF	National Wildlife Federation
OEE	U.S. EPA Office of Environmental Education
PEYA	President's Environmental Youth Award
PIAEE	Presidential Innovation Awards for Environmental Educators
PLT	Project Learning Tree
STEM	science, technology, engineering, and math
TERC	Technical Education Research Centers
UL	Underwriters Laboratories
USGBC	U.S. Green Building Council

List of Photos

Cover (top). Native American canoe. Credit: Tribal ecoAmbassadors

Cover(second row, left). Student on a boat trip. Credit: Sheri Kangas

Cover (second row, middle). Roadside cleanup. Credit: Richard Gonzales

Cover (second row, right). Student photographs flowers. Credit: Lisa Denton

Cover (third row). Marine conservation educator Danni Washington speaks at the 2014 NAAEE conference. Credit: Gerry Ellis

Cover (fourth row, left). Pre-service teachers on field trip. Credit: Kelly Keena

Cover (fourth row, right). Child at the beach. Credit: Lisa Denton

Page 1. Children looking at exhibit. Credit: U.S. Park Service

Page 4. Student at mountain lake. Credit: Sheri Kangas

Page 5. Student finds bullfrog in pond exploration. Credit: Christina de Martino, Science Adventure Program

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Page 11. Students working on computers. Credit: National Science Foundation

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Page 15 (left). Child with snail. Credit: Kelly Keena

Page 15 (right). Citizen scientist collects water data. Credit: Carl Rowe

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Page 28 (top). Students in the Arsenic Arresters project receive an EPA President’s Environmental Youth Award. Credit: EPA

Page 28 (bottom). Sahil Veeramoney, winner of an EPA President’s Environmental Youth Award. Credit: EPA

Page 29 (top). Nathaniel Wight, winner of an award for EE innovation. Credit: EPA

Page 29 (bottom). Angela Whittaker, winner of an award for EE innovation. Credit: EPA

Page 30. Laura Wilbanks , winner of a Bartlett Environmental Education Award. Credit: NEEF

Page 33. Boat on a sand bar. Credit: Richard Gonzales

Page 40. Outdoor science project. Credit: U.S. Forest Service

Page 41. Students hike in Rocky Mountain National Park. Credit: Kelly Keena

The National Environmental Education Advisory Council 2015 Report to the U.S. Environmental Protection Agency Administrator

Letter to the EPA Administrator

Dear Administrator McCarthy,

The National Environmental Education Advisory Council (NEEAC) provides recommendations to the U.S. Environmental Protection Agency (EPA) Administrator to inform the agency's strategic vision for, and enhance EPA's activities related to, environmental education (EE). This report presents NEEAC's 2015 recommendations on matters related to EE. It also acknowledges the challenges and opportunities across the broader EE field, summarizes NEEAC findings from a review of recent academic literature and national listening sessions, and assesses the progress made over the last decade in EE.

The recommendations herein are based on more than 18 months of in-depth research, analysis, and discussion. They draw upon the expertise and experience of NEEAC members and input from stakeholders who participated in listening sessions across the 10 EPA regions. These stakeholders included educators, researchers, and representatives of nonprofit and community organizations, state agencies, and the private sector.

We identified many examples of excellent EE efforts. However, we also discovered that EE activities often function in isolated, fragmented silos and are frequently underfunded. Based on our assessment of the country's EE needs in the 21st century, NEEAC sees the next few years as a critically important time for EPA to engage, lead, and fund key activities in the evolving and maturing EE field.

Additionally, the report acknowledges the rich history of EE, the previous 2005 NEEAC report, and current EPA initiatives. The 2015 NEEAC extends its gratitude to you for supporting a level of funding for EE in the Fiscal Year 2016 budget that is unmatched in the history of the National Environmental Education Act, and for repositioning the Office of Environmental Education to strengthen the potential for EE to help EPA achieve its mission.

It is with great respect for EPA's efforts to protect the environment and human health that the council submits this 2015 NEEAC Report.

Sincerely,

A handwritten signature in black ink, appearing to read "Kelly Keena", with a long horizontal flourish extending to the right.

Dr. Kelly Keena, Chair
National Environmental Education Advisory Council 2015

Executive Summary

Humans have always been dependent on the planet's natural resources for survival. Human health is directly linked to the health of the environment on which it depends. Fertile soil, plentiful and clean water, fresh air, and the wise use of natural resources not only influence quality of life, but also contribute to economic prosperity, national security, and sustainability.

The U.S. Environmental Protection Agency (EPA) clearly recognizes this interdependency, as evidenced by its mission "To protect human health and the environment." In addition, EPA works to ensure that "environmental protection contributes to making communities and ecosystems diverse, sustainable, and economically productive."

In a world that has grown more interconnected than ever before, there has never been a more critical moment in history to support environmental education (EE). Education and public discourse are needed to enable us to respond to the urgent alarm sounded by leading scientists on environmental challenges, such as responding to climate change, generating sustainable energy, and ensuring sufficient water resources and air quality. It is essential to build a workforce that can understand, collaborate, and take action to succeed with innovative solutions and emerging technologies.

The factors that influence human health and the environment are complex. The key to resolving current challenges and preventing future ones lies in supporting an educated population that understands the interconnectedness of human and natural systems. In order to engineer solutions to these challenges, our workforce needs to augment its capacity to think critically about environmental challenges, analyze potential actions, and work to create sustainable systems. EE provides a path to this vision for the future.



EE Definition: EE refers to the use of a diverse range of activities to teach individuals of all ages and backgrounds, as well as communities of varying scales, to explore their environments, engage in critical thinking and problem solving, and make informed decisions about how to use and conserve resources and environments.

This report provides a set of immediate and ongoing recommendations for EPA on matters related to EE. These recommendations are based on an analysis of information collected over an 18-month period. These recommendations reflect the opportunities and challenges EPA faces in supporting EE at the national level.

EPA plays an important role in EE. EPA already conducts many activities that are crucial to moving the nation forward through engagement with communities, leadership, and financial resources. However, significant opportunities exist for EPA to push beyond the status quo and drive change, innovation, and education.

It is the National Environmental Education Advisory Council's (NEEAC's) view that EPA has the following three key EE focus areas that are supported through the EPA Office of Environmental Education's (OEE's) three primary roles of championing, collaborating, and communicating about EE within the agency and beyond:

- **Engage:** EPA should engage its employees by equipping them with EE tools and training. These tools and training will help employees support EPA's mission, which will lay the foundation for OEE to facilitate collaboration within the agency to ensure efficient use of resources and increase the effectiveness of the agency's EE outreach.
- **Lead:** EPA can offer consistent leadership for the EE field at top levels of the federal government. This leadership would provide much-needed strategic inter-agency coordination. OEE can champion these efforts within the agency, across agencies, and with national leaders from across the EE field to support integration, maximize funding, and share resources and research.
- **Fund:** EPA should provide funding for personnel and grant opportunities at the national and local levels to advance EE initiatives. OEE can communicate its priorities through grants, awards, and partnerships.

Exhibit S.1 illustrates the interplay among EPA's three key EE focus areas and OEE's three primary roles.

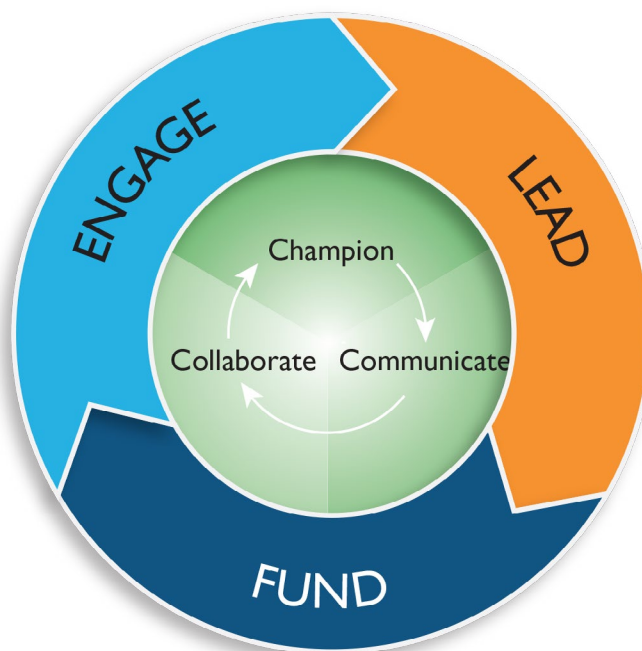


Exhibit S.1. EPA's EE focus areas and OEE's primary roles in EE.

NEEAC recommends that by 2018 EPA and OEE report to NEEAC on the agency's efforts to implement the five key recommendations presented in this document. Exhibit S.2 identifies NEEAC's 2015 recommendations and their associated outcomes.

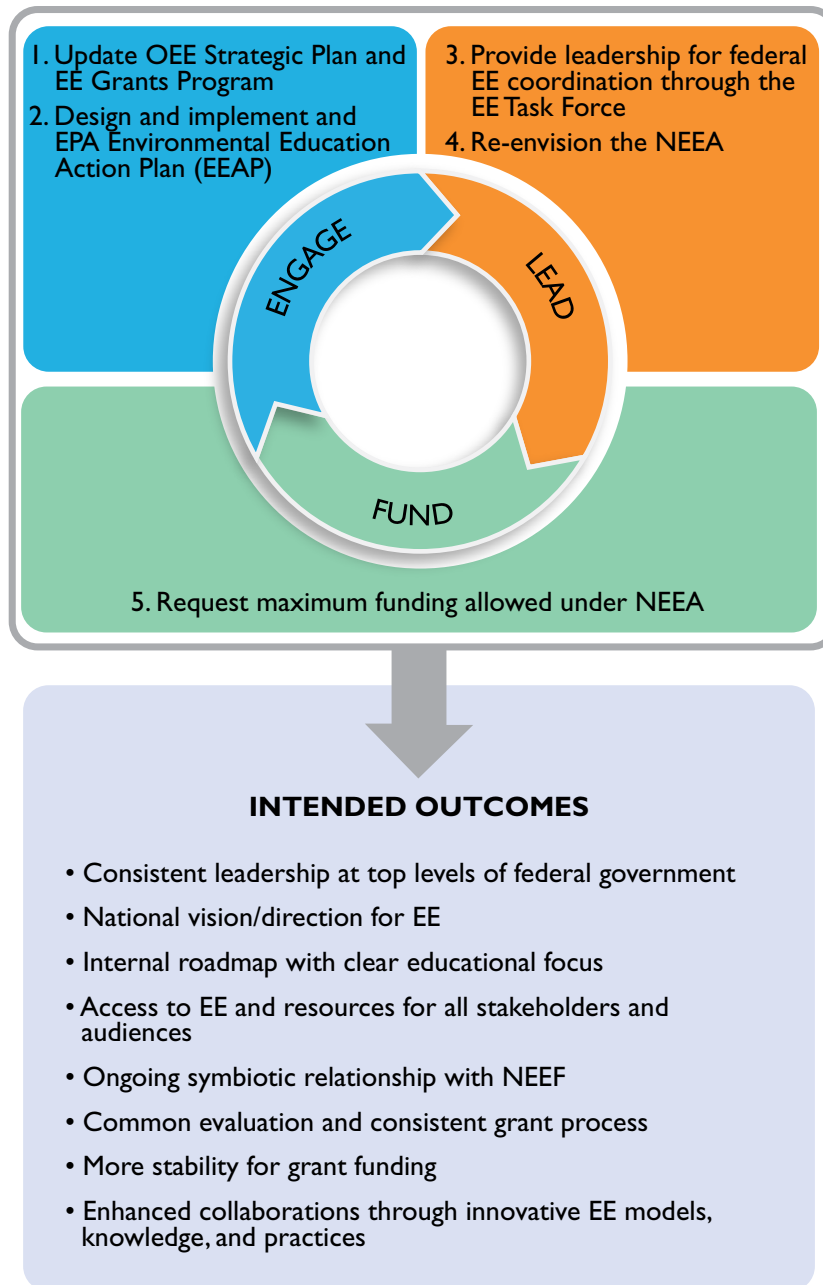


Exhibit S.2. Summary of 2015 NEEAC recommendations and intended outcomes.

Several **key ideas** discussed throughout this report include:

- EE is a critical tool to meet EPA's mission.
- EPA can leverage the good work of historical and current efforts by engaging and leading effectively.
- EE can be strategically coordinated and embedded in EPA's functions.
- Scientific knowledge is communicated to the public through education.
- EE needs additional and sustained funding to be effective.

1. Introduction

The time for environmental education (EE) is now. Never before in our history has EE been more important. The planet faces vast and complex environmental challenges. The key to resolving current challenges and preventing future ones lies in supporting an educated population that understands the interconnectedness of human and natural systems. In order to engineer solutions to these challenges, our workforce needs to augment its capacity to think critically about environmental challenges, analyze potential actions, and work to create sustainable systems. EE provides a path to this vision for the future.



EE Definition

EE refers to the use of a diverse range of activities to teach individuals of all ages and backgrounds, as well as communities of varying scales, to explore their environments, engage in critical thinking and problem solving, and make informed decisions about how to use and conserve resources and environments.

The U.S. Environmental Protection Agency (EPA) plays an important role in EE. EPA already conducts many activities that are crucial to the nation's EE, including projects and programs focused on engaging with stakeholders, demonstrating leadership, and providing financial resources. However, significant opportunities remain for EPA to push beyond the status quo and drive change, innovation, and education. Leveraging those opportunities will promote benefits for the nation, and EPA can itself benefit from effective EE because an environmentally literate society will better understand and more widely accept environmental regulation, requiring less monitoring and enforcement.

The National Environmental Education Advisory Council (NEEAC) helps connect EPA to other EE stakeholders. Council membership and responsibilities are defined by the National Environmental Education Act (NEEA) of 1990. NEEAC periodically assesses the national status of EE and provides EPA with recommendations for enhancing its EE activities. This report presents NEEAC's 2015 recommendations to the EPA Administrator to further position the agency to **engage, lead, and fund** EE through activities, functions, and policies under the NEEA that help achieve EPA's mission. Effective implementation of these recommendations will position EPA's Office of Environmental Education (OEE) to champion EE and collaborate and communicate within EPA, across other federal agencies, and with national partners in EE.

The remainder of this report is organized as follows:

- **Section 2 – National Status of EE in 2015** describes and assesses the extent and quality of EE in the United States and summarizes major challenges to improving EE.
- **Section 3 – The NEEA and EE at EPA** provides a general description of EPA's activities pursuant to the NEEA and OEE's progress in implementing recommendations from the 2005 NEEAC report. It also outlines a vision for EPA's role in the EE field.

- **Section 4 – NEEAC 2015 Recommendations** provides a set of immediate and ongoing recommendations for EPA and OEE. These recommendations reflect the opportunities and challenges EPA faces in supporting EE at the national level.
- **Appendix A – Excellence in EE** highlights achievements in the field that demonstrate engagement, leadership, and funding for EE and related fields. Although not an exhaustive list, these programs and projects offer instructive examples to EPA and other EE-focused organizations.
- **Appendix B – Development Timeline** provides an overview of the process and framework used to develop and organize NEEAC’s 2015 recommendations.
- **Appendix C – NEEAC Listening Sessions Summary** provides findings from a series of facilitated stakeholder listening sessions. These findings helped inform NEEAC’s 2015 recommendations.
- **Appendix D – Past and Present NEEAC Members** provides a list of individuals who have served on NEEAC since its establishment in 1990.
- **Appendix E – EPA OEE Staff** provides a list of employees currently working in OEE.

EE HAS BROAD IMPLICATIONS

EE is about more than the environment. EE is about people. It is about our quality of life in the places we live. EE is about the natural world and its systems. EE is about the complex interaction between humans and the natural resources we depend on and that we hope to conserve. It is about civic engagement and sustainability. EE is about understanding and participating in the world as it is and the world that we want for our children’s children.

EE is about more than knowledge. EE fosters the skills and attitudes that are necessary for developing a successful 21st century and for enabling people to take action.¹ This is because EE equips the populace with an understanding of the complex connections between human health and the environment. Environmental literacy depends on ecological and sociopolitical knowledge, recognition, and understanding of environmental issues; cognitive skills; motivation to solve current problems and prevent new ones; and environmentally responsible behavior.² Developing environmental literacy can and often does lead to an emotional connection to the natural environment that motivates action to address environmental challenges.^{3,4,5}



2. National Status of EE in 2015

A broad review of EE literature reveals that EE programming covers a multitude of environmental, health, and human issues ranging in scope from extremely local to broadly global perspectives. Practitioners include individual educators; educator communities; county, state, regional, and federal agencies; nongovernmental organizations (NGOs); and Tribal nations. Audiences include preschool children, school-age children, university students, parents, grandparents, policymakers, voters, business owners, corporations, and individuals of all cultural backgrounds. For more information about a range of EE projects and programs, see Appendix A.

This section further defines EE (Section 2.1), provides an overview of both the history and the modern landscape of the EE field (Section 2.2), and presents current challenges and opportunities for improving EE (Section 2.3).

2.1 About EE

“EE equips people with the knowledge, skills and motivation to make sound decisions about the environment and the world in which we live. When used to address a specific issue, such as climate change, water quality, or waste reduction, education helps people learn about the issue, understand the science behind it, care about it, and take action to address it.”⁶

Environmental Education: A Brief Guide for U.S. Grantmakers, 2013

EE refers to the use of a diverse range of activities to teach individuals of all ages and backgrounds, as well as communities of varying scales, to explore their environments, engage in critical thinking and problem solving, and make informed decisions about how to use and sustain resources and environments. EE is integrated and supported throughout all tributaries of learning in society. Delivery takes place across three broad categories that increasingly overlap:

- Formal education (i.e., learning in a classroom)
- Learning in “out-of-school environments”⁷ identified as non-formal education (i.e., institutional settings, such as nature centers)
- Informal education as part of day-to-day activities.⁸



2.1.1 21st century EE

“The future of environmental education will depend on its ability to implement effective programs that reach local audiences with culturally appropriate topics while also addressing important environmental problems.”⁹

Across the Spectrum: Resources for Environmental Educators, 2013

Nearly 40 years after the United Nations Educational, Scientific and Cultural Organization organized the first intergovernmental conference on EE in Tbilisi, Republic of Georgia,¹⁰ our perspective of Earth and our place in it has evolved. We now find ourselves in a highly interconnected, globalized ecosystem, facing social and environmental challenges at a massive scale. As leading scientists sound an urgent alarm,¹¹ we need effective civic engagement on climate change, water quality, air quality, and energy.¹²

The EE field has continually evolved and adapted in response to a rapidly changing, globalized world. This evolution has helped us in our efforts to realize our vision of a healthy and sustainable world. The five most striking evolutions and adaptations for EE in the 21st century include:

- **There is a stronger understanding that the environment is everything.** The environment is where we live; no longer is the environment a classification of solely natural areas. EE must be about the health of the environment and the wellbeing of the people living there.¹³
- **The importance of green jobs, the 21st century workforce, and the need for new skills in our everyday lives has grown.** Technological innovations to address environmental challenges are critical. There is growing demand for a workforce educated in science, technology, engineering, and math (STEM). Every level of formal education, including colleges and universities, increasingly focuses on STEM. In particular, EPA needs, and will continue to need, a highly trained workforce that not only understands complex environmental challenges, but also has the creativity and skills to solve them.
- **Mobile technology has revolutionized how people interact and learn.** Advancements in access to technology, specifically mobile devices, allow for the rapid spread of information. The growth in mobile technology also enables instant access to facts and figures, which highlights the need for the skills to critically analyze and filter through large volumes of available information. Mobile technology presents an opportunity to change how EE is delivered in the 21st century, both face-to-face and digitally.
- **Society is increasingly diverse.** The United States includes overlapping and also unique populations in urban, suburban, and rural areas. The demographics of these areas reflect particular needs for EE and gaps in environmental literacy. However, our environmental educators and leaders frequently do not reflect this diversity.
- **Community groups are consistently engaged in educational activities based on locally identified needs in their respective communities.** These activities may develop out of communities' needs for safety and wellness (rather than starting from a desire to address any particular environmental issue) and still contain strong social and environmental components.

These evolving trends present many challenges and opportunities to improve EE in the United States. Fifteen years into the 21st century, the promise and demands of social and environmental issues are still not fully understood. Never before have humans been more dependent on and simultaneously disconnected from our land and resources.¹⁴ Never has society faced such looming and interconnected environmental issues that are so deeply tied to human behavior.¹¹

2.1.2 Environmental learning and environmental literacy

Environmental literacy is the intended outcome of EE. Environmental literacy is defined as “the extent to which a person is concerned about the environment, equipped to make informed decisions about it, and has the skills and motivation to take environmentally responsible actions.”⁶ Environmental literacy provides learners with the understanding that human health and environmental health are joined in complex and interdependent relationships.¹⁵

EE enhances environmental literacy by cultivating an understanding of the human world’s inextricable relationship with the natural world through active and experiential engagement in real-world environmental problems. This leads to environmentally responsible behavior and collective action for a healthier, safer world.¹⁶

2.1.3 Snapshot of EE approaches and outcomes

In 2013, the authors of the Blue Sky Funder’s Forum Brief presented a useful approach to understanding the varied EE approaches and outcomes.⁶ Exhibit 2.1 adapts and builds on that approach in the form of a model that displays a simple, visual framework for understanding EE. This model is not intended as an exhaustive list, but rather an illustration of the extreme diversity across the EE discipline. The model reveals the nonlinear nature of EE in which any combination of providers, audiences, activities, and outcomes are possible. For example, a youth organization implementing an after-school program may use an environmental community action project to teach self-confidence and personal development. For specific EE provider examples, see Appendix A.

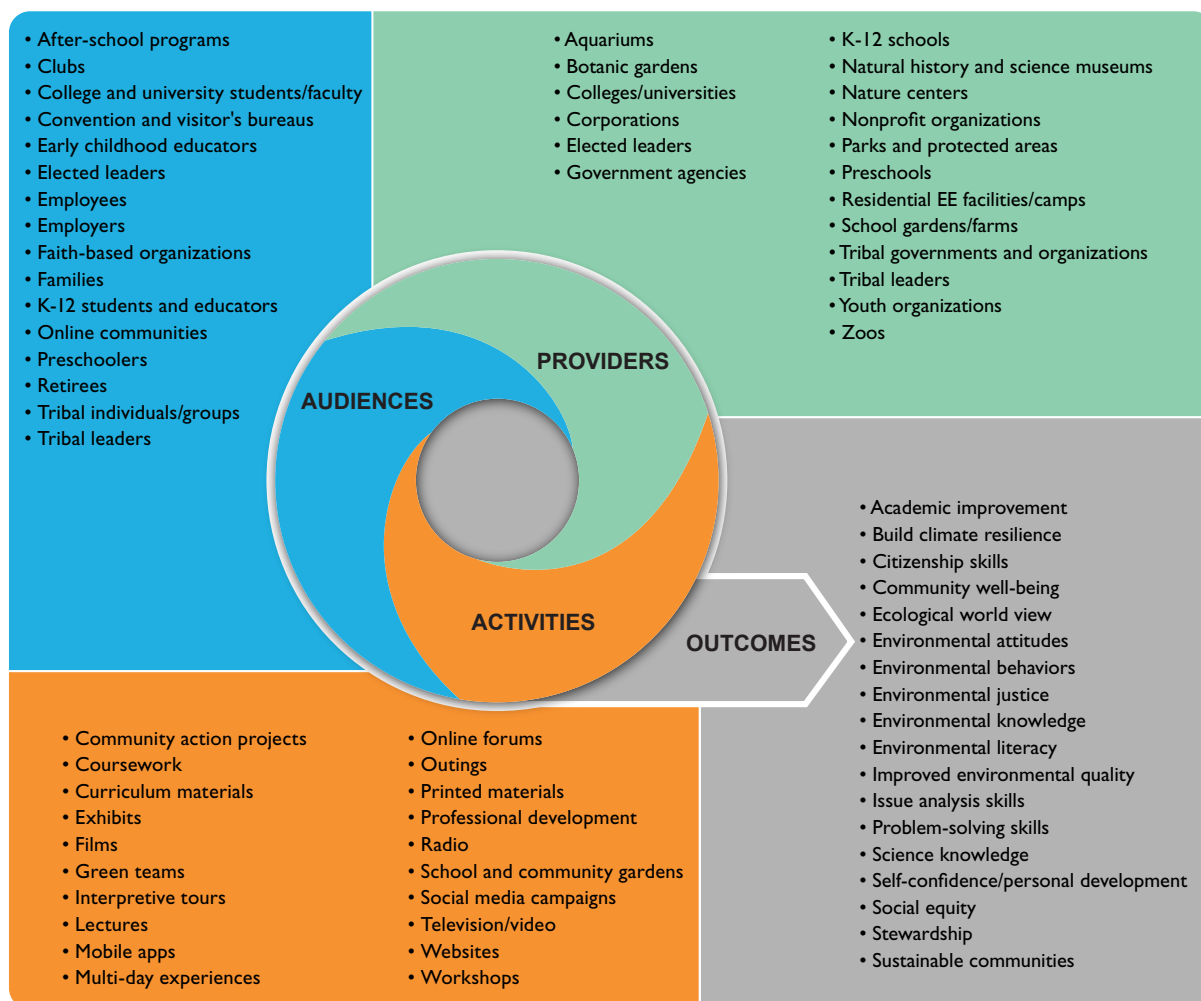


Exhibit 2.1. Model for understanding EE approaches and outcomes.

2.2 The national landscape of EE

This section describes the many ways in which EE influences our lives and includes information on how EE is applied across a wide range of sectors and activities.

2.2.1 Diversity in leaders, audiences, and stakeholders

Many of our most pressing environmental issues disproportionately affect socially and economically disadvantaged populations in the United States. For example, low-income and minority communities are often more vulnerable to the impacts of climate change, food scarcity, impaired water and air quality, and poor hazardous waste management.



According to a recent survey, racial and ethnic minorities are often the strongest supporters of climate and energy policies, including policies designed to reduce greenhouse gas emissions, despite the costs associated with such policies.¹⁷ However, minority groups are not adequately represented in the nation's current EE leadership.^{12, 17}

In order to achieve widespread environmental literacy, EE leaders, providers, and audiences need to reflect the diversity of our over-arching cultural landscape. Matching the diversity of EE leaders to our national demographics will help ensure that environmental issues are seen as culturally relevant to all groups.¹⁸

This underlines the need for the nation's EE leaders to communicate and coordinate with the environmental justice community. Effective coordination between the two fields can help bring equity in environmental health and safety to all communities and create equal access to decision-making processes involving the environment. **Environmental justice and EE professionals share common goals and offer unique strengths, creating space for powerful collaborations.**¹⁹

Voices on EE Diversity

"I'm speaking from the Latino community. We have a connection with nature; it's just in a different way. Look at family gatherings: A lot of communities have a hard time accommodating their extended families in apartments or houses, so where do they go? They go to local parks. If you go to any pier on any weekend here in L.A., you see the fishing lines over the harbor, and you see a lot of cultural diversity: African-American, Asian-American, and Latino. Our connection to nature has been and continues to be there, but there is some guidance that needs to happen. We need to be more a part of the fabric." – Juan Martinez²⁰

"For American Indians, that connection to the land is everything. Reservation life is not really an existence that has much of a future unless the young people start understanding nature again, not only through spiritual values but also through discovery of natural resources and the many sciences. We're at a point right now where it would be very advantageous for the government, including the Park Service, to start bringing youth back to our lands again." – Gerard Baker, Mandan-Hidatsa American Indian²⁰

2.2.2 Fragmentation of the field

EE is crosscutting by nature. As a result, the field has grown complex and fractured into smaller subsets of specialized foci.²¹ Professional networks organize around a range of specific EE types, goals, themes,

and venues (e.g., zoos and aquariums, connection to nature, outdoor education, interpretation, informal science education, green schools, conservation education, climate education, advocacy). There is a need for coordination among these fields of practice so that all activities can contribute to the same goal: a healthy, sustainable world.

This coordination requires efforts that are not traditionally defined as EE. For example, effective coordination across EE-related fields would require community leaders who are actively working to improve the health of their neighborhoods to create a place at their table for discussion of EE issues. Community leaders, including EE leaders, need to appreciate the value of diverse approaches to shared visions.²² Collaborative efforts strengthen environmental literacy.

2.2.3 Research and evaluation

This section provides information on the evolution of EE research and evaluation, future areas of focus, and key challenges to applying research and evaluation findings.

Evolution of EE research and evaluation

The infrastructure and practices involved in EE evolved out of years of nature study, outdoor education, and conservation education. Early research efforts worked to define EE, frame the field, and provide purpose and scope.²³ EE research topics are as diverse as the field itself; they are often tied to specific EE providers, audiences, activities, and outcomes.^{24, 25} This diversity continues to be both an asset and challenge for improving EE, especially as it relates to program evaluation.²⁶

As described by Gough,²⁷ EE research has also evolved over time, expanding beyond simple quantitative methods of measurement to include a variety of qualitative methods. These qualitative methods can be used to measure the effectiveness of single programs and evaluate the impacts and value of personal experiences. Both types of evaluation improve our understanding of the effectiveness of EE. In general, the diverse nature of the field demands a wide range of methods and methodologies.^{24, 26, 27}

Future research and evaluation areas

Moving forward, there are several areas of potential future EE research. Ardoin, Clark, and Kelsey²⁸ identify four broad areas of where future EE research is needed: (1) collective and community learning and action, (2) the connection of environmental quality to human wellbeing (physical and mental health), (3) urban and diverse populations, and (4) social media and technology. Other key areas of ongoing research include environmental learning, behavior, and belief systems;^{28, 29} environmental literacy assessments beyond middle school using the National Environmental Literacy Assessment as a model;^{23, 30} early childhood education programming impacts on stewardship, sustainability and business outcomes, EE and STEM education, and “dosage” of nature and wellbeing.¹



Continued evaluation work is valuable and necessary to understand EE program effectiveness, inform EE educators about participant experiences, support educators individually and organizationally, and continue improvement of EE programs.^{25, 26, 31} With consistent reporting frameworks and planning, evaluation findings can be aggregated to inform wide-scale understanding of EE's effectiveness.³¹ In the long-term, such work could help demonstrate the value of EE for meeting broader environmental goals.²⁵

Challenges in applying research and evaluation findings

It is important to note that EE research and evaluation findings are not widely disseminated; they often remain inaccessible to practitioners and administrators in the field.³² Despite advancements in researchers' understanding of the effectiveness of EE practices and techniques, many EE leaders are still not applying the lessons that researchers have identified.⁷ While some efforts have been made to connect EE researchers and educators [e.g., programs such as EECapacity, Nature Bridge, and Children and Nature Network (C&NN)], this continues to be a critical need.²⁶ **The**

priority is not just to access research databases and journals, but also to provide findings that are free from jargon and overly academic language. Instead we can ask, "How can we present research and evaluation findings as manageable, meaningful, and relevant to diverse audiences?"



2.2.4 Participation in governmental agencies

EE takes place at many levels of government, ranging from local county land and water conservation districts to state departments of natural resources and education to federal agencies, such as the [U.S. Fish and Wildlife Service](#) (FWS) and [NASA](#). Government agency involvement in EE is varied and often includes activities such as facilitating discussions, building capacity for EE, recognizing achievements, and providing "boots on the ground" for educational programming.

At the national level, EE initiatives often exist in multiple offices within a single agency; they can be interconnected or can operate in isolation. For example, within EPA many EE initiatives are led by OEE (see Section 3.2), but there are numerous EE programs in other offices. For example, the Office of Children's Health Protection offers a nine-lesson curriculum focused on healthy kids and healthy environments, the Office of Water provides water-related educational resources for adults and children, and regional offices publish area-specific EE materials.

At the state level, agency support for EE varies. In general, there has been growing interest in the past five years for states to develop and implement Environmental Literacy Plans (ELPs). This trend has catalyzed coordination of state-level EE initiatives.³³ For example, the 2010 Colorado Kids Outdoors Grants Program³⁴ supported increased coordination between the Department of Education and Department of Natural Resources to write and implement the Colorado Environmental Education Plan.

State government agencies also support EE through partnerships with private organizations. For example, the Wisconsin Land and Water Conservation Association, an NGO, partners with the state's 72 county land-conservation offices to offer EE programs for schools.

2.2.5 Participation in the NGO sectors

NGOs function at every scale of EE. Both small and large NGOs support and implement EE activities at local, regional, state, and national levels. NGOs also advance environmental literacy. They include diverse stakeholders; promote current research and engage academia with educators on the ground; work with corporations and governmental agencies; and mobilize educators for the promotion and engagement of EE through national conferences, specific initiatives, collaborative resource-building, and advocacy of EE politically.

At the national level, strong NGOs are important partners for federal agencies that are active in EE. Many NGOs have long-standing relationships with EPA and OEE, including the National Environmental Education Foundation (NEEF), the North American Association for Environmental Education (NAAEE), and the C&NN.

At the state level, NAAEE has established its strong Affiliate Network that enables exchanges between local EE organizations and the wider NAAEE community. Local organizations collaborate with one another and with EPA's regional EE coordinators to provide small grants, support professional development, and prioritize regional projects. Each state's affiliate organization provides excellent networks for communication between the field and national perspectives.

At a local scale, NGOs maintain the majority of localized EE efforts and are often the most knowledgeable about locally relevant environmental issues of concern. Smaller NGOs increasingly embrace collective impact strategies by forming collaborative relationships among funders, nonprofits, and government entities to design and work toward shared goals.

2.2.6 Participation in the private sectors

For federal agencies, collaboration with the private sector provides access to additional thought leadership, strategic intelligence, and resources. Because of this, collaboration with the private sector presents a significant opportunity to enhance EE research, analysis, and evaluation.

Collaboration among governments, foundations, NGOs, and the private sector

There are many examples of how private companies, government entities, and NGOs can work together to enhance the effectiveness of EE initiatives. For example, NEEF has partnered with Samsung to create resources for educators and students that promote environment-focused STEM educational opportunities. NEEF has also worked with Toyota for 15 years to support the National Public Lands Day and cooperated with Verizon on communications for the Take a Second Campaign, which helps to raise awareness about energy conservation. See Appendix A for additional examples.

EE initiatives within the private sector

An increasing number of corporations are implementing employee engagement programs to further their internal corporate sustainability goals.³⁵ In these programs, education plays a key role in helping to inform and activate the companies' and employees' personal and global impacts. The benefits of this shift include enhanced program development, community outreach, mentorship programs, new environmental career paths in sustainability and corporate social responsibility, extension of EE audiences, and a more committed and loyal workforce. One example of this type of program is [Wrigley's Cleaner and Greener Communities Campaign](#).

Internal and external factors can motivate the creation of these corporate programs. **Consumers, shareholders, and corporate officers increasingly demand that companies in many industries adopt sustainable practices.** One example includes the [Decorative Panels International](#) (DPI) hardwood facility in Alpena, Michigan. DPI uses no chemicals in their manufacturing process. In addition, it employs a staff forester to assist private landowners with management of more than a half million acres of forestland in northern Michigan. Exhibit 2.2 displays an infographic developed by Underwriters Laboratories (UL) using data to highlight the importance of sustainability communications in industry.

2.2.7 Green jobs and the green workforce

Recent years have seen notable growth in the size of the nation's "green workforce." The Vice President's Middle Class Task Force³⁷ defines green jobs as jobs that provide sustainable family wages and benefits, are accessible to diverse workers in all working classes (i.e., blue and white collar), and involve improving the environment. Green jobs include nearly every economic sector (see Exhibit 2.3) including farming, engineering, manufacturing, construction, technology, healthcare, retail, and energy. Community colleges and nonprofit environmental groups are active in creating job training programs that create opportunities for low-skill workers in the United States.³⁸

In the next ten years, sustainability strategy and growth strategy will become one and the same.

87% of global consumers consider a company's social and environmental commitment before making important decisions, such as purchase choices.

93% of CEOs see sustainability as critical to the success of their businesses.

81% of CEOs say their companies have fully integrated sustainability into their company-wide strategies (up from 50% in 2007).



Exhibit 2.2. Infographic displaying corporate sustainability survey data.³⁶

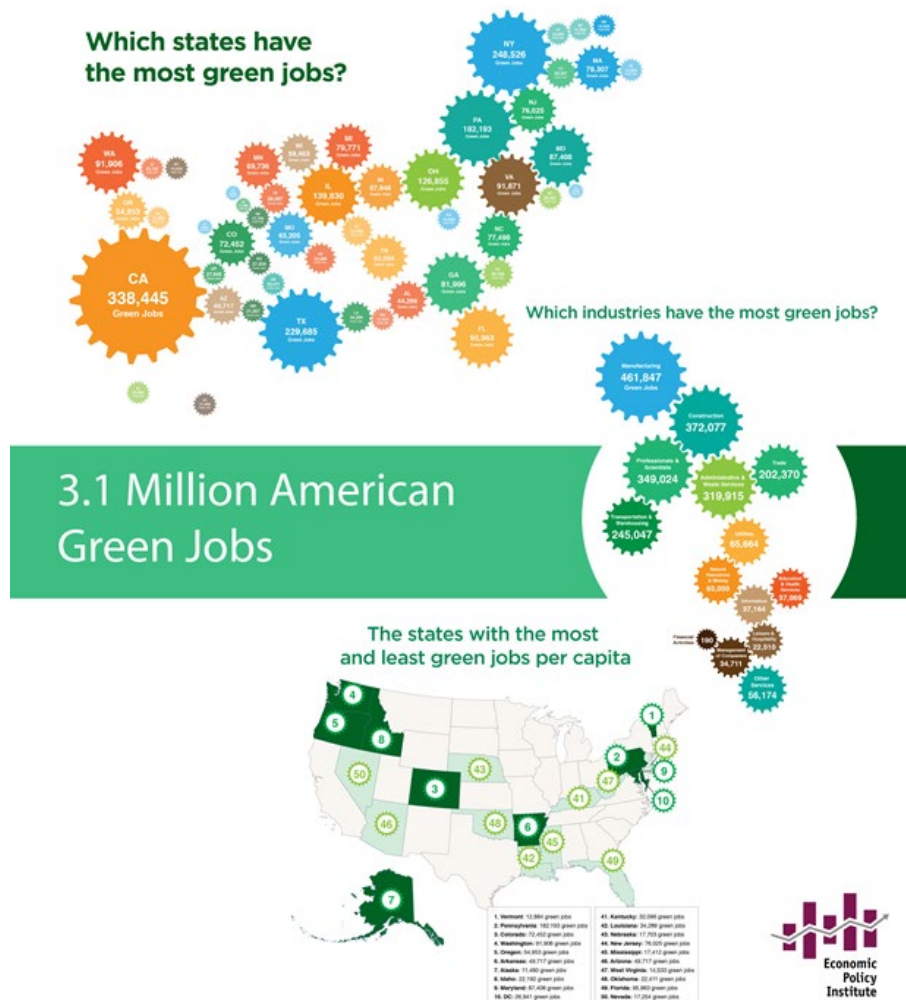


Exhibit 2.3. 3.1 million American green jobs: The full picture.⁴⁰ [The Economic Policy Institute](#).

As the nation's green economy continues to grow, there is a need for an environmentally literate workforce to produce goods and services with environmental benefits. Because of this, environmental literacy is becoming increasingly important as a criterion that employers use to review job candidates. A recent NEEF

survey of corporate employers from a broad range of industry sectors and companies of all sizes revealed that “65% of respondents value job candidates’ environmental and sustainable knowledge while 78% of respondents thought the value of job candidates’ environmental and sustainability knowledge would increase in importance as a hiring factor within five years.”³⁵

It is important to note that while racial and ethnic minorities comprise 38% of the U.S. population, these populations are severely under-represented in the green workforce and hold fewer leadership positions than their White counterparts.³⁹

2.2.8 Green Schools and green schoolyards movements

“A movement to green school grounds and connect students to nature is gaining momentum in the United States and around the globe, weaving the ideas of urban sustainability and ecological design together with academic achievement, public health, children’s wellbeing, sense of place, and community engagement.”⁴¹

Sharon Gamson Danks, Green Schoolyards America, 2014

The Green Schools movement is a rapidly developing movement motivated by EE goals. The movement also focuses on the sustainability of physical buildings and sites. The aim is to reduce schools’ environmental impacts and costs, improve the health and wellness of students and school staff, and provide EE and sustainability lessons.⁴² The movement is based on collaborative initiatives led by a wide range of stakeholders, including teachers, nutrition services personnel, custodians, maintenance and building engineers, community members, parents, and policymakers. These stakeholders collaborate to build relationships between those who work in school buildings and those who design and maintain them. These relationships support efforts to communicate the financial benefits of employing sustainability practices in schools. More information on this topic is available from the **U.S. Green Building Council’s (USGBC’s) Center for Green Schools**.

Another rapidly expanding opportunity for EE is the Green Schoolyards movement, which emphasizes building naturalized areas and food gardens. Green schoolyards draw on the efforts of a diverse range of interest groups, including organizations that focus on children’s geographies, children’s access to nature, and children’s social, emotional, and physical wellness. Green schoolyards help showcase EE’s benefits for academic, social, and emotional wellbeing in childhood.⁴³

2.2.9 Children’s restricted access to nature



In 2010, the Kaiser Family Foundation released a report citing an increase in the time that 8- to 18-year olds spend with electronic media (e.g., television content, music/audio content, computers, video games). The amount of time increased from 6 hours and 21 minutes per day in 2004 to 7 hours and 38 minutes per day in 2009.⁴⁴ The proliferation of electronic media access and use, along with other barriers that limit outdoor play and time spent in nature (e.g., parental fear of abduction or harm, traffic dangers, lack of natural space), restrict children’s access to the social, emotional, physical, and intellectual benefits of nature.⁴⁵ There are many consequences to indoor childhoods, including a documented epidemic of childhood obesity and other negative impacts on health.^{46, 47} In addition to the tremendous health benefits of time spent in nature, studies suggest that positive experiences in nature in childhood have a strong positive relationship with pro-environmental attitudes and behaviors as adults.^{48, 49, 50}

A number of organizations and initiatives are dedicated to removing barriers to children's access to nature. One such organization is the C&NN. According to the C&NN's [website](#), in 2014 the organization supported 369 grassroots campaigns worldwide; these campaigns connected more than 3.5 million children to experiences in nature. Another organization involved in this area, the National Wildlife Federation (NWF), has developed a program called [Be Out There](#). Through this program the NWF is working with hundreds of partner organizations to advance policies that reconnect children with nature. Activities include a petition to the U.S. Surgeon General to issue a "call to action" to all Americans that emphasizes the importance of regular, active time outdoors. Be Out There engages health care providers, caregivers, policymakers, and educators with a goal of getting 10 million children outdoors and active.

2.2.10 Role of technology

As noted in Section 2.1, a proliferation in access to, and use of, mobile technology has revolutionized how people interact and learn. Greenwood and Hougham⁵¹ summarize the struggle for EE to incorporate technological learning while remaining true to the goal of connecting people to the natural world. This obvious tension creates a need for balance in adapting EE to stay current in educational trends while staying rooted in a world that does not require an electrical outlet. The implications for 21st century learning are many while the adaptations in our formal and non-formal educational systems are few.

Greenwood and Hougham⁵¹ provide current examples of EE programs that have successfully adapted to the "Knowledge Age" by connecting individuals to the natural world while integrating technology. Their examples include citizen-science initiatives, an area that many EE practitioners and researchers have embraced (see also Appendix A). Other examples include climate change education activities like those of [CLEANet.org](#) and [GlobalChange.gov](#).

The jobs children are being prepared for do not yet exist, and today's parents are raising their children with access to technologies that were not available to them when they were young. It is important to recognize that much of the technology we currently use to interact with and learn from each other will become obsolete in a matter of years, not generations. This is an area of interest where further research is needed.^{28, 52}

2.2.11 Information vs. education

As described in the most recent NEEF report,¹ environmental challenges that threaten our wellbeing are becoming increasingly prevalent while public perception and understanding of basic scientific concepts and processes are diminishing. This phenomenon reflects a disconnect between the availability of information





and the ability to use that information constructively, which depends on education. Government agencies sometimes fail to recognize the distinction between education and information. For example, Ardoin and Heimlich³² found a common misperception among agencies with a conservation mission that education and information are the same thing.

Andrews⁵³ offers a useful distinction in the context of a community-based model for education. According to Andrews, information implies a collection of knowledge transferred to individuals (e.g., social marketing, pamphlets, websites), while education implies the motivation, skills, and understanding to receive the knowledge and know what to do with it. In this respect, knowledge is not only transferred to the individual, but is instrumental in transforming the individual.

To merely provide individuals with information about complex environmental problems is not sufficient; information needs to be presented using educational strategies to support public understanding, as it was envisioned in the NEEA.

2.3 Challenges and opportunities for EE

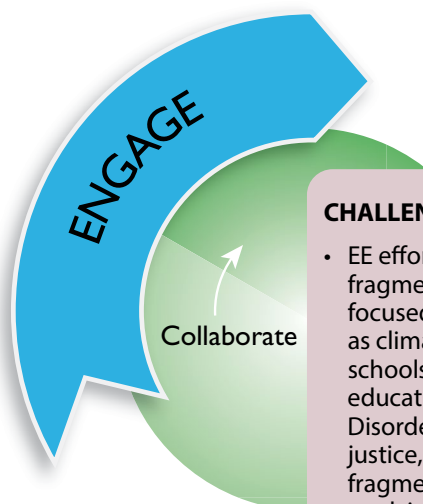
“ But since our interlinked economies depend on both natural and human resources from around the globe, we must continually find new ways to preserve our natural world while building more harmonious, culturally rich, and creative societies.⁵⁴ ”

21st Century Skills: Learning for Life in Our Times, 2009

Findings based on current research, listening sessions conducted by NEEAC, and the expertise of NEEAC members show that the modern view of EE encounters a range of new and persistent challenges. However, we also recognize opportunities for cultivating EE in all aspects of American life. This section illuminates challenges and opportunities for EE that provide a rationale for the NEEAC recommendations presented in Section 4.

We summarize these challenges and opportunities in the following tables. They are organized according to EPA’s three key focus areas: **engage (Exhibit 2.4)**, **lead (Exhibit 2.5)**, and **fund (Exhibit 2.6)**. The challenges identified in the tables affect all organizations and individuals that operate in the EE field. Challenges that are specific to EPA are outlined in Section 3.

Please note that the opportunities in the right-hand columns of these exhibits are not necessarily presented as solutions to the challenges in the left-hand columns.



CHALLENGES

- EE efforts and initiatives are fragmented and typically focused on specific issues, such as climate change, green schools, sustainability education, Nature Deficit Disorder,¹⁴ environmental justice, and many others. This fragmentation creates silos of work in EE and a lack of coordination. Resolving this challenge will require not only communication and coordination, but also collaborative leadership.
- Practitioners and educators in conservation organizations and agencies need access to relevant research and teaching methods.³²
- The EE community still struggles to communicate to the public about pressing environmental concerns, opportunities to address them, and the complex nature of present-day challenges, such as climate change.
- EE leaders and programs often do not represent the diverse population of America nor the new cultural landscapes created by immigration and urbanization.
- There is a tension in EE between connecting people to nature and leveraging technology.⁵¹

OPPORTUNITIES

- NGOs' collective and collaborative work creates opportunities to integrate EE into everyday activities, including activities related to waste management, public transportation, water conservation, and other areas.
- The research community is active and robust. EECapacity and Nature Bridge are excellent examples of research bulletins that are written clearly and without jargon for practitioners. There are many opportunities for national organizations and agencies to connect relevant research and evaluation findings to the field.
- Opportunities exist for informed, interdisciplinary approaches to (1) reach diverse and new audiences, and (2) train culturally diverse EE providers who are trusted in their communities.
- Increased collaboration between local scientists and EE providers, combined with more training to simplify climate science, makes it easier to communicate about the urgency of environmental concerns and solutions to address them.
- Sustainability, green living, and connecting to nature are growing trends. Organizations as diverse as sports teams, technology companies, universities, and celebrity groups are embracing sustainability and environmental responsibility. These important public interest opportunities provide educators with an opening to raise awareness and strengthen engagement and learning. By engaging civic, community, and media organizations, the EE field can build much-needed awareness and, most importantly, motivate environmentally responsible action.
- Many people provide EE in the scope of their work or volunteerism even if they do not self-identify as environmental educators.
- Urbanization has redefined the term "environment" from one invoking images of untouched wilderness to the all-encompassing term for the context in which we live, including urban, rural, suburban, fringe, Tribal land, and wilderness areas. EE is not only for the rugged outdoor enthusiast, but for everyone.
- Social media allows environmental educators to engage broader audiences, share promising practices, and facilitate collective efforts.

Exhibit 2.4. Challenges and opportunities related to engaging and collaborating with stakeholders.

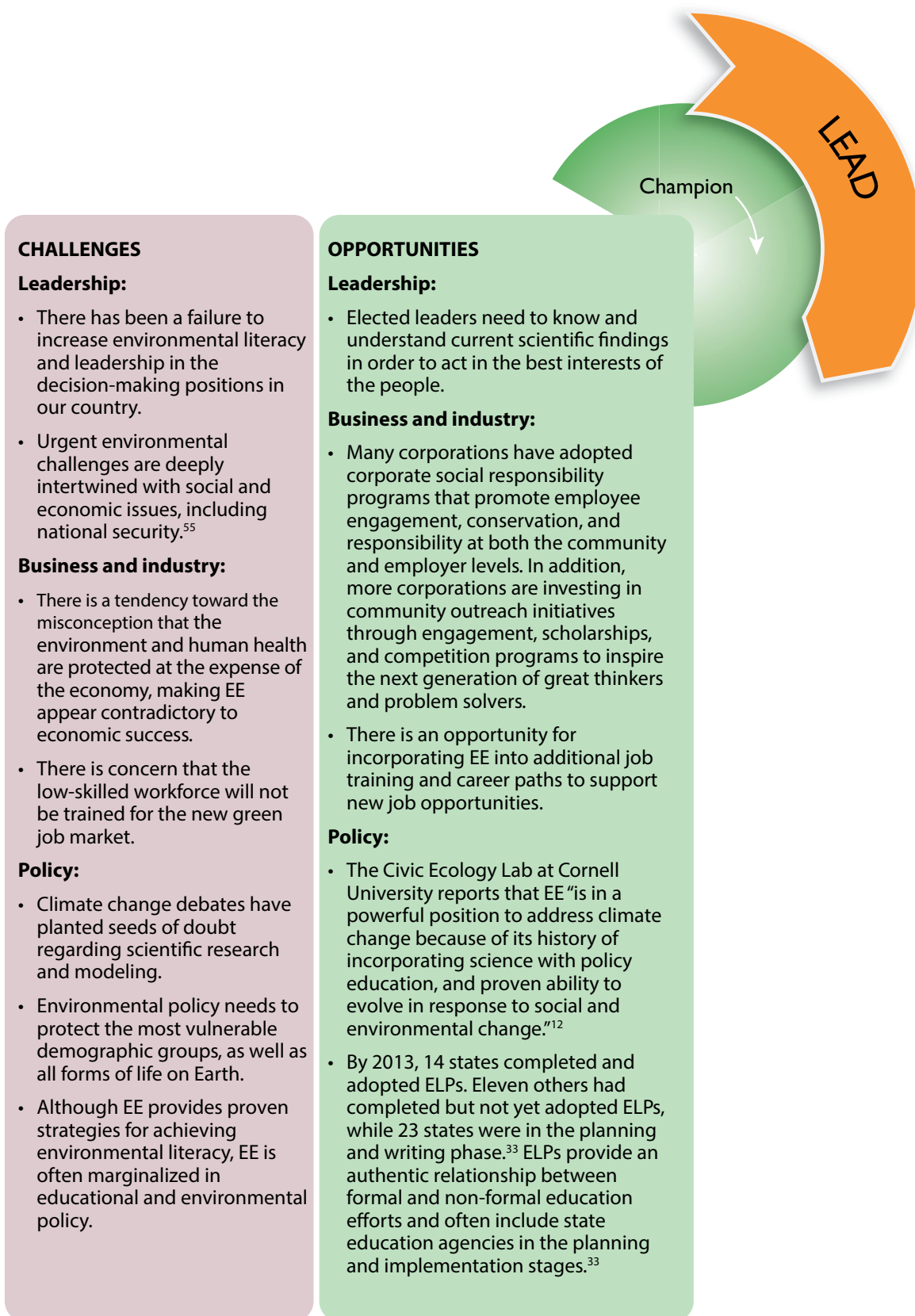


Exhibit 2.5. Challenges and opportunities related to leading and championing EE efforts.

CHALLENGES

Research:

- The EE research evidence base is too heavy on short-term or immediate outcomes. More EE research is needed to obtain longitudinal evidence of outcome success.
- Most EE research conducted to date focuses on programs that seek to influence one or more outcomes in the areas of environmental literacy, behaviors, engagement, or knowledge/skills. This research is predominantly comprised of single-program evaluations.

Formal, Non-Formal, and Informal Education:

- Environmental literacy requires an understanding of systems theory, the complexity of systems, and the concept of interdependence. Currently, educational content is taught in isolation, making systemic concepts difficult for learners to understand and connect.
- There are few formalized entries into EE as a profession, and training for EE practitioners is rarely standardized. Also, many people involved in building environmental literacy do not associate themselves as professional environmental educators.
- Few pre-service teacher-training programs include necessary information on environmental literacy, tools for educating students outside the classroom, or techniques or systems-based understanding for teaching across disciplines.
- Aligning a non-standardized field that is broader than formal education to standards-based education is a challenge.¹⁸

OPPORTUNITIES

Research:

- Ardoin, Clark, and Kelsey²⁸ recommended future EE research on the importance of (1) collective and community learning and action, (2) an increased emphasis on the intersection of environmental quality and human wellbeing, (3) working with urban and diverse populations, and (4) social media and other technologies.
- There are opportunities for research focused on multi-dimensional evaluations, longitudinal evaluation of lasting program impacts, and training of practitioners in evaluation so that what is measured is what is intended to occur.²⁶

Formal, Non-Formal, and Informal Education:

- These challenges require critical-thinking skills and an understanding of systems and their interconnections. These are skills embedded in EE.
- There may be private, university, and NGO opportunities to extend programs through formalized training and certification programs.
- Pre-service training and continuing professional development in EE for new teachers have the potential to elevate EE in schools and classrooms, specifically in relation to STEM.⁵⁶
- The recently released Next Generation Science Standards for K–12 students mirror and integrate concepts in EE throughout the disciplinary core ideas and cross-cutting concepts. In 2014, NAAEE published Linking Environmental Literacy and the Next Generation Science Standards: Tool for Mapping an Integrated Curriculum,⁵⁷ as a guide to support EE in formal K–12 settings as related to national standards in science.
- The Partnership for 21st Century Skills includes critical thinking, communication, collaboration, and creativity as the four essential learning and innovation skills. These are processes, skills, and outcomes that are deeply embedded in EE.
- STEM education highlights content and process skills present in EE and offers students opportunities to engineer solutions to problems. Project-based learning initiatives, research, and exploratory programming can connect preschool through graduate students to the environment through STEM. This is one area where securing non-traditional funding from private and NGO partners will be critical in the future. Work in this area is led by NEEF's Greening STEM initiative and groups like McREL International's work on Green STEM. Key funding currently comes from programs like UL's and the NAAEE's Innovation in Education Awards.
- Long-running projects (e.g., Audubon's Christmas Bird Count) and newer programs (e.g., Journey North, Project BudBurst, eBird) engage the public and classrooms in the scientific process including data entry, data retrieval, and opportunities to analyze and compare data from different regions.

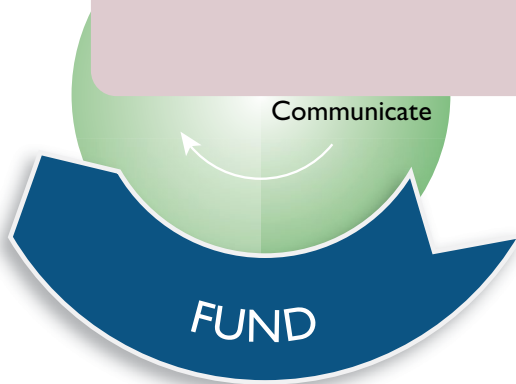


Exhibit 2.6. Challenges and opportunities related to funding and communicating about EE efforts.

3. The NEEA and EE at EPA

This section outlines the history of the NEEA and EE at EPA (Section 3.1), provides an overview of OEE and its work (Section 3.2), and presents information on NEEA-mandated programs and structures (Section 3.3).

Progress in Implementing NEEAC's 2005 Recommendations

The last NEEAC report was published in 2005. It set a course for OEE with eight recommendations to set standards, measure results, and recognize achievements in EE. In the past 10 years, OEE has made progress in supporting EE, but there remains more work to be done. EPA and OEE should continue to strive to attain these goals. Although the 2015 NEEAC did not build this report from the basis of the 2005 report, the 2015 NEEAC report reaches similar conclusions. Text boxes throughout this section provide updates on the activities and progress since 2005 and highlight OEE's key collaborations.

3.1 History of the NEEA and EE at EPA

The NEEA provides the foundation for EPA's historical and ongoing efforts related to EE. Enacted in 1990, the NEEA set a rigorous and well-planned course for EPA to serve as a national leader in EE. This pivotal law included two key findings: (1) relationships between human health and the environment are complex, and (2) an effective response to environmental challenges requires understanding of their complexity and the skills to solve them. **At the time, former EPA Administrator William Reilly concluded, "In the end, environmental education boils down to one profoundly important imperative: preparing ourselves for life and all its surprises in the next century. When the 21st century rolls around, it will not be enough for a few specialists to know what is going on while the rest of us wander around in ignorance."**⁵⁸

The 101st Congress enacted the NEEA, and President George H.W. Bush signed it into law to:

- Require EPA to collaborate with state, regional, Tribal, and local entities to improve awareness of, and effective solutions to, environmental challenges and EE-related issues
- Direct federal natural resource agencies to work with EPA on environmental and EE-related efforts
- Elevate EE as an EPA priority
- Establish the EPA OEE, NEEAC, the EE Task Force, and NEEF (formerly known as the National Environmental Education and Training Foundation).

By mandating the creation of both OEE and NEEF, the NEEA sought to bridge efforts on EE-related issues between the federal government and nongovernmental realms. Although NEEF exists as an independent NGO, its activities complement those of EPA. NEEF extends EPA's ability to foster environmental knowledge in all segments of the American public by leveraging private support for the agency's mission.⁵⁹ More information on OEE and NEEF are provided in Sections 3.2 and 3.3.

3.1.1 Relevance of the NEEA today

Our understanding of the environmental challenges facing the nation and the need for EE in 1990 was very different from our understanding today. Today there is an increasing awareness in the nation that the environment is intertwined with the economic and social factors of a globalized society. This is a shift from the predominant paradigm of the last century when the NEEA was originally drafted. While some sections of the NEEA had great foresight for establishing environmental literacy, there is a need to modernize the language and priorities of the NEEA to be more robust and more relevant to EE in today's context (see Recommendation #4 in Section 4).

3.1.2 Support for implementation of NEEA programs

Although the NEEA is a critical law that set the course for EE at EPA, it was cut from the budget but reinstated by Congress in the past few years. The budget supporting the NEEA has never been fully funded to its 1990 legislated ceiling of \$14 million per year. Translating into today's dollars, it becomes clear that NEEA support could be most effective with a much higher ceiling.

In February 2015, EPA submitted a request for Fiscal Year 2016 with an unprecedented budget for OEE at \$10.996 million. While still not reaching the \$14 million ceiling, it is a movement in the right direction and gives credibility to EE at EPA.

3.2 Office of Environmental Education

The NEEA established OEE to undertake a wide range of responsibilities, including (1) developing and managing EE activities within EPA; (2) coordinating EE efforts with other federal agencies; (3) supporting development and dissemination of model EE curricula and media materials; (4) supporting training and professional development, including fellowships; and (5) managing an EE Grants Program.⁶⁰ Because of the NEEA, OEE provides EE with a permanent home in EPA and helps to demonstrate the necessity and importance of an education field dedicated to human and environmental health protection.

The current NEEAC was appointed during a period of uncertainty for OEE. OEE experienced a rapid succession of leaders with differing agendas and OEE's budget support was tentative. More recently, OEE leadership has been more stable, and the establishment of a permanent deputy director position has increased the office's ability to perform effectively. OEE also recently transitioned from its location in the Office of External Affairs to the Office of Public Engagement and Environmental Education within the Office of the Administrator. This move has strengthened the potential for EE to help achieve EPA's mission. It has elevated OEE within the agency, making collaboration within EPA and between federal agencies more effective and increasing the prominence of EE.

The following sections provide additional information on key OEE activities.



Progress in Implementing NEEAC's 2005 Recommendations: Funding for Environmental Protection

Emphasis on education is evidenced in EPA's 2014–2018 priorities, which include addressing climate change, air quality, and water quality issues, and protecting America's water conservation, sustainable development, pollution prevention, and enforcement and compliance efforts. Education is a key strategy for accomplishing each of these overarching environmental goals.

3.2.1 EE Grants Program

The purpose of OEE's [EE Grants Program](#) is to support EE projects that increase public awareness about environmental issues and provide participants with the skills to take responsible actions to protect the environment. This grant program provides financial support for projects that design, demonstrate, or disseminate EE practices, methods, or techniques. Funded projects are intended to foster collaboration, contribute to research and evaluation in the field, advance the cultural relevancy of EE, and serve as models that can be replicated in a variety of settings.^{61, 62}

Since 1992, EPA has distributed between \$2 million and \$3.5 million in grant funding per year for a total of \$62 million, supporting more than 3,600 grant projects. However, the program is highly competitive and less than 10% of applications receive funding. This competitiveness reflects the need for more EE funding across the country. In the national listening sessions conducted by NEEAC for this assessment, the most frequently identified obstacle to improving EE was lack of funding.

Exhibit 3.1 displays information about the categories of grant recipients through 2014. Awards for the 2015 EE Grants Program are pending at the time of this report.

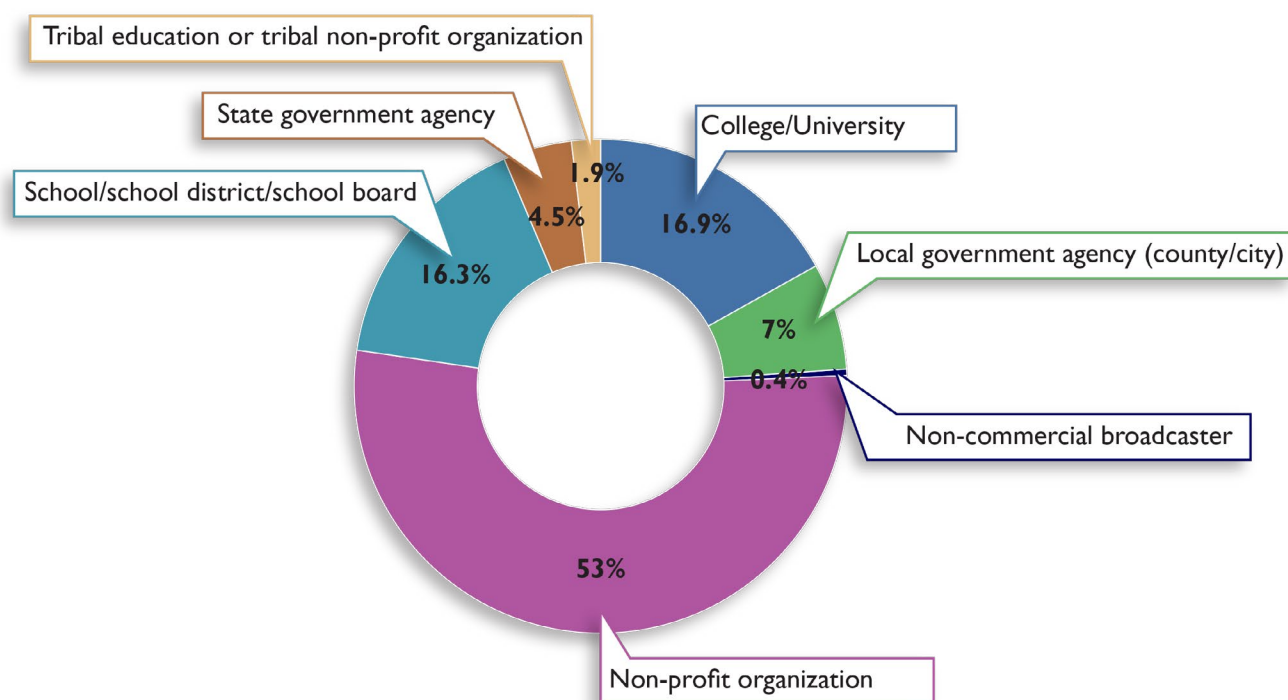


Exhibit 3.1. Percentage of EE grants awarded since 1992 by recipient category.

Progress in Implementing NEEAC's 2005 Recommendations: EE Grants Program

- It is important that EPA's EE funding be allocated in a strategic manner to highlight programs that fulfill EPA's mission and goals and that further the field of EE. As recommended by NEEAC in 2005, the EE Grants Program has established a mechanism for accountability that requires awardees to develop logic models as part of the grant application process. These logic models are based on awardee-determined outputs and short-, medium-, and long-term outcomes that create clear targets for each grant. When done well, logic models can support the alignment of EE goals to specific project objectives,²⁵ and can help OEE to understand the overall impact of the EE Grants Program (see Recommendation 1 in Section 4).
- Grant collaborations among EPA, the National Oceanic and Atmospheric Administration (NOAA), NASA, the National Park Service (NPS), and the National Science Foundation (NSF) are forward-thinking and have well-designed evaluation components.

As recommended in 2005, the EE Grants Program emphasizes collaborations and partnerships but does not require them. OEE has placed a stronger emphasis on projects that involve regional collaboration. Especially since 2009, OEE has dedicated larger amounts of funding to fewer projects (see Exhibit 3.2).



Exhibit 3.2. EE Grants funding data.⁶²

3.2.2 EPA and OEE partnerships and collaborations

Progress in Implementing NEEAC's 2005 Recommendations: OEE Partnerships and Collaboration

In 2008, EPA and NOAA jointly funded the **National Environmental Literacy Assessment**, a measure of environmental literacy for 6th–8th grade students that is intended to develop a baseline for future comparison.⁶³ EPA provided joint funding with NOAA for Phase I, and provided staff support for Phases II and III (NOAA continued to fund Phases II and III). NAAEE administered all three phases.

In 2005, NEEAC recommended researching the correlation between education efforts and environmental quality. In response, OEE funded a 2008 study in cooperation with the NPS Conservation Study Institute and Shelburne Farms in Vermont. The two-year study investigated the impact of education interventions that addressed air quality.⁶⁴ The study found preliminary evidence that education does improve environmental quality.

OEE also supported the development of **My EE Evaluation Resource Assistant**, an online tool used to help educators develop a plan to evaluate their programs. Supporting organizations' evaluation efforts represent forward progress. However, there remains a need for impact evaluation coordination and findings dissemination. Evaluation on a program-by-program basis does little to inform the whole picture of EE, and EE organizations rarely have staff devoted to evaluation efforts.

OEE and other EPA offices are collaborating with other organizations to bolster the impact of EE efforts in the United States. Examples of OEE's partnerships and collaborations include:

- **Take a Second Campaign.** OEE coordinates with NEEF to provide access to a clearinghouse of environmental data to inform and engage the public.
- **Teacher Training Guidelines.** OEE collaborates with NAAEE to support the development of EE Guidelines for Excellence through a teacher training program.
- **Global EE Program.** In partnership with NAAEE, OEE is broadening the EE audience by working with international partners in Chile and Taiwan.

Other examples of EPA collaboration for EE include:

- **Inter-agency collaboration.** EPA collaborates with other federal agencies that have environmental protection mandates. This collaboration involves implementing various programs and workgroups, including Hands on the Land, **America's Great Outdoor Initiative**, and the education workgroup of the **United States Global Change Research Program**. OEE provided input into the development of the U.S. Department of Education Green Ribbon Schools (ED-GRS) network's pillar to evaluate school performance in EE. Topics under this pillar include conservation education, climate change education, and environment and ocean literacy.
- **Pollution Prevention Program.** EPA's Pollution Prevention Program addresses pollution in air, land, and water. It proposed e-enterprise initiatives that target small, medium, and large businesses; Tribal communities; and industrial sectors, with the goal of cultivating best technical practices and consumer product development strategies that reduce pollution and support multimedia sustainability objectives.
- **My Environment.** EPA developed this search application to provide a cross-section of environmental information based on a user's location. My Environment is a powerful tool for EE because it provides real-time data on air and water quality based on ZIP code. It also provides users with information on local energy consumption and production, health statistics, ways to connect to volunteer opportunities, and a means for announcing environmental clean-up efforts in the user's community.

NEEAC recognizes the unique relationship between sovereign Tribal governments and the United States as a government-to-government relationship. NEEAC also recognizes the cultural values of Tribal input in their own place-based environmental activities. With 21st century EE and training, Tribes will exercise self-autonomy as a partner facing environmental issues such as climate change.

3.3 Additional NEEA-mandated programs and structures

This section provides updates on other initiatives defined by the NEEA. OEE implements the majority of these activities.

3.3.1 NEEAC

OEE leads and participates in several advisory groups to continue to build on long-standing EE efforts and to improve communication among environmental educators. NEEAC is one such group. It is comprised of 11 members representing primary and secondary education, colleges and universities, nonprofit EE organizations, state departments of education and natural resources, and business and industry. Appointed in 2012, current NEEAC's members represent cultural, ethnic, gender, and age diversity; they also possess a range of professional backgrounds and expertise. NEEAC was inactive between 2007 and 2012, resulting in a unfortunate lack of transition between councils and no institutional memory within the council. There are also opportunities for improving the continuity of exchanges between NEEAC and EPA; these opportunities are included in the recommendations to the EPA Administrator (as discussed under Recommendation 1 in Section 4).

3.3.2 EE Task Force

The EE Task Force is comprised of representatives from federal agencies. Its objective is to ensure coordination of EE-related activities across federal agencies.⁶¹ In December 2012, the EE Task Force reconvened along with NEEAC. However, NEEAC has not observed any subsequent activity from the EE Task Force. There are opportunities for improving the effectiveness of collaboration between the EE Task Force and NEEAC (see Recommendation 3 in Section 4 for more detail).

3.3.3 NEEF

Section 3.1 provided information on the relationship between EPA and NEEF, as chartered by the NEEA. It is important to emphasize that **NEEF provides an unparalleled opportunity to support OEE in its efforts to champion, coordinate, and communicate EE**. The 2015 NEEAC recognizes currently unmet needs within OEE that can be resolved by leveraging NEEF's capabilities.

NEEF is the nation's leading organization in lifelong environmental learning. Its focus is on connecting people to the knowledge they need to improve the quality of their lives and the health of the planet. NEEF has proven its ability to support EPA's leadership in EE by:

- Building partnerships with corporations and other national EE organizations
- Generating grants, gifts, and donations (see Exhibit 3.3 for a breakdown of NEEF's 2012 income, and Exhibit 3.4 for information on NEEF's grants in 2012)
- Facilitating cross-agency collaboration for EE [Please note that this is accomplished in part through board meetings held with ex-officio federal agency members (no voting capacity) that meet 3–4 times each year as advisors to NEEF and who receive progress reports from NEEF]
- Creating results while working with a small percentage (10%) of EPA's total EE budget
- Keeping up-to-date on recent EE research and contributing to the body of EE evidence, which helps lend credibility to EE nationally
- Developing innovative and engaging programs that are relevant to current issues and urgencies
- Maintaining awareness, enhancing understanding, and disseminating information regarding the relationship between EE and STEM as illustrated by partnerships with corporate supporters.

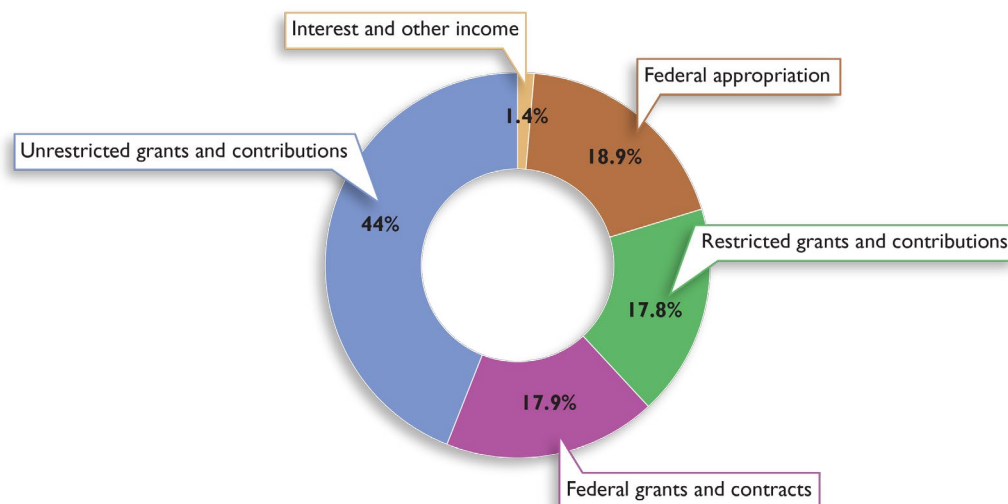


Exhibit 3.3. NEEF income in 2012.

awards & grants FY 2012

In our fiscal year 2012, October 1, 2011–September 30, 2012, NEEF provided more than \$503,000 in grants and awards to recipients in 39 states and Guam. Recipients included 16 schools, 27 teachers, 53 friends of the land groups, 37 public land managers and 20 students.



Exhibit 3.4. NEEF grants in 2012.

3.3.4 EECapacity (formerly Environmental Education and Training Partnership)



Environmental educator training for teachers and other education professionals is provided under the NEEA through a cooperative agreement awarded by OEE. This EPA program, now referred to as [EECapacity](#), represents a promising approach to meeting 21st century EE needs through partnership with academic institutions. EECapacity provides increased training opportunities for formal and non-formal educators, advances EE at state and national levels, and reaches diverse audiences. EECapacity's key contributions to the EE field include [improving access](#)

[to research, providing quality online professional development](#) on emerging topics and trends, and [providing resources for environmental educators](#).

Progress in Implementing NEEAC's 2005 Recommendations: EECapacity

The EECapacity program has made considerable progress in recent years, including:

Establishing a professional learning community for 30 educators who currently work or are interested in working with Hispanic/Latino communities to create an online publication and explore non-traditional partners.

Establishing online teacher training courses designed to improve teachers' abilities to educate people about the environment. Courses include EE in Urban Communities; Measuring EE Outcomes; Bridging Communities in EE; Civic Ecology, Health, and the Environment; EE in Non-formal Settings; and Urban Stewardship Leaders Training.

Establishing the [Community Climate Change Fellowship Program](#). This program assists educators and community leaders in addressing climate change-related issues in their communities while promoting leadership, innovation, and strategies for broadening the audience of EE.

Continuing to support the inclusion of a diverse EE audience and embracing other educational and community education approaches that are tailored to 21st century EE. In partnership with NAAEE and Cornell University, EECapacity forges new pathways for the EE field of practice.

3.3.5 Environmental internships and fellowships

The NEEA included requirements for the creation of internships and fellowship programs, but these programs are currently inactive. Originally intended for undergraduate, graduate and postdoctoral students, these opportunities were managed by the OEE and funded through grants. These opportunities enabled students to acquire 21st century skills in a more relevant, integrated, and academic structure that contributed to national STEM goals and EE objectives. These programs represent an opportunity for OEE to retain a highly skilled and technically proficient STEM workforce prior to graduation.⁶⁵

Today, EPA provides access to numerous professional opportunities related to environmental protection. Information on internships, fellowships, scholarships, and post-doctoral opportunities at EPA and other federal agencies (e.g., the American Association for the Advancement of Science and the National Research Council) are available via [EPA's Careers website](#).

Progress in Implementing NEEAC's 2005 Recommendations: Environmental Internships and Fellowships

EPA's support for educational development in recent years includes the following:

- The National Network for Environmental Management Studies Fellowship Program provided short- or long-term research opportunities for graduate and undergraduate students and encouraged careers in environmental protection. The program was active from 1984 to 2013.
- EPA's Tribal ecoAmbassadors Program forms partnerships between Tribal college and university students and EPA scientists. The goal of these partnerships is to direct EPA resources toward the most pressing environmental issues in Tribal communities, as identified by the students. This innovative program, managed by the Office of International and Tribal Affairs, addresses the intersecting needs for Tribal community sovereignty, EE in higher education, and training for green jobs.
- EECapacity's Community Climate Change Fellowship Program is building a network of professionals to tackle community problems related to climate change (see Section 3.3.4 for more information).

3.3.6 EE awards

EPA and NEEF recognize exemplary EE programs, educators, and youth-developed projects through several annual awards programs highlighted below.

EPA President's Environmental Youth Award

The [President's Environmental Youth Award](#) (PEYA) program promotes awareness of America's resources and encourages positive community involvement. Through this program, the President of the United States joins with EPA to recognize young people for protecting the nation's air, water, land, and ecology. One outstanding project from each region is selected for national recognition. Eligible projects are developed by individuals, school classes (K–12), summer camps, and youth organizations to promote environmental stewardship. Examples of 2014 award winning projects are provided below; all awardee information is provided by EPA.⁶⁶



Arsenic: It's What's for Dinner (Arsenic Arresters)
Whiteface, Texas (EPA Region 6)

Groundwater that is contaminated by arsenic is the main source of drinking water in Cochran County, Texas. Arsenic is a naturally occurring metal and a known carcinogen. Eight middle school students, called the Arsenic Arresters, led a research project in Whiteface, Texas, with the goal of reducing local arsenic contamination and limiting human exposure. The group conducted research, interviewed experts in the field, and tested drinking water, wetlands, native plants, and soil in their community. They discovered that sand dropseed (a type of grass) is an effective tool for removing arsenic from the soil, and that water drawn from the hot side of the tap had lower levels of arsenic than water from the cold side. Based on these results, the Arsenic Arresters instituted an educational campaign that involved creating outreach materials and hosting public awareness days. As a result of this project, arsenic levels in their county are decreasing.

Creating an Efficient and Novel Method for Remediation of Marine Oil Spills through STEM Principles (Sahil Veeramoney)
Portland, Oregon (EPA Region 10)

After studying the environmental impact of the 2010 Deepwater Horizon oil spill and other oil spills, Sahil Veeramoney began to research different methods for environmental remediation. He discovered that the current methods for oil spill remediation were inefficient, expensive, and toxic. Sahil wanted to develop a more



efficient method that could be deployed in the United States and worldwide. He combined ferromagnetic nanoparticles with chlorella algae to magnetize and separate oil. In a laboratory setting, his results showed significant improvement in efficiency over current remediation methods. He presented his findings to other students, the public, and professionals. His presentations resulted in an increased general awareness about the environmental impact of oil spills, the inefficiency of current methods of remediation, and the need to develop more efficient methods of environmental management after oil spills.

Presidential Innovation Awards for Environmental Educators

Through the [Presidential Innovation Awards for Environmental Educators](#) (PIAEE), the White House Council on Environmental Quality (CEQ) and EPA recognize outstanding K–12 teachers who employ innovative approaches to EE and use the environment as a context for student learning. Up to two teachers from each of EPA's 10 regions are selected to receive this award each year. Examples of 2014 award winners are provided below; awardee information is provided by EPA⁶⁷ and NEEF.⁵⁹



*Nathaniel Wight, Bronx Design & Construction Academy
Bronx, New York*

Bronx Design & Construction Academy is located in one of the poorest Congressional districts in the United States. As a founding teacher, Nathaniel Wight was pivotal in creating a learning environment where students make connections between sustainable technology and real-world environmental issues. Nathaniel coordinated the installation of a green roof at the school. He uses the green roof to educate students in his Energy-Environment Research Club and ecology classes about environmentally sustainable building practices, food production, and urban ecosystems. Students collect and evaluate temperature data to learn about the urban heat island effect, an important environmental issue in cities. In addition, architectural and pre-engineering students survey the roof and use computer-aided programs to digitize data, plumbing students build rainwater harvesting and irrigation systems that conserve water, and carpentry students experiment with sustainable building designs. Nathaniel's students also use organic waste collected from the school to produce compost, which is then used in the green roof's garden.

Nathaniel's students actively participate in sustainability events outside the school and have been recognized locally, nationally, and internationally for their environmental stewardship. Nathaniel also serves as a mentor to his fellow teachers; his dedication and passion for EE inspire other educators to learn and teach about environmental sustainability. His efforts have been so successful that plans to build an Energy-Environment Research Center at the school are underway. The center will provide another opportunity for students and the community to learn about environmental topics such as renewable energy systems.

*Angela Whittaker, Cumberland County High School & Middle School
Cumberland, Virginia*

As a teacher for 17 years, Angela Whittaker has played a pivotal role in developing EE curricula in Virginia and nationwide. For the past seven years, she has been developing the Education for Sustainability Program at the Cumberland County High School and Middle School in Cumberland, Virginia. This program fosters partnerships among the school, local businesses, and the community. The program consists of hands-on courses in career and technical education (which have been adopted by the Virginia Department of Education), sustainable and renewable energy, and green building design. Angela also developed Learning from Nature, a middle-school course that teaches students about biological gardening, soil management, sustainable landscape design, and water conservation. The course enables students to engage with community members who have expertise in outdoor gardens, greenhouses, and research landscapes. Each student designs a project to educate others about the importance of healthy food and sustainable resource management. For example, several of her students built a raised bed garden that supplies food to the school cafeteria, the cooking class, and the local food bank.



Angela also developed courses for grades 9 through 12 that focus on green building design and renewable technologies. As part of these courses, students complete service projects that benefit the school (e.g., building compost bins for the cafeteria, designing photovoltaic systems to be installed on the school roof, teaching younger students about solar thermal energy and recycling, designing a solar energy-powered irrigation system for the school's garden). Angela has also assisted her students in participating in national activities, such as the Recycle Bowl contest. Her dedication to EE continues to inspire students to promote environmental sustainability in their school and their community.

NEEF Bartlett Award

The **Richard C. Bartlett Award**, established by NEEF and supported by The Bartlett Foundation, was created to recognize teachers who best represent Mr. Bartlett's passion for and leadership in EE. Mr. Bartlett (1935–2011) considered the role of teachers in integrating EE to be critical for preserving the natural world for future generations. His commitment to conservation and EE spanned over four decades and inspired environmental educators nationwide. An example of a recent Bartlett Award winner is provided below.

*Laura Wilbanks: Whiteface Elementary School
Whiteface, Texas*

Laura Wilbanks' passion is using the environment as a platform to excite the minds and hearts of children and youth. Her career includes non-formal outdoor education with the New Mexico Museum of Natural History in Las Cruces, the Youth Conservation Corps in New Mexico and Indiana, youth summer camps in Texas and New Mexico, and 25 years in the Texas public school system. Laura's EE program at the Whiteface Elementary School, called Science Rocks U, asks students to identify environmental challenges in their community and then solve those issues using STEM skills. The program integrates cross-curricular subject matter to enable students to learn more about their local and global environment. As part of the program, Laura organizes park and museum visits that help students view the historical, geographical, and cultural significance of their environment. Field studies utilize mathematics and science and even incorporate language arts through routine field journal entries. The effectiveness of the program is evidenced by the impressive number of Laura's Science Rocks U students who have won state and national competitions.



Laura shows a strong dedication not only to her students but to the community at large. She engages with local corporations, wildlife refuges, and private landowners to find outdoor learning spaces for her students. She also mentors other teachers in the region and connects her students with professionals in the area to help solve real environmental issues in their community.⁵⁹

Other NEEA Awards

The NEEA outlined four additional awards to be given out by EPA at the recommendation of NEEAC. These awards are not currently active because they were costly, administratively intensive, and duplicated other national awards.

Progress in Implementing NEEAC's 2005 Recommendations: EE Awards

OEE and the White House CEQ combined the 2013–2014 annual joint awards ceremony for PEYA, PIAEE, and the Bartlett Award with a workshop where the awardees were asked to provide input on the federal government's EE efforts. Through this workshop format, OEE and the CEQ generated excellent feedback. At this time, it is unclear how that feedback will be used in the future.

4. NEEAC 2015 Recommendations

This section presents NEEAC's recommendations for EPA to **engage, lead, and fund** EE. It includes general guiding principles for the 2015 NEEAC recommendations (Section 4.1), detailed descriptions of the specific recommendations (Section 4.2), information on the intended impacts and outcomes of NEEAC's recommendations (Section 4.3), and concluding thoughts (Section 4.4).

The recommendations presented here were developed to be actionable, meaningful, realistic, and relevant to the agency's mission of protecting the environment and human health. The recommendations are designed to strengthen EE efforts throughout EPA and to enable EPA to succeed in its role as the national champion of EE; this role is a critical one, given the urgency of the complex environmental issues our country currently faces.

It is with this spirit of hope and cooperation that NEEAC offers its 2015 recommendations to the EPA Administrator.

4.1 Guiding principles for 2015 NEEAC recommendations

EPA has a key opportunity to engage, lead, and fund EE by using many of the systems and structures that are already in place within the agency. For each of these focus areas, NEEAC sees specific guiding principles:

- **Engage:** EE is a meaningful strategy to support EPA's mission of protecting the environment and human health for all groups.
- **Lead:** There is a need for consistent EE leadership at top levels of the federal government.
- **Fund:** EE requires funding that is appropriately distributed among national, regional, and local efforts.

At the nexus of these three focus areas, EPA can create new opportunities for OEE to champion EE, collaborate with federal agencies and national organizations, and communicate with the EE field:

- **Champion:** OEE champions EE by (1) setting a high standard of EE in the federal government (both within EPA and externally), (2) continuing to collaborate with national NGOs and local EE leaders through the EE Regional Coordinators, and (3) connecting research/evaluation and practice.
- **Collaborate:** OEE collaborates and integrates EE internally at EPA, across other agencies, and with NGOs, businesses and industries, Tribal nations, and other stakeholders. OEE also collaborates by cultivating new partnerships within the EE field and with other movements that have similar goals (e.g., healthy communities, empowerment, outdoor recreation, and children in nature).
- **Communicate:** OEE communicates clearly the ongoing work needed to further EE across the federal government, at local government levels, in the media, and across a range of civic organizations. Through its awards programs, OEE also communicates about the benefits of EE, the need for widespread support for EE initiatives, and key priorities for the field.

Exhibit 4.1 illustrates the interplay of EPA's three EE focus areas and OEE's three primary roles.

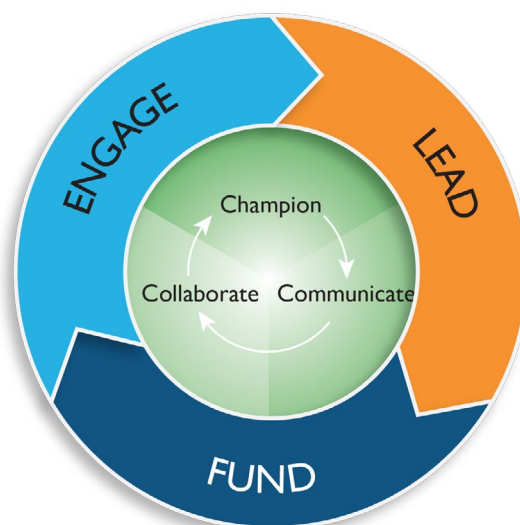


Exhibit 4.1. EPA's and OEE's roles in EE.

4.2 Recommendations to the EPA Administrator

With continued input from internal EE experts, federal agencies involved in EE, external EE partners through NEEF, the EE Task Force, and national NGOs, NEEAC developed five overarching recommendations for EPA. These recommendations are organized by focus area in the following sections, and are summarized in Exhibit 4.2.

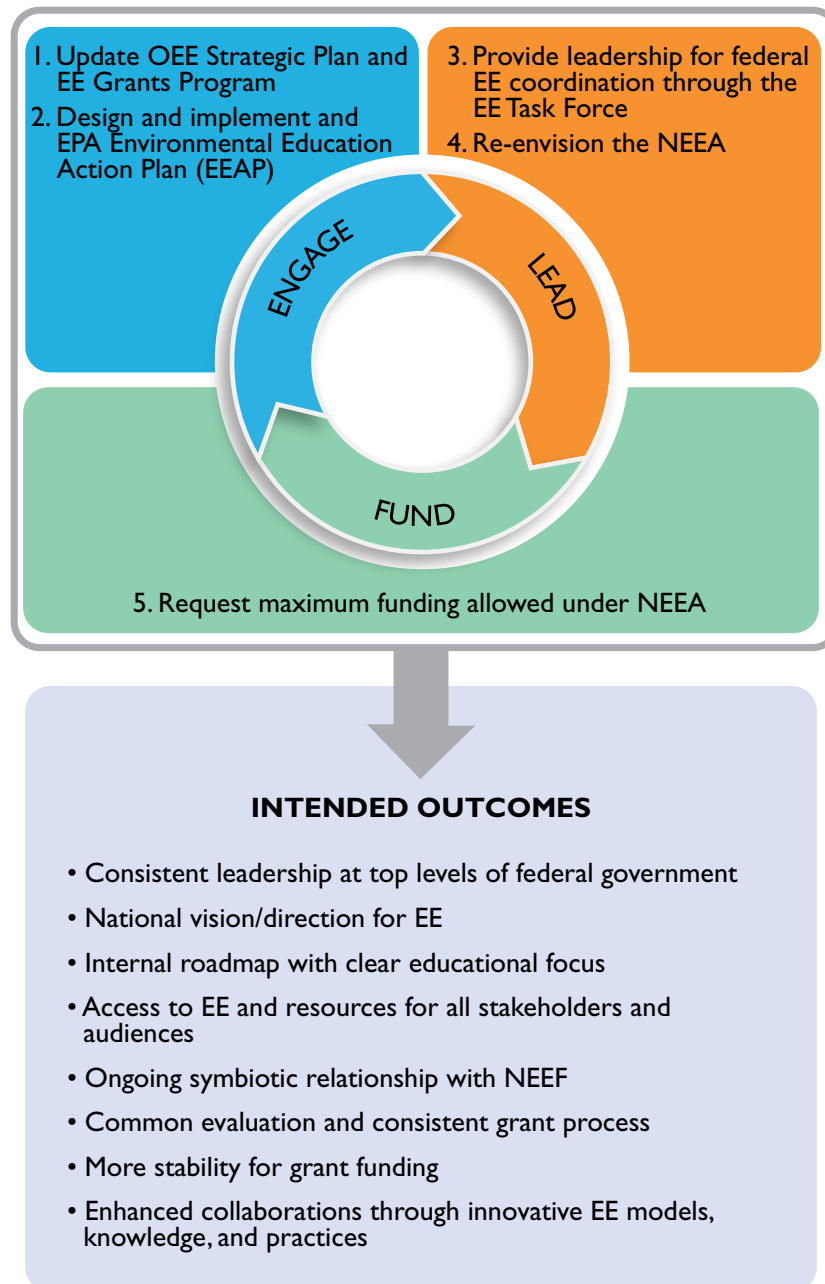


Exhibit 4.2. Summary of NEEAC 2015 recommendations and intended outcomes.

4.2.1 Engage

Recommendation 1: Update the OEE Strategic Plan and EE Grants Program

EPA has established several initiatives related to EE. EPA should engage employees by equipping them with the EE tools and training they need to support EPA's mission through EE. This will lay the foundation for OEE **collaboration** within the agency to ensure efficient use of resources and increase effectiveness of EE outreach. In particular, NEEAC sees considerable potential benefits from more effective collaboration between EPA and NEEF.

Update the OEE Strategic Plan. NEEAC recommends that OEE periodically review and revise its strategic action plan to align with updates to agency-wide strategic planning. Currently, EPA's strategic plan dates from 2014 to 2018 while OEE's strategic plan expired in 2011.

NEEAC recommends that OEE's strategic plan be updated to enhance collaborative efforts to leverage new funding sources, especially with NEEF. As part of its Congressional Charter, NEEF can "encourage, accept, leverage, and administer private gifts for the benefit of, or in connection with, the environmental and training activities and services of the United States Environmental Protection Agency."⁶¹

Toward this end, NEEAC recommends that OEE and NEEF meet semi-annually (two times per year) to jointly identify EPA and NEEF priorities for EE that best lend themselves to attracting and receiving private funding. The EPA Administrator and Deputy Administrator hold the authority to request funds for EE through NEEF and the above strategy can be developed with OEE.

NEEAC recommends that the updated OEE strategic plan:

- **Include current frameworks for environmental literacy.** These frameworks should build on the Tbilisi Declaration, but move forward from the outdated linear models to ones that more accurately represent current understanding of how environmental literacy is achieved.
- **Strategically use the expertise of OEE staff and EPA regional EE coordinators.**
- **Leverage relevant research and evaluation findings to keep current research and evaluation efforts in the strategic planning process.** This can be achieved through partnerships with EECapacity and NGOs, such as NEEF, NAAEE, the C&NN, and Nature Bridge.
- **Outline communication strategies that include an overall digital strategy and activities for using technological tools to engage with stakeholders.** OEE can adapt and design communication strategies that target EE professionals and all segments of the public where formal, non-formal, and informal environmental learning can occur. This communication will benefit EE professionals by providing access to a clearinghouse of current EE research, evaluation practices, and model programs and approaches. It will benefit other stakeholder groups by providing access to information regarding the value and importance of EE. Exhibit 4.3 presents a listing of the specific actions necessary to complete this step.



Disseminate EE research and evaluation outcomes

- Link to existing networks of EE and related EE research, including the eeLink through EECapacity, NAAEE, the C&NN research database, and the Nature Bridge research bulletins, among others
- Share information on blogs, including links to OEE resources
- Publish evaluation reports from the EE Grants Program

Create two-way communication within EPA and between appropriate federal agencies

- Maximize the EE Task Force to engage and communicate with all federal agencies that are active in EE
- Improve communication and collaboration both among offices within EPA and between EPA and other federal agencies by using strategies that are tailored to the specific offices and agencies

Create two-way communication with the EE field

- Coordinate messaging with national EE and related organizations
- Coordinate messaging with EPA regional EE coordinators
- Improve OEE's website
 - Include a portal or dashboard that provides professional environmental educators with access to accurate science resources that can be used to support their work in local communities. The portal can also serve as a resource for science and major research initiatives that are interested in EE
 - Update expired or non-functional links on the OEE webpage
 - Utilize social media for two-way engagement
 - Provide links to other EPA efforts to inform the public (e.g., MyEnvironment, EJSCREEN)

Communicate EE's value and relevance to the public and key stakeholders

- Customize messages to suit target audiences and sectors (e.g., formal, non-formal, informal)
- Include ongoing strategies, such as public service announcements; digital and social media; live events; educational seminars; training events; educator focus groups; blogging sessions with key educational influencers; online surveys; computer simulations; and competitions and grassroots action through NEEF, NAAEE, and other NGO partners

Exhibit 4.3. Recommended actions to develop OEE communication strategies

Update the EE Grants Program. The EE Grants Program is a critical source of funding for the EE field. The program makes EE a stronger field by (1) supporting promising programs and partnerships; (2) fostering collaboration instead of competition; (3) advancing EE's cultural relevancy for a diverse landscape; and (4) providing funding at national, regional, and local levels.

NEEAC recommends that OEE continue the EE Grants Program, synthesize and share evaluation reports, and leverage additional funding. NEEAC also recommends the following specific improvements to the program:

Increase overall grant funding by requesting the maximum allowed under the NEEA. When considering funding projects, NEEAC recommends that OEE support EE collaborations with non-traditional partnerships and under-resourced communities. In particular, NEEAC recommends that EPA encourage collaborations that support under-represented groups through:

- Projects originated by Tribal groups (as opposed to projects that include Tribal groups, but may not include direct services or funds to Tribal participants)
- Projects that include access to EE for communities that do not have access to EE programs or resources
- Projects that prepare the future environmental workforce.

Additionally, EPA should evaluate the feasibility of designating a portion of environmental penalties levied by the federal government on environmental polluters to fund EE initiatives.

Streamline the awards process. NEEAC recommends that OEE expedite the grant application process by first requiring letters of intent to narrow the applicant pool. Applicants who pass this screening should then be required to complete the lengthy federal grant application. This approach might reduce the burden on OEE staff and the amount of time that recipients must wait to receive funding.

Formalize a Grants Review Team. Building a consistent team of grant reviewers for headquarters and regions who serve for overlapping three-year terms can enhance the grant-review process and ensure consistency across awards. NEEAC recommends building a team of reviewers from the following pools:

- Active NEEAC members, a group that already represents diverse interests and backgrounds as well as ethnic/gender diversity
- Former award recipients
- NAAEE's Affiliate Network, which is an at-ready, state-level network of backbone organizations in existence to support and promote EE in their states.

Compile, compare, and analyze the evaluation of grants. NEEAC acknowledges the great strides OEE has made in evaluating grant award projects. Nevertheless, it is important to note that there is no collective understanding of whether EE grants are meeting the overall goals of the EE Grants Program. Using project logic models and standard reporting questionnaires, OEE can take advantage of grant reports to build a greater understanding of EE, learn whether grants are achieving their goals, and set future priorities based on lessons learned through the grant projects.

Change operational procedures for NEEAC. NEEAC recommends the following actions to enhance its partnership with EPA (specifically OEE):

- **Modernize the role of the NEEAC to offer more comprehensive expertise and support to OEE.** This involves ensuring consistent appointment of members for overlapping terms. Overlapping terms ensure a consistent level of engagement and rigor between biennial reports to the administrator. Modernizing the role of the NEEAC should also involve instituting ongoing, meaningful engagement opportunities for NEEAC members and OEE staff.
- **Facilitate ongoing knowledge exchange between OEE and the NEEAC beyond the biennial reports.** This may include a series of shorter white papers regarding trends and opportunities in EE. These white papers could be developed collaboratively by NEEAC and OEE and could be prepared in conjunction with the EE Summit (see Recommendation 3). This ongoing exchange, in addition to the biennial report, would enable the NEEAC to provide deeper and more targeted advice on special topics and emerging trends.
- **Support NEEAC members to hold annual listening sessions and town hall forums with each member's specified stakeholder group.** This would enable members to represent segments and industries in a more robust and comprehensive manner.

Recommendation 2: Design and implement an EPA EE Action Plan

NEEAC recommends that EPA develop an EE Action Plan (EEAP). The EEAP is envisioned as a blueprint for the coordination of EE within EPA. It should be aligned with the agency's overall strategic plan to ensure that EE efforts support the agency's mission of protecting human health and the environment.

In 2010, the Congressional architects of a NEEA reauthorization bill voiced similar recommendations:

“(13) ensure the coordination of Federal statutes and programs administered by the Agency relating to EE, consistent with the provisions and purposes of those programs, and work to reduce duplication or inconsistencies within those programs; (14) work with the Department of Education, the Federal Interagency Committee on Education, the National Oceanic and Atmospheric Administration, and other Federal agencies to ensure the effective coordination of programs relating to EE, including EE programs to encourage outdoor recreation relating to national, State, and local parks, national forests, national marine sanctuaries, and wildlife refuges.”⁶⁸

National Environmental Education Reauthorization Act of 2010

The creation and implementation of an agency-wide EEAP will require leadership. NEEAC believes OEE is the appropriate office to lead this effort. However, given the limitations for staffing under the NEEA, it would be understandable if responsibility for the EEAP was delegated elsewhere within the agency.

The EEAP could integrate the following activities:

- Identifying appropriate EPA offices that are involved in EE or working with environmental messages.
- Convening regular dialogues with representatives of relevant EPA offices, NEEF, and a NEEAC liaison to identify EE-related gaps and overlaps within the agency.
- Creating a series of actionable next steps for each EPA office's program.
- Providing staff training for targeted EPA employees at headquarters and in regional offices. The training would educate staff on strategies for improving environmental literacy.
- Conducting an agency-wide awareness-raising campaign.

In addition, the EEAP could include a plan to re-energize and invest in EPA regional EE coordinators, who are well-positioned to amplify local, state, and regional EE efforts. In particular, the EEAP could include provisions for the following:

- Professional development opportunities for EPA regional EE coordinators so that they are highly trained in EE and connected to their regional networks
- Opportunities for communication and coordination between OEE and the Office of Environmental Justice, both of which employ EPA regional EE coordinators
- Opportunities for NAAEE's Affiliate Network to provide EPA regional EE coordinators with state-level input.

These activities and exchanges may currently occur, but not consistently across EPA regions.

4.2.2 Lead

EPA is in a position to provide consistent leadership for the EE field by facilitating strategic inter-agency coordination at top levels of the federal government. OEE can champion EE efforts within the agency, across agencies, and with national leaders from the EE field. In this way, EPA and OEE can support integration, maximize funding, and share resources and research with other key stakeholders.

“Communities of practice need many different resources: ideas, mentors, processes, technology, equipment, money. Each is important, but foremost among these is learning and knowledge: knowing what techniques and processes work well, and learning from experience as people do the work.”⁶⁹

The Berkana Institute, 2006

Recommendation 3: Provide leadership for federal EE coordination through the EE Task Force

EE is practiced and supported by numerous federal agencies. A coordinated approach to EE will reduce duplication and maximize the effectiveness of federal support for EE nationally. NEEAC recommends that EPA lead the coordination of EE efforts across federal agencies through convenings of the EE Task Force.

Benefits of improved EE coordination across the federal government include:

- Creation of strong partnerships and networks between federal agencies.
- Integration of current environmental literacy concepts across the agency as strategies for engaging with the public regarding regulation and policy.
- Training for field personnel to support engagement with the public on issues of environmental regulation and other EPA priorities.
- Improved ability to communicate complex technical and scientific knowledge to the public and the press through informed educational strategies, and not simply by disseminating information. Examples of this are popping up in EPA, but are not the norm.
- Strengthening of coordination and cooperation between federal agencies working on environmental outcomes.
- Sustained multiagency efforts toward shared goals.
- Improved accountability through standardized reporting and evaluation.

NEEAC envisions OEE leading this effort by engaging in dialogue with representatives of relevant federal agencies, NEEF, and a NEEAC liaison. The purpose of this dialogue is to share knowledge and ideas pertaining to EE program goals, audiences, challenges, opportunities, gaps, and overlaps. OEE could lead the agencies in developing coordinated, actionable next steps for each of their programs.

In order to re-energize and sustain the cross-agency EE Task Force as it was envisioned by the NEEA, NEEAC recommends that OEE take the following actions:

- **Convene in-person EE Task Force meetings on a regular basis to share information on programs, initiatives, and resources.** This action would help to avoid redundancy, increase efficiency, and leverage funding.
- **Ensure that the EE Task Force has a liaison for NEEAC, and vice versa.** This action would enable both groups to maintain effective communication.
- **Use in-kind services from other federal agencies.** These services might include such things as knowledge, data, and expertise.
- **Explore what the EE Task Force can do for workforce training.** This action would be especially useful for improving opportunities available to Tribal and under-served populations, and audiences of all ages.
- **Explore collaborative ways to reinstate the internship and fellowship program.** This might involve collaboration through partnerships and cost-sharing strategies (e.g., instituting internships and fellowships at local and regional levels rather than at EPA headquarters).

NEEAC also recommends that OEE convene a wide variety of stakeholders in an annual EE summit. The summit would provide an opportunity to convene stakeholders and highlight key environmental and community issues. The summit could be based on a different theme each year (e.g., green workforce, climate education) to help maintain momentum, solidify partnerships, and recognize a wide range of successes. The summit could be modeled after the 2014 awards ceremony coordinated by the CEQ and EPA, where awardees attended a workshop to generate ideas on further EE strategies. Exhibit 4.4 identifies some specific recommended activities that could expand on that example of successful coordination.

Hold summit in conjunction with PEYA and PIAEE awards ceremony

- Ensure each annual summit has a theme that is based on current trends in EE (e.g., green workforce, climate education)
- Invite participants from key stakeholder groups (e.g., OEE, NEEAC members, NEEF, EE Task Force, EPA regional EE coordinators, EECapacity Principal Investigator and staff, EE researchers, and Tribal Leaders)
- Invite leading researchers, program leaders, formal and non-formal educators, corporations, community leaders, policymakers, and audiences to provide input and share knowledge

Share summit proceedings across the EE field (e.g., through issue briefs or reports)

Create a new strategic plan to regularly engage with external stakeholders throughout the year (e.g., through webinars, e-learning modules, topic specific in-person meetings, university partnerships, and international organizations)

Exhibit 4.4. Recommended actions to convene a an annual EE summit

Recommendation 4: Re-envision the NEEA

NEEAC recommends that Congress reauthorize the NEEA. In addition, NEEAC recommends that Congress secure NEEA funding and fund the NEEA to its ceiling with a rate of inflation factored in for the future. The 2010 reauthorization bill⁶⁸ recommended \$40–50 million to account for the increase in EE needs and to offset inflation since 1990.

NEEAC also sees reauthorization as an opportunity for the NEEA to be substantially improved. Given the environmental and contextual changes (e.g., new technologies) we see today, NEEAC believes there would be considerable value in re-envisioning the NEEA to account for present-day environmental challenges and opportunities. This recommendation echoes every council preceding this 2015 NEEAC.

In particular, NEEAC recommends the following improvements to the NEEA:

- The language in the NEEA needs to be updated to account for current environmental priorities, modern perspectives on environmental issues, and best practices for EE in formal and non-formal settings. All of these areas have evolved substantially since 1990.
- The NEEA should be adapted to account for the recommendations identified in this report.
- The next iteration of NEEA should provide EPA the ability to adapt to a progressive EE field and collaborate with NEEF, other offices within EPA, and other federal agencies engaged in EE.

In consultation with EPA and OEE, a modernized NEEA can be achieved through collaboration among the authorizing committee, appropriators, EE stakeholders, NEEAC, and EE experts.

NEEAC understands that the EPA Administrator cannot reauthorize the NEEA and recognizes the importance of learning from EPA about successes and challenges in the past 25 years of implementation. To this end, NEEAC recommends that EPA, and specifically OEE, engage in targeted conversations with NEEAC to reflect on the current NEEA and examine how a re-envisioned NEEA might better support effective EE initiatives that contribute to the agency's mission.

4.2.3 Fund

Recommendation 5: Request maximum funding allowed under the NEEA

The success or failure of EE programs and partnerships is dependent on many factors, but especially consistent, reliable funding. Funding, or lack thereof, often makes the difference in forming successful EE partnerships with other agencies, and the effectiveness of the actions recommended in this report is directly tied to funding. Therefore, the NEEAC recommends that the EPA Administrator include in her annual budget proposal the maximum funding allowed under the NEEA.

4.3 Impacts and outcomes of recommendations

Each of the recommendations identified in this report relates to a nationwide coordinated approach to EE, as outlined in Exhibit 4.5.

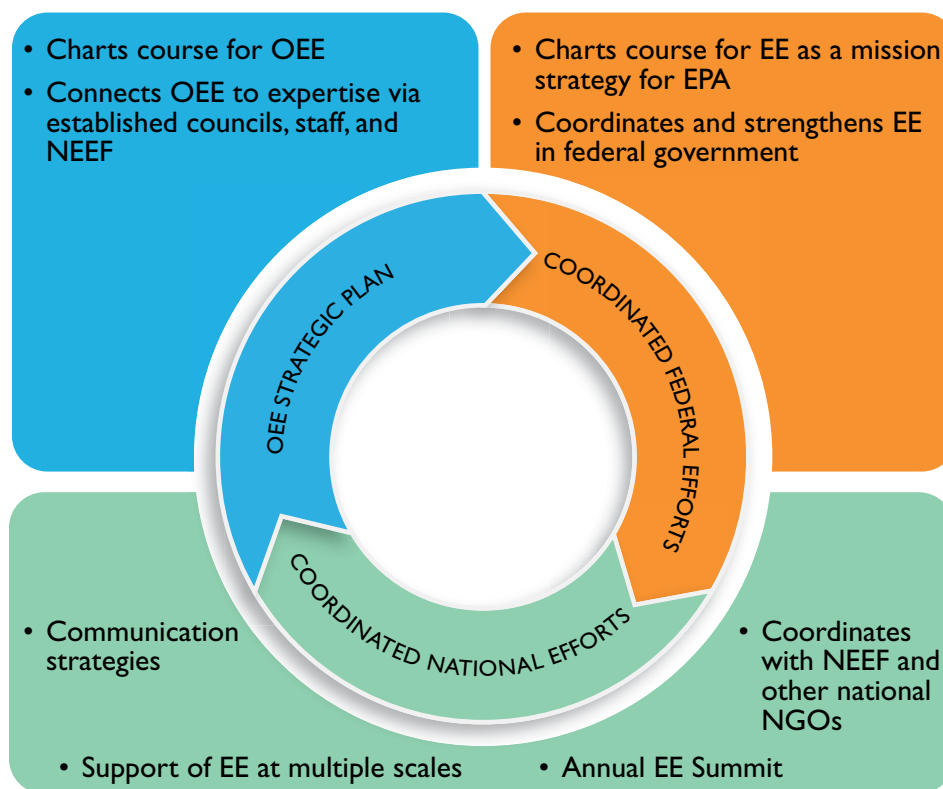


Exhibit 4.5. Illustrative representation of a nationwide coordinated approach to EE.

By acting on the recommendations described in this report, EPA will achieve the following intended outcomes:

- EPA will be a national leader of EE in the federal government
- Consistent, reliable, and maximum funding allowed under the NEEA will enable OEE to champion EE initiatives, lead collaborations, and provide communication for environmental educators and national EE organizations
- The value of EE will become evident and will be communicated with a clear voice
- EE will continue to receive broad support and funding
- All people in the United States, Territories, and sovereign Tribal nations will have better access to locally relevant EE in their communities.

4.4 Conclusions

There has never been a more critical moment for EPA to employ EE. In the context of today's environmental challenges, expanded and effective EE programs are vital to protecting human health and the environment. EPA is in a position to **engage, lead, and fund** EE efforts. OEE has the ability to **champion, coordinate, and communicate** about EE. By leveraging this joint capacity, EPA has a significant opportunity to advance our nation's EE efforts, substantially raise our national environmental literacy, and enhance our ability to address complex environmental challenges in the 21st century and beyond.

Through strategic EE planning, EPA and OEE can build collaborative partnerships with other federal agencies and national efforts that maximize support and funding for EE. In this way, EPA and OEE can catalyze the expansion of our nation's scope of EE programs, cultivate new environmentally literate audiences, and demonstrate how we can understand complex environmental challenges and create innovative solutions through collaborative action.



Appendices

- **Appendix A – Excellence in EE** highlights achievements in the field that demonstrate leadership, engagement, and funding for EE and related fields that interconnect with EE. Although not an exhaustive list, these programs and projects offer instructive examples to EPA and other EE-focused organizations.
- **Appendix B – Development Timeline** provides an overview of the process and framework used to develop and organize NEEAC's 2015 recommendations.
- **Appendix C – Listening Session Summary** provides the findings from a series of facilitated stakeholder listening sessions. These findings helped inform NEEAC's 2015 recommendations.
- **Appendix D – Past and Present NEEAC Members** provides a list of individuals who have served on NEEAC since its establishment in 1990.
- **Appendix E – EPA Office of Environmental Education Staff** provides a list of employees currently working in EPA's OEE.



Appendix A. Excellence in EE

The national portrait of EE brims with formal and non-formal organizations that model excellence in EE. They do this by demonstrating extraordinary leadership in systems of delivery, keeping educators engaged with the field and up-to-date with best practices, and providing first-rate resources and educational strategies. These organizations range from regional to international and from newly formed to well-established. They include nonprofits; NGOs; professional organizations; coalitions; governmental agencies (national and local); Tribal communities; institutions of higher learning; and new non-traditional partners such as sports teams, faith-based organizations, and corporations. Excellent EE organizations and programs typically are collaborative within their locale, Tribal nation, state, region, or national level.

Because of the diversity of organizations involved in EE, the wide range of goals they strive to achieve, and the variable settings in which they operate, EE activities generate a variety of outcomes related to environmental literacy, pro-environmental behaviors, and human wellbeing.

This appendix recognizes a broad range of exemplary organizations, programs, and movements that support EE goals by engaging, leading, funding, and recognizing outstanding EE achievement.

With so much great work underway in EE, it is impossible to mention every excellent project or program. The selection of examples in this appendix is meant to illustrate the potential for public and private EE implementation on multiple scales. Special emphasis is given to highlighting effective collaborations across multiple stakeholder groups and sectors.

A.1 Engage

The section provides examples of excellence in engaging environmental educators and the audiences and communities they serve.

No Child Left Inside Coalition

Formed in 2007, the No Child Left Inside (NCLI) Coalition is a national coalition of over 2,000 business, health, youth, faith, recreational, environmental, and educational organizations that represent over 50 million Americans. In light of recent trends that emphasize exercise and play for children, the NCLI Coalition is responding with programs to get children and families outdoors. The coalition is pushing for schools, school districts, and states to provide more EE resources, train teachers, and develop ELPs. The coalition also engages policymakers, communities, families, and schools in a collaborative effort to improve children's health and wellbeing through environmental and outdoor education initiatives in the formal and informal sectors.⁶

IslandWood: Master's Studies in Urban Environmental Education

IslandWood, in Seattle, WA, and Antioch University Seattle offer an MA Ed. in urban EE. This degree is designed to prepare educators to address urban environmental issues through the social, educational, economic and cultural aspects of urban life. The program enables graduate students to become educational leaders who are capable of addressing critical environmental issues through different lenses, including socio-ecological resilience, sustainable practice, equity, and justice.

National Audubon Society

The National Audubon Society works to conserve and restore natural ecosystems, focusing on birds, other wildlife, and their habitats. The organization has more than 500 local chapters, 2,500 designated "Important Bird Areas," citizen scientist programs, education centers, and sanctuaries.

BirdSleuth

Cornell Lab of Ornithology's BirdSleuth is a set of curricular resources and professional development opportunities designed to help teachers and informal educators engage youth in eBird and other citizen science projects. BirdSleuth evolved from Classroom FeederWatch, which originally was funded by NSF to create classroom resources to involve students in inquiries related to birds coming to feeders at their schools. Not all birds come to feeders, and the program expanded to equip students to conduct investigations about any bird, anywhere. With EPA funding, the curriculum expanded further to focus on habitats, migration, and conservation. The online "BirdSleuth Action Map" makes it possible for classes or youth groups to post photos and stories about their efforts in citizen science or habitat improvement. Viewers can comment and "like" these posts.

Citizen Science

eBird

Cornell Lab of Ornithology's and Audubon's collaboration eBird is a citizen science project in which anyone, anywhere in the world, can submit data about birds they have seen. The database is growing at an astronomic rate, currently holding over 250 million observations from every country and representing 98.5% of the world's bird species. These data provide the basis for powerful models of bird population dynamics and other research by professional biologists and information scientists. eBird also provides a powerful tool way to engage students and the public in science. In observing birds and submitting their observations, they are acting as scientists. And even if students never submit data, they can use eBird's data visualization tools to learn what species live in their communities, which ones migrate, and whether their populations are changing over time.

Project Budburst and U.S. Fish and Wildlife Service

Starting in spring 2015, FWS and the National Ecological Observatory Network's (NEON's) Project BudBurst will offer a new citizen science course to hundreds of FWS staff, volunteers, Friends groups, and others. The online course will include detailed information about the importance of citizen science, plant phenology, and climate change to the FWS. Utilizing Project BudBurst, a national citizen science plant phenology program and platform, participants will be able to contribute observations from national wildlife refuges, schoolyard habitats, local communities, and other areas of interest. Involvement in Project BudBurst includes hands-on experience in collecting phenology data that contribute to ongoing research by scientists interested in observations made by individuals across the country. [NEON](#) is funded by the NSF.⁷⁰

Academic programs

Several universities have EE undergraduate and graduate programs, such as the University of Wisconsin at Stevens Point, the University of Michigan, the Ohio State University, and Southern Illinois University. These universities typically have a cohort of faculty focused on EE, interpretation, and conservation behavior. As a result, these institutions have helped form the research basis of the field.

Curriculum-based professional development

Well-established and recognized programs such as [Project WILD](#), [Project Learning Tree](#) (PLT), and [Project WET](#) (Water Education for Teachers) provide educators with exemplary activities, educational best practices, and educational materials on environmental concepts and issues. Through these programs, networks of local certified facilitators deliver domestic and international workshops for educators. These programs support pre-kindergarten through high-school teachers in teaching interdisciplinary, critical-thinking skills. These model programs continue to evolve to meet 21st century EE needs. For example, PLT developed (1) Environmental Experiences for Early Childhood, a collection of over 130 experiences designed for educators working with children age three to six; (2) a GreenSchools! Program; and (3) a set of online workshops that are offered in a

self-paced, online format. Project WILD recently offered Growing Up WILD for early learners. The program has also added emphasis on STEM, scientific processes through authentic investigations, and careers.

Other federal agencies

Federal agencies, such as NOAA, the U.S. Forest Service, NPS, and the FWS, provide vital support for on-the-ground EE activities throughout the United States. This support includes resources, training, and technical services.

The Association of Fish & Wildlife Agencies represents North America's fish and wildlife agencies. Its goal is to advance sound, science-based management and conservation of fish and wildlife and their habitats. EE is an important aspect of these agencies' work.

A.2 Lead

The section provides examples of excellence in leading within the EE field.

California Regional Environmental Education Community

The California Department of Education's Environmental Education Program administers the California Regional Environmental Education Community (CREEC) project. CREEC coordinators in each of California's superintendent regions seek out high-quality EE resources and informal education opportunities that align with K–12 standards. They communicate these resources and opportunities to teachers through trainings and a searchable database.

Chicago Wilderness

Chicago Wilderness is a regional alliance that connects people and nature. The alliance comprises more than 300 organizations working together to restore local nature and improve residents' quality of life by protecting lands and waters. Chicago Wilderness members include local, state, and federal agencies; large conservation organizations; cultural and educational institutions; volunteer groups; municipalities; corporations; and faith-based groups.

Association of Fish and Wildlife Agencies Conservation Education Strategy

The Association of Fish and Wildlife Agencies (AFWA) awarded two multi-year, multi-state Sportfish and Wildlife grants to support the development of an educational strategy to foster an informed and involved citizenry. Through collaboration with state agencies across the country, AFWA produced webinars and developed an online conservation education toolkit. The toolkit includes a list of core concepts, best practices for stewardship education, links to K–12 education and community resources, and guides to help educators teach the content and processes of wildlife science.

A Better City Program

In Boston, Massachusetts, this program challenges and recognizes businesses, institutions, and building owners to meet a broad range of sustainability standards and practices. These include increasing energy efficiency, reducing resource consumption, decreasing solid waste, and reducing greenhouse gas emissions.

NAAEE's Natural Start Alliance

Dedicated to helping young children experience and care for nature, this alliance focuses on mobilizing the early-childhood EE stakeholders, especially parents and professionals. The Natural Start Alliance serves as a clearinghouse for research-based evidence, provides tools and resources, promotes and advocates access to nature, and creates a community for its members.

Climate Literacy & Energy Awareness Network Project

The Climate Literacy & Energy Awareness Network (CLEAN) Project is a collaboration between the Technical Education Research Centers (TERC), the Cooperative Institute for Research in Environmental Science at the University of Colorado Boulder, and the Science Education Resource Center at Carleton College. The project is funded by grants from NOAA, NSF, and the Department of Energy. The three components of CLEAN are (1) to provide high-quality digital resources to secondary and undergraduate educators, (2) guide and support educators in teaching “big ideas” in climate and energy science, and (3) create a community of professionals committed to improving climate and energy literacy.

Cherokee Central School

Cherokee Central School is an innovative, cultural green school with a futuristic attitude toward education of its community. The school is projected to achieve USGBC Leadership in Energy and Environmental Design (LEED) Silver certification for its green design. The green features incorporated into the school’s design provide exceptional opportunities for students, faculty, staff, and the community at large to learn about and appreciate environmentally friendly practices and technologies.

A.3 Fund

The section provides examples of excellence in funding projects that advance the EE field.

Blue Sky Funders Forum

Launched in 2014, the Blue Sky Funders Forum brings foundations and corporations together in partnership with nonprofit and government leaders to strengthen the field of EE. The result is more sustainable ecosystems, stronger economies, and healthy and vibrant communities for everyone.

Environmental Education Funders Collaborative

The Environmental Education Funders Collaborative is based in the San Francisco Bay Area. The collaborative provides support to organizations that connect youth to the natural world and equip them with the experience, scientific knowledge, and skills they need to become lifelong environmental advocates and engaged members of their communities.

UL Innovative Education Award

The newly established UL Innovative Education Award provides \$250,000 and mentor support for organizations that work in environmental and STEM education, sustainable communities, and youth empowerment. Applicants are asked to provide strong evidence of programs that (1) advance STEM learning through research and investigation, (2) promote citizenship and social responsibility, and (3) tackle real environmental problems. Winners of the inaugural award will be announced in August 2015.

NEEF Grant Awards

NEEF grant awards include the following past recipients.

Schoolyard STEM Lab

The Schoolyard STEM Lab is an outdoor classroom space designed to provide hands-on, immersive EE experiences. The first Schoolyard STEM Lab was awarded to students and teachers of Nizhoni Elementary School in Shiprock, New Mexico. The award was announced on Earth Day, 2015, as part of the Environmental Education Week celebrations. This award is in partnership with Samsung.

Be Water Wise DC Grants

In 2012, grants up to \$1,000 were awarded to 13 schools in Washington, DC, to support water conservation and stormwater management projects. The projects engaged 6,000 students (or 14% of District students) in addressing these issues in their school building and grounds. The projects involved building eight new school gardens, conducting home water audits, and installing 50 faucet aerators. The result was the conservation of more than 390,000 gallons of treated water per year. The students' improved environmental literacy was demonstrated through pre- and post-surveys. HSBC Bank sponsored this program.

Planet Connect Youth Engagement Grants

This FWS-sponsored program has awarded \$20,000 in grants to 20 students in grades 9–12 from 12 states to support their problem-solving, wildlife conservation-based projects. Through these students' projects, the program was able to reach 4,000 community members. The grants also enabled the students to participate in summer internships related to their projects.

Department of Defense National Public Lands Day Legacy Awards

This awards program provides support for volunteer habitat restoration projects on military lands that improve local parks and outdoor space, and provide EE to the public. In 2014, \$140,000 was awarded to 25 military installations to bring the public out to volunteer for National Public Lands Day events. Awardees received up to \$6,500 each; provided education about critical environmental, natural, and cultural resources; and built partnerships between the military site and those who live in the surrounding community. Over 1,500 volunteers took part in various natural and cultural resource improvement activities. Military branches represented include the U.S. Army, the United States Air Force, the Navy, the Army National Guard, and the U.S. Marine Corps. Many of the sites are promoting habitat for pollinators such as bats, bees, birds, and insects. The United States Department of Defense Legacy Resource Management Program sponsored this program.

Sustainable Energy Award

In 2012, three public high schools received \$10,000 each for their school-wide efforts to achieve energy savings with technology. The total population of the three schools was 3,421 students. The percentage of students at these schools who received free or reduced-cost lunches was 56%. Students of the **Northwest Pennsylvania Collegiate Academy** in Erie, Pennsylvania, saved \$10,945 and more than 180,000 kWh in one year. The **Boston Latin School** of Boston, Massachusetts, implemented a \$75,000 lighting retrofit that saved 200,000 kWh and \$33,000 in one year. The **Secondary Academy for Success** in Bothell, Washington, reduced their carbon footprint by 24,000 lbs. of carbon dioxide. Samsung sponsored this program.

A.4 Awards Programs

These national awards promote models for organizations and individual educators in EE.

NAAEE Annual Awards

NAAEE has been a leader in promoting excellence in EE throughout North America for more than four decades. NAAEE's influence stretches across North America and worldwide, with members in more than 30 countries. NAAEE and its 54 state, provincial, and regional affiliate organizations have more than 16,000 members. These members are professionals with EE responsibilities and interests; they span the business, government, higher education, formal (K–12) education, non-formal education, early childhood education, science education, STEM, and other sectors of society.

Each year NAAEE presents awards to recognize such things as service to the organization, leadership and outstanding service within the field of EE, and outstanding service in environmental justice, among other achievements.

U.S. Department of Education [Green Ribbon Schools](#)

ED-GRS awards recognize schools and school districts that have reduced their environmental impacts and cost; improved health and wellness of schools, students, and staff; and provided EE. To apply for the ED-GRS award, schools and school districts must apply first through their state departments of education; this helps to raise state-level authorities' awareness of the schools' achievements.

[The New Leaders Initiative](#)

Each year the Brower Youth Award, administered by the Earth Island Institute, recognizes the work of six young leaders who are making strides in the environmental movement. Brower Youth Award winners demonstrate excellence in leadership and a commitment to the communities their work serves. The New Leaders Initiative houses three programs that recognize young environmental leaders – Brower Youth Awards, Movement In Green, and Rooted Rising.

[The Living Future Institute's Living Building Challenge™](#)

The Living Building Challenge™ is the built environment's most rigorous performance standard. It calls for the creation of building projects at all scales that operate as cleanly, beautifully, and efficiently as nature's architecture. To be certified under the challenge, projects must meet a series of ambitious performance requirements over a minimum of 12 months of continuous occupancy.

The Center for Sustainable Landscapes at Phipps Conservatory and Botanical Gardens in Pittsburgh, Pennsylvania, achieved Living Building Challenge certification in 2015. It is the first building in the world to achieve all four of the world's highest sustainable building standards (others include USGBC's LEED certification, WELL Platinum Pilot certification, and Four-Stars Sustainable Sites Initiative™ certification).

Appendix B. Development Timeline

This report was designed to address the following questions:

- What does EE look like nationally in 2013–2015? (Section 2)
- What does EE look like at EPA (specifically through OEE and NEEA)? (Section 3)
- What opportunities exist for EPA to participate in EE in the future? (Section 4)

The recommendations presented in Section 4 were formulated after one year of information gathering. This effort involved collecting information about, and perspectives on, the national landscape of EE and EE at EPA (focusing on OEE). NEEAC members identified gaps and opportunities for enhanced EE that exist between EPA and the wider EE field. These gaps and opportunities formed the basis for NEEAC's recommendations.

The majority of NEEAC's work was conducted in smaller work groups. These work groups included (in chronological order):

- **Definitions work group:** captured current operational definitions of common terminology in an effort to clarify the jargon routinely used in the EE field.
- **Stakeholders work group:** included the broader EE community in the development of this report by conducting a series of listening sessions (see Appendix C for more information).
- **Research work group:** conducted a literature review of relevant research.
- **Drafting work group:** generated an April 2013 progress report for OEE.
- **Intra-agency work group:** explored the status of EE activities within EPA.
- **Inter-agency work group:** investigated the relationship of EE activities conducted with agency partners.
- **Models of EE work group:** defined parameters for a "quality" or "successful" EE activity by collecting examples (see Appendix A for more information).
- **EE in the 21st Century work group:** researched modern strategies for EE, tracked the progress made since the 2005 report, and worked on recommendations for how EPA can modernize the NEEA.
- **EE in the U.S. writing group:** synthesized research and dialogue on this topic area.
- **EE in the EPA writing group:** synthesized research and dialogue related to this topic area.
- **Editing team:** had responsibility for the format, structure, revisions, and edits of the final report.

In April 2014, NEEAC convened at EPA Region 8 Headquarters in Denver, Colorado, to evaluate the first year of information gathering. Through a facilitated interactive process, NEEAC generated individual recommendations and their potential impact. Those recommendations were grouped by theme and then built into a logic model. The logic model enabled NEEAC members to visualize how the recommendations might be implemented, from inputs to activities to indicators to short-, medium-, and long-term impacts to the ultimate vision.

The recommendations were put into three categories or overarching themes: community, leadership, and grants. NEEAC divided into three groups to further develop the recommendations for those themes.

In September 2014, the Editing team generated a working copy of the report and recommendations. Through an iterative process led by the Editing team, with input from NEEAC, the logic model and recommendations were refined and finalized.

It is important to note that there were some unanticipated delays during the development process due to conditions that were out of the control of NEEAC and OEE. This made it difficult to consistently work on the report and keep in communication with one another. Communication was also hindered by the fact that the NEEAC report was mostly generated remotely. This challenge underlines NEEAC's recommendation that the council have consistent and sufficient time to meet and work face-to-face. In-person interaction will enable NEEAC to create recommendations through a more-efficient process that results in enhanced benefits to OEE and EPA.

Appendix C. NEEAC Listening Sessions Summary

The listening session conducted for EPA Regions 1 and 2 was based on a different series of four questions, which were subsequently modified for the remaining seven listening sessions. The input from the EPA Regions 1 and 2 listening session is included in this summary.¹

In summer 2013, NEEAC conducted a series of eight listening sessions with EE stakeholders, including educators, representatives of nonprofit organizations, state representatives, a pediatrician, and members of business and industry, to gather information to prepare this report. Participants in the listening sessions were asked to respond to the following four questions about the status of EE in the United States:

1. What are some major challenges to improving EE?
2. What are the personal skills, education, and training that are needed to respond to current and future environmental problems?
3. Could you please describe the extent and quality of EE programs that exist in your area?
4. What are some national or local programs that could serve as models for future EE initiatives?

This appendix provides an analysis of the input received from the listening session participants. It identifies common themes and trends, and highlights recommendations.

1. What are some major challenges to improving EE?

Participants reported that a lack of funding and resources remain a significant impediment to the effective integration of EE in schools. Teachers typically do not have the time or resources to teach EE in addition to core content, and EE is not a priority compared with core content. Federal standards limit teachers' flexibility to integrate EE into lessons, and there is no incentive to integrate EE into schools, except for the passion of individual teachers. (Some states have adopted ELPs that are helping in this aspect.)

Moreover, there is a lack of interconnectedness and integration across curricula and subjects and between programs. In addition, limited research is available to educators to ensure that they are using the best EE resources, and limited evaluation results are available to show which ones are effective.

Participants also noted that collaboration between communities is difficult, and there is a lack of awareness about (1) EE activities conducted by other communities, and (2) what resources exist. Instead of collaborating, communities and organizations are often competing for funding and support.

Participants identified the following recommendations to improve EE:

- Increase support for state-wide organizations that are networking and building capacity
- Promote state EE certification programs
- Increase interaction with youth and after-school clubs

- Communicate potential resources and programs to teachers and create networks to enhance access to existing resources
- Implement “infrastructure” to ensure that EE becomes institutionalized, such as the infrastructure that supports state-wide ELPs
- Engage the U.S. Department of Education in EE discussions, and integrate EE into school curricula and national and state content standards
- Develop a shared set of national goals or benchmarks, or an agenda to increase the collective impact of EE
- Embed EE into schools by promoting year-long projects, as opposed to periodic, one-day field trips
- Develop working partnerships with public schools
- Create a model to systematically include EE in existing curriculum
- Focus on teacher training and professional development so that teachers are comfortable teaching and integrating EE in the classroom.

2. What are the personal skills, education, and training that are needed to respond to current and future environmental problems?

Participants noted that effective communication skills are vital to conveying EE information to audiences, particularly when working with children in schools. Bringing scientists, engineers, and other professionals into schools is important, but those individuals must be able to relate to the children so that messages are conveyed. In addition, developing students’ abilities to communicate is essential for expanding EE, as children are future environmental stewards and will help EE reach a broader audience.

Several participants discussed the importance of fostering the ability of students to think collaboratively, innovatively, creatively, and critically. An inter-disciplinary approach that incorporates EE topics into other lessons enhances skills for solving real-world problems. In addition, introducing civics lessons to students provides them with knowledge about taking action in their local communities.

Participants noted that state ELPs provide a mechanism for clearly identifying the skills, content, and training that are necessary to increase environmental stewardship, and that development of these plans should be encouraged. Many participants noted the need for an aggressive and sustained EE curriculum.

Participants identified the following recommendations for providing training and skills that are considered essential to responding to environmental problems:

- Strengthen the understanding of science (and statistics as a part of science), and how to distinguish “good” data from “bad” data
- Provide the public with an understanding of how the environment affects health, economics, and social and cultural perspectives
- Engage communities to help solve their problems, and involve organizations in decisions made at the community level
- Foster the relationship between children and the places where they live, and provide them with opportunities to learn about and engage in their local environment
- Ensure that the needs of underserved and diverse communities are being met, and increase EE training opportunities for those communities

- Offer training to EE providers about how to engage schools
- Provide training on how to access existing EE resources
- Administer professional development opportunities and training for teachers to help them learn about teaching environmental concepts in a creative, experiential, inquiry-based way, while still addressing classroom standards
- Offer students more outdoor learning experiences
- Incorporate technology in EE lessons and use social media to EE's advantage; technology can help connect students to real-world situations while in the classroom.

3. Could you please describe the extent and quality of EE programs that exist in your area?

In response to this question, participants described the EE programs and activities that exist in their states.

4. What are some national or local programs that could serve as models for future EE initiatives?

Participants highlighted EPA's Small Grants Program as an effective model for EE initiatives. For example, the program awarded a grant to the Utah Society for EE that allowed the organization to distribute money to each state in EPA Region 8. Each of the state's EE associations identified projects that were coordinated with state goals. Affiliates are knowledgeable about regional EE needs and are working together effectively to focus on high-priority projects.

Several participants noted that PLT, Project WET, and Project WILD are great programs that conduct cutting-edge research and reflect EE trends. These programs are adaptable and can be used by different groups for varying situations. Participants also discussed the useful information available through the Children's Environmental Health Network and NEEF. NOAA's Bay Wetland Education and Training also was discussed as an effective EE program that promotes locally relevant learning for students in K–12.

The NAAEE Guidelines for Excellence in EE were also touted as an essential resource for EE initiatives. NAAEE's Affiliate Network was also discussed; this large network is viewed as an effective model for sharing information and offering professional development opportunities. The network's model facilitates the accomplishment of EE objectives and enhances capacity building, not just among educators and schools, but also among the general public, communities, and industry.

Total number of participants and participant locations		Organizations
Session for EPA Regions 1 and 2		
6	<ul style="list-style-type: none"> Cambridge, Massachusetts New York Washington, DC 	<ul style="list-style-type: none"> Keep America Beautiful Campaign for Environmental Literacy Council for Environmental Education Technical Education Research Centers (TERC) and Climate Literacy Network Girl Scouts of the USA
Session for EPA Regions 3 and 4		
10	<ul style="list-style-type: none"> Kentucky Washington, DC Maryland Florida Shenandoah Valley, Virginia 	<ul style="list-style-type: none"> Grand Bay National Estuarine Research Reserve, Gulf of Mexico Alliance Kentucky Environmental Education Council
Session for EPA Regions 5 and 6		
10	<ul style="list-style-type: none"> Portland, Texas Michigan Chicago, Illinois New Mexico Minnesota Ohio Madison, Wisconsin 	<ul style="list-style-type: none"> University of Michigan
Session for EPA Regions 7 and 8		
5	<ul style="list-style-type: none"> Springfield, Missouri Colorado 	<ul style="list-style-type: none"> Teacher at Wonders of the Ozarks Learning Facility Wyoming Association for Environmental Education Northeast South Dakota Utah Society for Environmental Education
Session for EPA Regions 9 and 10		
9	<ul style="list-style-type: none"> California California – Bay Area Seattle, Washington Central Sierra Nevada foothill area Palmdale, California 	<ul style="list-style-type: none"> Alliance Climate Education Strategic Energy Innovations (nonprofit organization) Lockheed Martin BRIEF California
Session for EE Behavior Stakeholders		
2	<ul style="list-style-type: none"> Kansas City Denver, Colorado 	<ul style="list-style-type: none"> Earth Force
Session for Interdisciplinary Stakeholders		
4	<ul style="list-style-type: none"> Washington Colorado California 	<ul style="list-style-type: none"> Colorado Alliance for Environmental Education California Department of Education
Session for Tribal Stakeholders		
2	<ul style="list-style-type: none"> Maryland 	<ul style="list-style-type: none"> None identified

Exhibit C.1. Listening session participants

Appendix D. Past and Present NEEAC Members

Current members

Angie Chen
California
2011–present
Stakeholder group: Nonprofit

Vidette (Kiki) Corry
Texas
2011–present
Stakeholder group: State Departments of Education and Natural Resources

Scott Frazier
Montana
2011–present
Stakeholder group: Business and Industry

Kenneth J. Gembel
Michigan
2011–present
Stakeholder group: Senior American

Cara Gizzi
Massachusetts
2011–present
Stakeholder group: Business and Industry

Richard Gonzales (Vice-Chair)
Texas
2011–present
Stakeholder group: Nonprofit

Dr. Kelly Keena (Chair)
Colorado
2011–present
Stakeholder group: Primary and Secondary Education

Dr. Mark L. Kraus
Florida
2011–present
Stakeholder group: Colleges and Universities

Caroline Lewis
Florida
2011–present
Stakeholder group: Primary and Secondary Education

Dr. Edna Negron-Martinez
Puerto Rico
2011–present
Stakeholder group: Colleges and Universities

Victoria Rydberg
Wisconsin
Appointed 2015
Stakeholder group: State Departments of Education and Natural Resources

Former members contributing to 2015 Report

Kay Antunez De-Mayolo
California

2011–2013

Stakeholder group: State Departments of Education and Natural Resources

Dr. Anne Stephens
California

2014

Stakeholder group: State Departments of Education and Natural Resources

Former members

Please note: this list may not be comprehensive.

Dr. Kristina Allen
Arizona
1994–1996

Stakeholder group: State Departments of Education and Natural Resources

Richard Bartlett
Texas
2000–2003

Stakeholder group: Business and Industry

Rodney L. Bates
Nebraska
1994–1996

Stakeholder group: Business and Industry

Dr. Kathleen A. Blanchard
Massachusetts
1994–1997

Stakeholder group: Nonprofit

Judy Braus
Washington, DC
1994–1997

Stakeholder group: Primary and Secondary Education

Dr. Dianne Cantrell
Ohio
2000–2004

Stakeholder group: College and University

Dr. Peter B. Corcoran
Florida
1994–1997

Stakeholder group: College and University

Margaret E. Cowan
Alaska
1991–1993

Stakeholder group: State Departments of Education and Natural Resources

Deron Davis
Georgia
2006

Stakeholder group: State Departments of Education and Natural Resources

James L. Elder
Massachusetts
2000–2002

Stakeholder group: Business and Industry

Jane Wilson Eller
Kentucky
2000–2004

Stakeholder group: State Departments of Education and Natural Resources

Claudia R. Fowler
Louisiana
1998–2000

Stakeholder group: Primary and Secondary Education

Catania C. Galvan
California
1998–2000

Stakeholder group: Nonprofit

Fenna Gatty
California
1991–1992

Stakeholder group: Primary and Secondary Education

Cynthia A. Georgeson
Wisconsin
1997–1999

Stakeholder group: Business and Industry

Dennis Grams
Nebraska
2004
Stakeholder group: Business and Industry

Cynthia Harrell-Horn
California
1991–1994
Stakeholder group: Nonprofit

Dr. Norbert S. Hill
Colorado
1991–1992
Stakeholder group: Nonprofit

Richard S. Holmgren
California
1991–1994
Stakeholder group: Business and Industry

Hyder Houston
Washington, DC
2000–2002
Stakeholder group: Nonprofit

Steven C. Hulbert
Washington
1994–1997
Stakeholder group: Business and Industry

Arva J. Jackson
Washington, DC
1994–1997
Stakeholder group: Senior American

Barry W. Jamason
New York
1997–2001
Stakeholder group: Senior American

Dr. Paulette Johnson
Pennsylvania
1997–2001
Stakeholder group: College and University

Robert B. Kochtitzky
Mississippi
1997–1998
Stakeholder group: Senior American

A. Marie Marrs
Washington
2000–2004
Stakeholder group: Primary and Secondary Education

Kathryn E. May
Georgia
1994–1995
Stakeholder group: Primary and Secondary Education

Bill McBeth
Washington
2004
Stakeholder group: College and University

Mary Moulton
Connecticut
2006
Stakeholder group: Nonprofit

Coleen N. Murakami
Hawaii
1997–1999
Stakeholder group: State Departments of Education and Natural Resources

Victoria Newberry
Hawaii
2000–2003
Stakeholder group: State Departments of Education and Natural Resources

Tanya Oznowich
New Jersey
2000–2003
Stakeholder group: State Departments of Education and Natural Resources

David W. Patti
Pennsylvania
1999
Stakeholder group: Business and Industry

Michelle A. Perrault
California
1991–1994
Stakeholder group: Nonprofit

Barbara R. Pietrucha
New Jersey
1997–1999
Stakeholder group: Primary and Secondary Education

Dr. Elroy Rodriguez
California
1991
Stakeholder group: College and University

Joan Rosner
New York
1991–1992
Stakeholder group: Senior American

Andrew W. Savitz
Massachusetts
1997–1998
Stakeholder group: Business and Industry

Susan S. Seacrest
Nebraska
1997–1999
Stakeholder group: Nonprofit

Virginia S. Smith
Illinois
1994–1997
Stakeholder group: Nonprofit

Jim Stark
Washington
2006
Stakeholder group: Business and Industry

John K. Strickler
Kansas
1991–1997
Stakeholder group: State Departments of Education
and Natural Resources

Anne Taylor
North Carolina
2006
Stakeholder group: Nonprofit

Alejandra Tres
Oregon
2006
Stakeholder group: Nonprofit

Dr. Gertrude L. Volk
Illinois
1998–2000
Stakeholder group: College and University

Sally Wall
Texas
2006
Stakeholder group: Primary and Secondary Education

Mike F. Way
Colorado
1998–2000
Stakeholder group: Nonprofit

Dr. Richard J. Wilke
Wisconsin
1991–1997
Stakeholder group: College and University

Dr. Thomasena H. Woods
Virginia
1991–1993
Stakeholder group: Primary and Secondary Education

Appendix E. EPA OEE Staff

Office of Public Engagement and Environmental Education

Brian Bond, Associate Administrator

Office of Environmental Education

Sarah Sowell, Deputy Director

Javier Araujo, Designated Federal Officer (NEEAC)

Carly Carroll, EE Specialist

Ginger Potter, Senior EE Specialist

Ryan Robison, Special Projects Advisor

Emily Selia, Communications and Outreach Specialist

Karen Scott, Senior EE Specialist

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