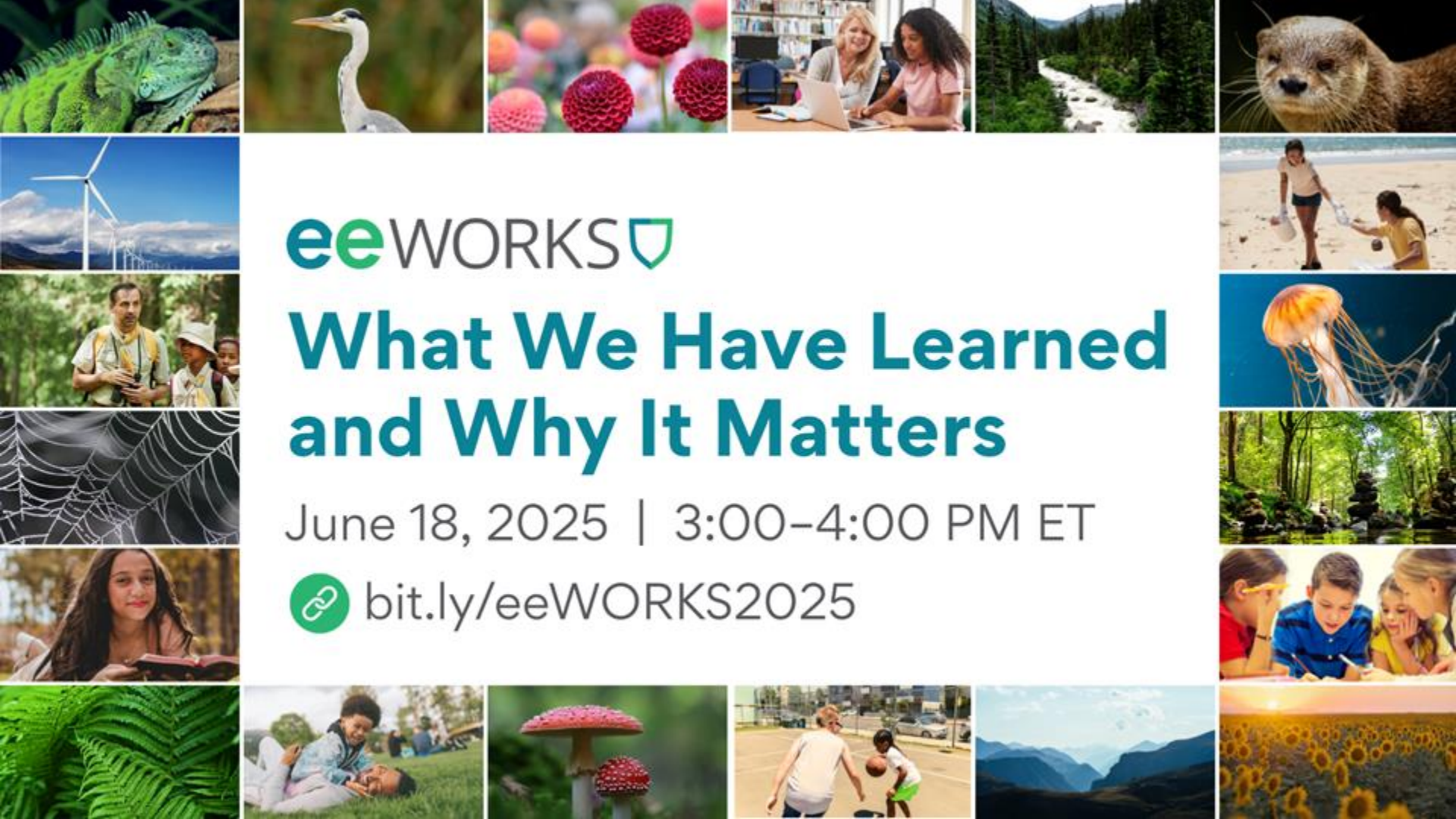
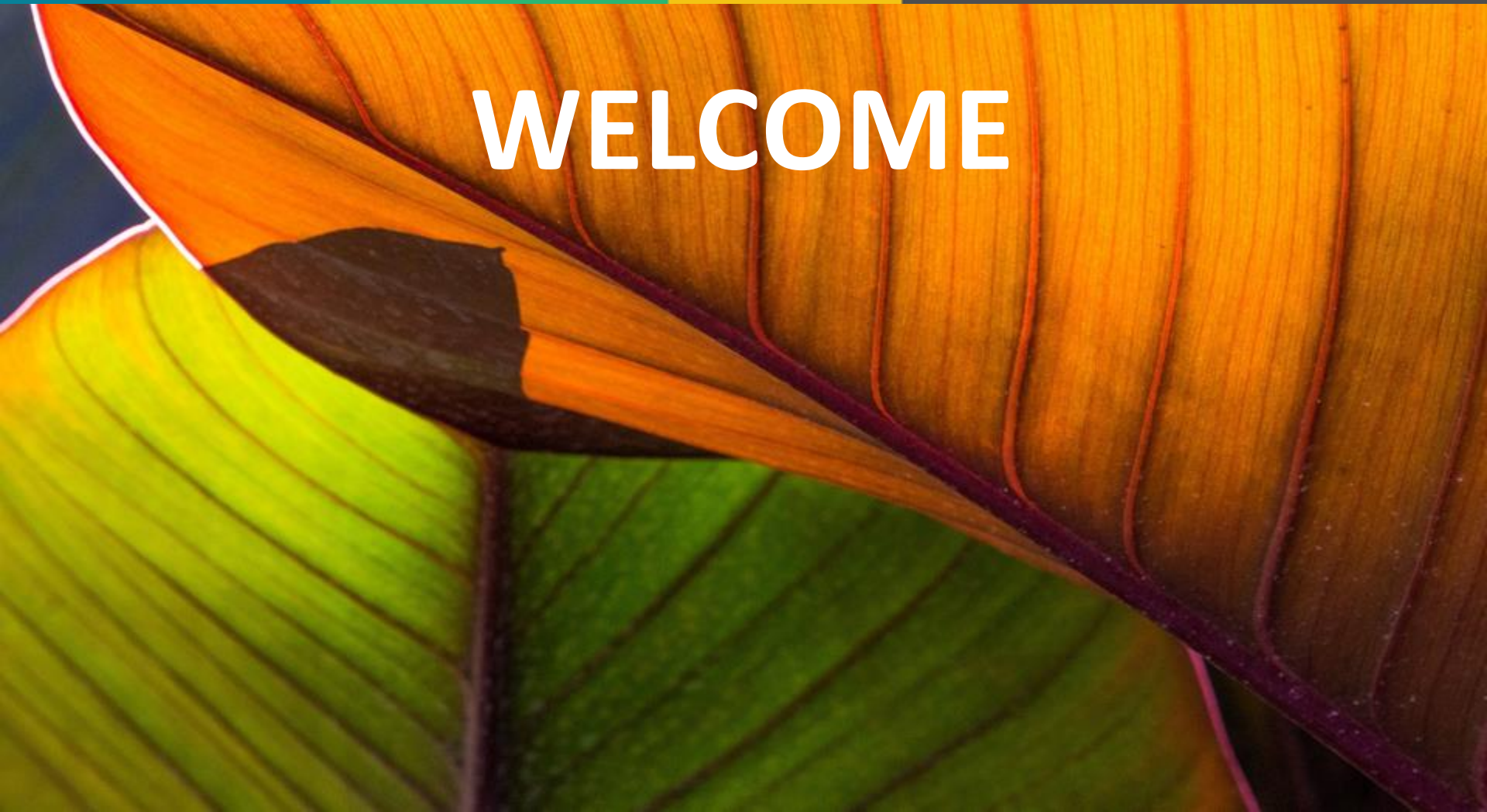

eeWORKS
What We Have Learned and Why It Matters
June 18, 2025 | 3:00–4:00 PM ET
bit.ly/eeWORKS2025


WELCOME

Why this project?

Making the case for environmental education!

Such a Talented and Curious Group: What Actually Works in EE?

The Wonderful Research Team

Dr. Alison Bowers
Research Associate
Social Ecology Lab
Stanford Doerr School of Sustainability

Dr. Martha Monroe
Professor
University of Florida

Dr. Heidi Ballard
School of Education
University of California Davis

Dr. Nicole Ardoin
Associate Professor of Environmental Behavioral Sciences
Stanford Doerr School of Sustainability

Looking Back, Looking Ahead

Thanks so much for sending us your questions! We will answer as many as we can during the webinar!

NAAEE's Webinar Series: Bringing New Ideas and Insights to the Our Field and Beyond!

Thanks to EPA and ee360+!

Thanks to our Affiliate Co-hosts!

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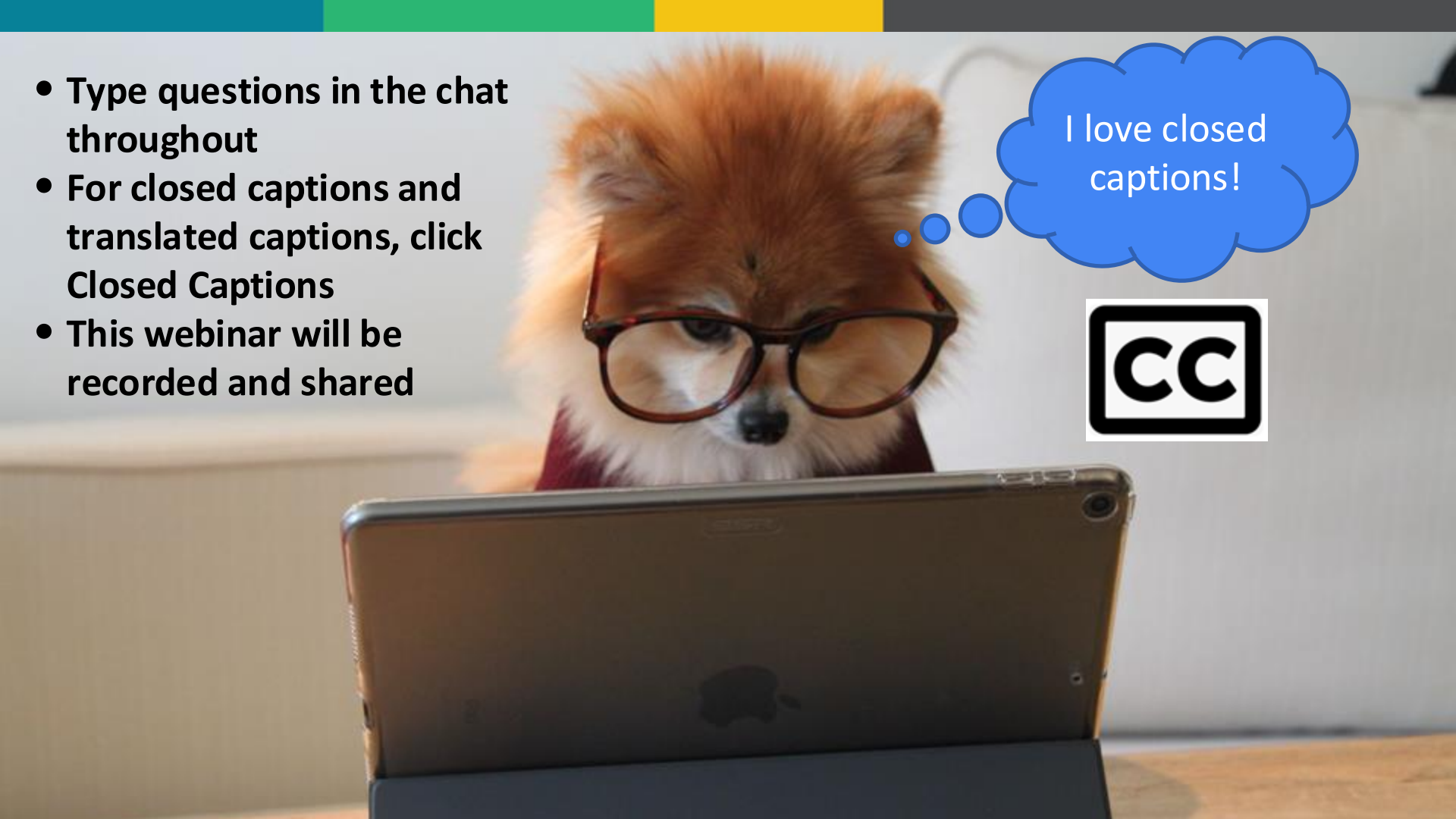
- Type questions in the chat throughout
- For closed captions and translated captions, click Closed Captions
- This webinar will be recorded and shared



Use chat to join conversation & ask questions

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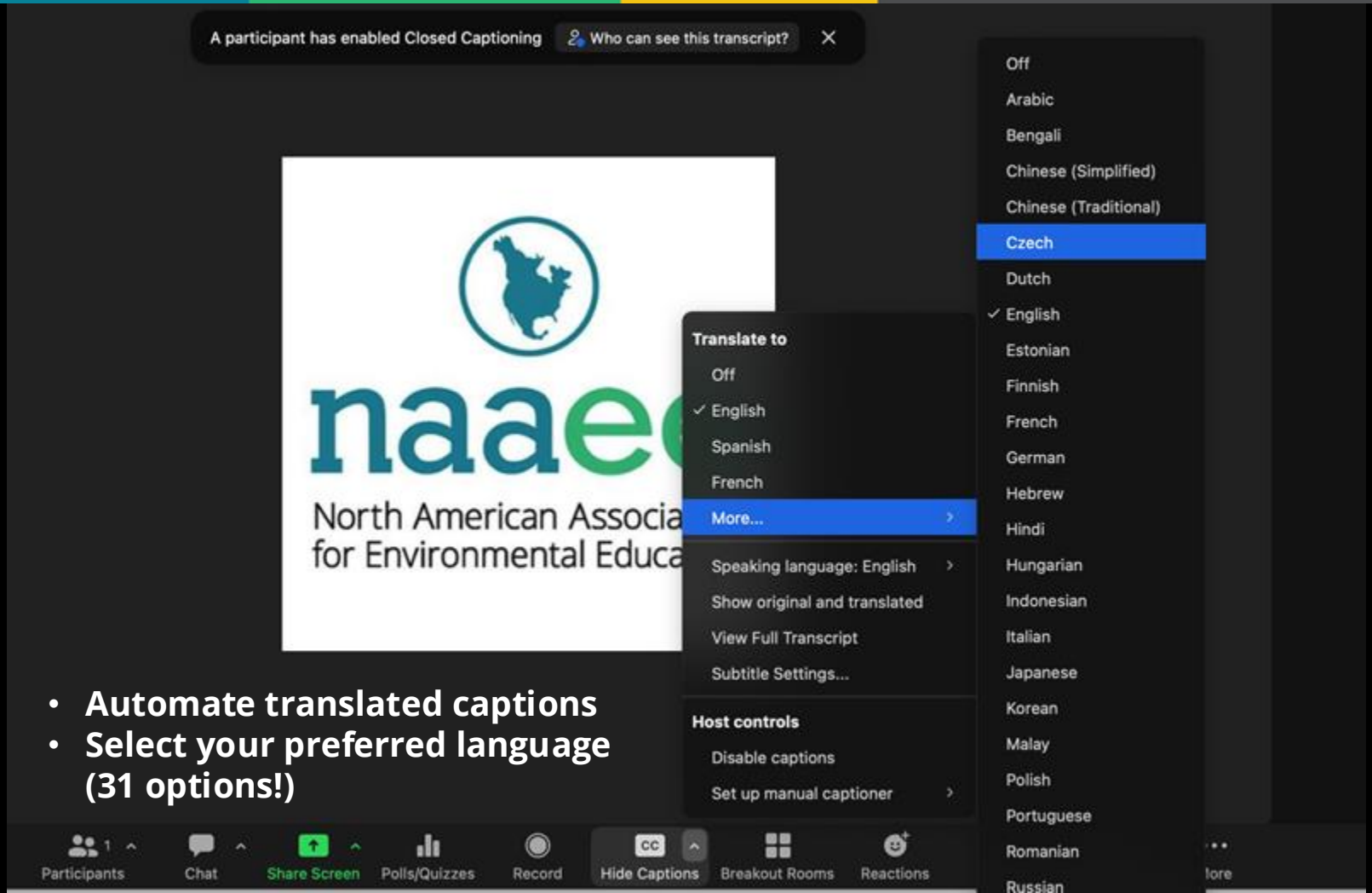
For captioning and translations click “Closed Captions”

Unmute | Start Video | Participants 2 | Chat | Share Screen | Record | Show Captions | Reactions | Apps | Whiteboards | Leave



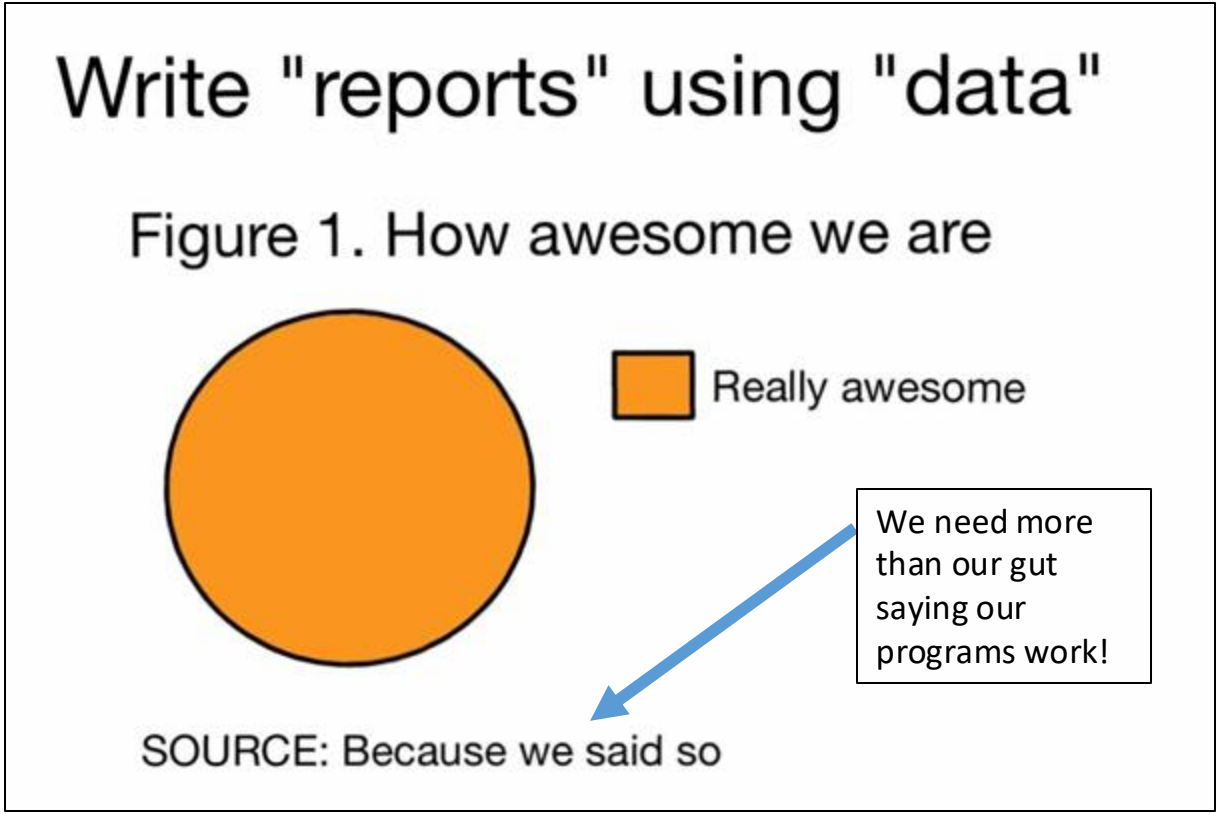
- **Automate translated captions**
- **Select your preferred language (31 options!)**

Thanks, Carrie!

Carrie Albright,
Senior Communications and Data Specialist

From Anecdotes to Evidence: Demonstrating the Impact of EE

What's the Evidence that EE Works?



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What is the impact of environmental education (EE)?

What outcomes are important in the field?

What existing evidence documents effective approaches related to the range of desired EE outcomes?

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Messaging and Communications for the Field

Anecdotes and evidence: Both are important (and can work together!)

1. The Research (Evidence)
2. Stories that Illustrate the data (Anecdotes)
3. Communication & Tools (Synthesizing research and stories)
4. Training and Professional Development (Using the tools to support your work)

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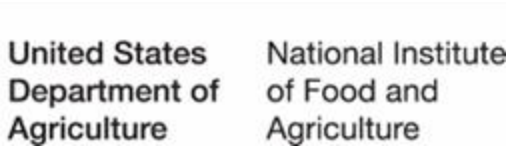
FLORIDA


USDA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Department of
Agriculture
National Institute
of Food and
Agriculture

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Thanks to Drew Burnett for all he did to help with the online versions, along with so many others, including others on the NAAEE team and the group here today.

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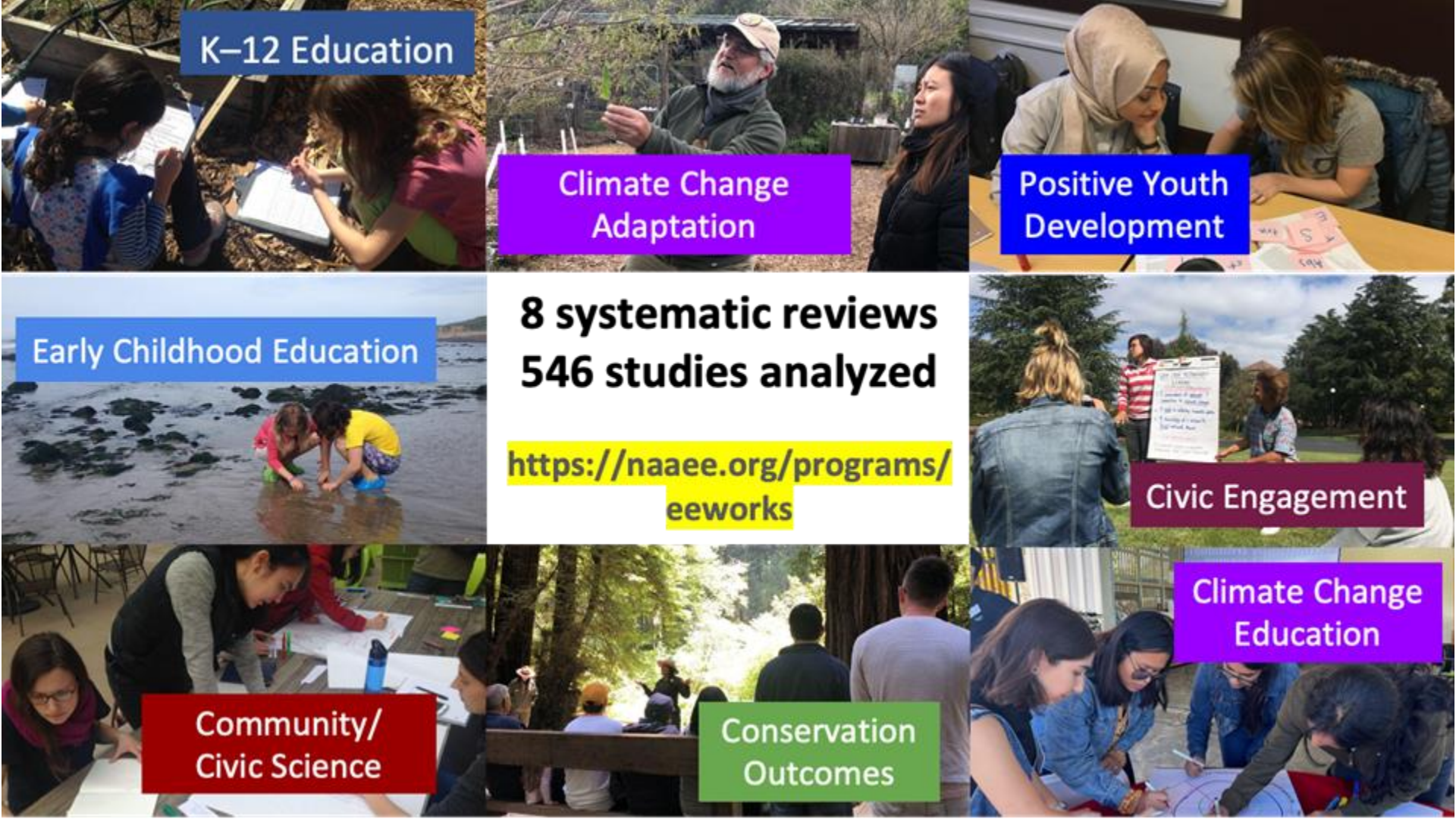
K–12 Education
Climate Change Adaptation
Positive Youth Development
Early Childhood Education
8 systematic reviews
546 studies analyzed
https://naaee.org/programs/eeworks
Civic Engagement
Community/ Civic Science
Conservation Outcomes
Climate Change Education

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https://naaee.org/programs/eeworks

The website includes information on each review:

- The executive summary of the synthesis paper
- Examples of educational programs from the collection of papers that illustrate the findings
- More information on the process

From Anecdotes to Evidence:
Diving into the Research Review Process

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From Anecdotes to Evidence: Demonstrating the Power of Environmental Education

Stanford | naaee North American Association for Environmental Education

eeWORKS is a program of NAAEE, Stanford, and many other partners.
A special thanks to all of our supporters: Gray Family Foundation, Storer Foundation, Pisces Foundation, U.S. EPA, U.S. Fish and Wildlife Service, and U.S. Forest Service

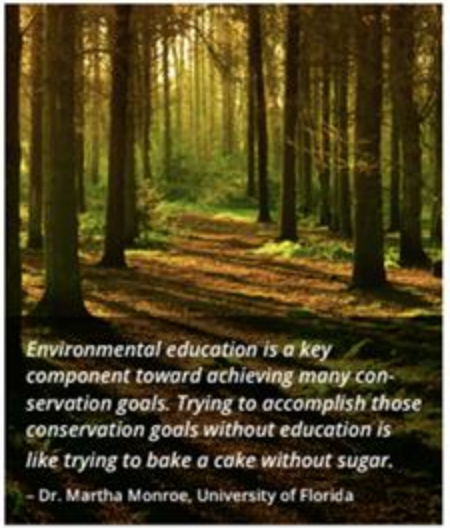
EXECUTIVE SUMMARY

Stanford Analysis of Over 100 Studies Finds Environmental Education Leads to Conservation Results

Researchers Discover Increases in Pro-Environmental Behavior, Positive Environmental Impacts, and Community Capacity to Address Environmental Issues

Researchers at Stanford University analyzed 105 peer-reviewed studies to assess environmental education's effects on conservation outcomes. An overwhelming **98% of the studies in the analysis report that environmental education has positive impacts on conservation outcomes.** The findings suggest that environmental education helps support and sustain a range of conservation efforts, including community conservation work. It engages key audiences and helps people understand, care about, and act on environmental issues.

Stanford's research review offers compelling evidence that **environmental education contributes to conservation and environmental quality in five key ways:** 1) building **knowledge, skills, and intentions** to adopt environmental behaviors; 2) adopting **pro-environmental behaviors in students' personal lives**[1]; 3) taking **direct environmental actions during the educational programs**[2]; 4) building **community conservation capacity**[3], and 5) **measurably improving the environment.**[4] Seventy percent of the studies reported that environmental education achieves more than one outcome concurrently.



Environmental education is a key component toward achieving many conservation goals. Trying to accomplish those conservation goals without education is like trying to bake a cake without sugar.

– Dr. Martha Monroe, University of Florida

How to Communicate about the Benefits of EE


Our Speakers!

Turning It Over to Martha and Heidi

Dr. Martha Monroe
Professor
University of Florida

Dr. Heidi Ballard
School of Education
University of
California Davis

Systematic Review Process

Applied keyword Boolean code **search** terms

Then excluded articles that failed basic requirements

Then excluded studies that failed previous criteria, or provided no **empirical findings**

Full text **coded** for topic, participants, educational strategies, outcomes measured

This process enables us to capture ALL the findings, positive and negative

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But it has limitations

- ➔ We only captured what is in the English-speaking, peer-reviewed, literature – i.e., journal articles, not dissertations, conference presentations, or grant reports
- ➔ Time lag grows from research activity > publication > synthesis
- ➔ We can't say what is happening in the field – we can only say what the research has reported

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We didn't do this alone:
Many students and staff helped

W. Chaves
C. C. Jadallah
K. O'Connor
E. Gaillard
A. Kannan
A. Oxarart
N. W. Roth
N. Holthuis
A. J. Lindell
R. Plate

And the Advisory Board!

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The Systematic Review Process

Example paper:

Community and Citizen Science Programs Support Environmental Education Outcomes (100 articles)

https://naaee.org/programs/eeworks/community-citizen-science-support-outcomes
eeWORKS Citizen Science_Executive Summary.pdf
eeWORKS Citizen Science_Final Report.pdf

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Criteria

Synthesize research literature that reported **measured outcomes** of environmentally-related programs to understand how they support environmental education objectives.

Variety of Terms

("citizen science" or "community science" or "public participation in science research" or "PPSR" or "public monitoring" or "participatory mapping" or "participatory modeling" or "participatory monitoring" or "volunteer monitoring" or "community-based participatory research" or "CBPR" or "crowdsourcing")

+

(learning or education or student or engagement or development)

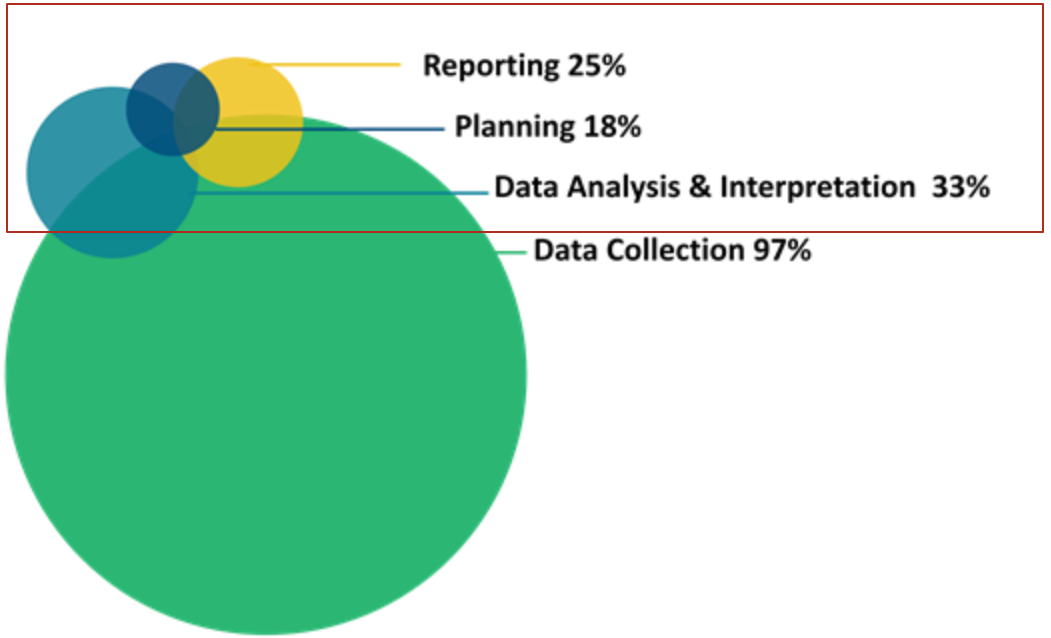
+

(environment* or sustain* or ecology or conservation or biodiversity)

What does participation look like in CCS for EE?

Overall definition:

Community and Citizen Science is defined as the range of participatory ways of doing science that involve members of the public in some or all parts of scientific research or monitoring projects for which the data or results are used for monitoring, decision-making, or basic research.



Gathering Outcomes

Environmental Science Content Knowledge (56 articles)	• Understanding of subject matter: facts, concepts
Science inquiry skills and understanding the nature of science (>32)	• Observable practices, such as asking questions, collecting or analyzing data, planning investigations, using evidence • Understanding methods generate scientific knowledge, epistemology
Positive attitudes about science, the local place, and the environment (>16)	• Measurable demonstration of attitude toward science or environmental topics or concepts • Positive bond between people and a particular place
Community connectedness and cooperation (30)	• Outcomes related to how people relate to each other and groups • Social learning (collective sense-making, trust between political actors and stakeholders); community capacity and governance
Efficacy, identity, environmental behavior and stewardship (>29)	• Confidence in one's ability to participate in a science or environmental activity; how learners view themselves; observable actions to directly maintain, restore, improve, or educate about the health of an ecosystem, or participation in civic, governmental, or cultural affairs

(Ballard, Lindell, Jadallah. *2024*. Environmental Education Outcomes of Community and Citizen Science: A Systematic Review of Empirical Research. *Environmental Education Research*)

Community and Citizen Science Programs Support Environmental Education Outcomes (100 articles)

Strategies based on our Findings

- Support making sense of data collection
- Encourage working with data and sharing findings
- Emphasize the local place
- Connect to the local community
- Investigate socio-ecological aspects of issues
- Explore with digital technology

https://naaee.org/programs/eeworks/community-citizen-science-support-outcomes
eeWORKS Citizen Science_Executive Summary.pdf
eeWORKS Citizen Science_Final Report.pdf

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Continuing with a quick look at each of these reviews.

The Benefits of Environmental Education for K–12 Students (119 articles)

https://naaee.org/programs/eeworks/benefits-k12-students
eeWORKS K–12 Benefits_Key Findings.pdf

Outcomes of EE

- Knowledge in science, mathematics, reading, writing, and more
- Emotional and social skills
- Environmentally friendly behavior
- Critical thinking, oral communication, analytical skills, problem solving, and higher-order thinking
- Motivation to learn
- Feelings of civic responsibility, empowerment, and ability to take action

The Impact of EE on Conservation and Environmental Quality (105 articles)

Outcomes of EE

- Building knowledge, skills, and intentions to adopt environmental behaviors.
- Taking environmental actions during programs
- Adopting personal environmental behaviors
- Building community conservation capacity
- Improving the environment (e.g., water quality)

https://naaee.org/programs/eeworks/conversation-environmental-quality
eeWORKS Conservation_Executive Summary.pdf
eeWORKS Conservation_Final Report.pdf

The Benefits of EE and Nature Connections in Early Childhood (66 articles)

Outcomes of EE

- Consistent gains in children's environmental knowledge, attitudes, and behaviors
- Broader Developmental Benefits
  - Cognitive
  - Socio-emotional
  - Physical
  - Language & Literacy
- Adaptable, accessible, and able to be implemented in a variety of settings

https://naaee.org/programs/eeworks/benefits-early-childhood
eeWORKS Early Childhood_Executive Summary.pdf

Supporting Civic Engagement Outcomes (56 articles)

Strategies

- Focus on the local community
- Engage learners
- Build in action taking
- Emphasize lifelong learning
- Provide meaningful social interaction

Outcomes of EE

- At the individual level
  - Civic knowledge
  - Civic attitudes
  - Civic skills
  - Civic action
- At the community level
  - Social cohesion
  - Community well-being

eeWORKS-Civic-Engagement-Executive-Summary-a.pdf
eeWORKS-Civic-Engage-Strategies-a.pdf

Strategies That Support Positive Youth Development (60 articles)

Strategies

- Meaningful relevance and place-based approaches
- Youth-centered or youth-led activities
- Opportunities for teamwork and collaboration
- Action strategies
- Natural, outdoor settings
- Explicit direct instruction in complex skills
- Interdisciplinary programs that incorporate culture, art, and life skills with environmental science

eeWORKS-Positive-Youth-Development-Strategies-Access.pdf
eeWORKS-Positive-Youth-Development-Exec-Sum-Access.pdf

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Identifying Effective Climate Change Education Strategies (49 articles)

Cce.exec_summ-1_1.pdf
Cce.strategies.pdf

Strategies

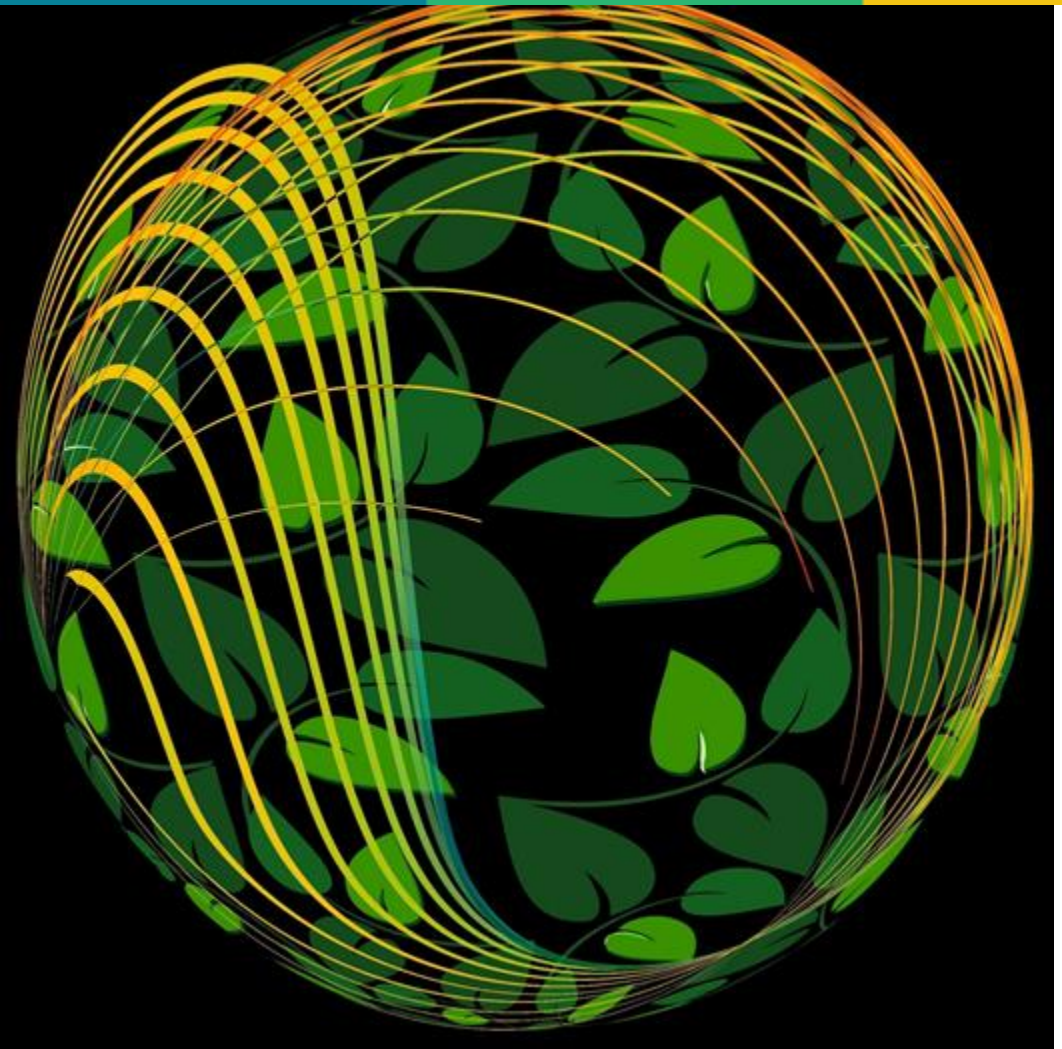
- Good science education
  - Personally relevant and meaningful
  - Engages learners
  - Experiences with scientific process
- Good environmental education
  - Builds skills through personal, school, and community projects
- Helps learners face controversy
  - Uses deliberative discussion and explore how they know
  - Address misconceptions

QUESTIONS for you about going forward

1. How have you used these reviews?

1. What else would help you?

Bike path in Portugal



Part II:
What have we learned?
What should we think about going forward?

Turning It Over to Nicole and Alison

Dr. Nicole Ardoin
Associate Professor of Environmental Behavioral Sciences
Stanford Doerr School of Sustainability

Dr. Alison Bowers
Research Associate
Social Ecology Lab
Stanford Doerr School of Sustainability

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- Collaborative synthesis process to do a review of all the reviews (across 546 primary studies!)
- Document-based discussions with representatives from all of the review teams
- Thematic analysis and iterative refinement led to identification of six key themes
- Final paper drafted and will be submitted soon—stay tuned!

Theme 1: EE employs a rich repertoire of teaching and learning approaches

- No one-size-fits-all model emerged
- Flexibility allows adaptation to specific audiences, settings, learning preferences, available resources
- Supports interdisciplinary nature of environmental topics

Theme 2: EE fosters participatory approaches

Characterized by:

- Active engagement
- Skills-focused
- Learner input
- Collaboration
- Real-world connections

Benefits:

- Increases knowledge and awareness
- Improves critical thinking
- Builds self-efficacy
- Enhances civic engagement

Theme 3: EE includes direct action

Examples of direct action:

- Monitoring local environmental conditions
- Organizing community clean-ups
- Implementing habitat restoration
- Conducting community surveys
- Environmental advocacy campaigns

Benefits:

- Develops agency and empowerment
- Fosters sense of citizenship
- Builds civic know-how
- Creates measurable outputs

Theme 4: EE focuses on local community settings in issues identification and resolution

Contextualizes global issues at local level

Advantages:

- Makes abstract concepts tangible
- Encourages identification of relevant audiences
- Allows direct impact observation
- Makes complex issues more approachable

Supports:

- Community connections
- Place-based learning
- Local partnerships
- Context-specific solutions

Theme 5: EE surfaces and discusses personally relevant and meaningful information

Links environmental issues to:

- Personal experiences
- Daily lives
- Individual values
- Local impacts

Benefits:

- Helps identify personal role in solutions
- Supports emotional engagement
- Creates connections
- Fosters sense of belonging

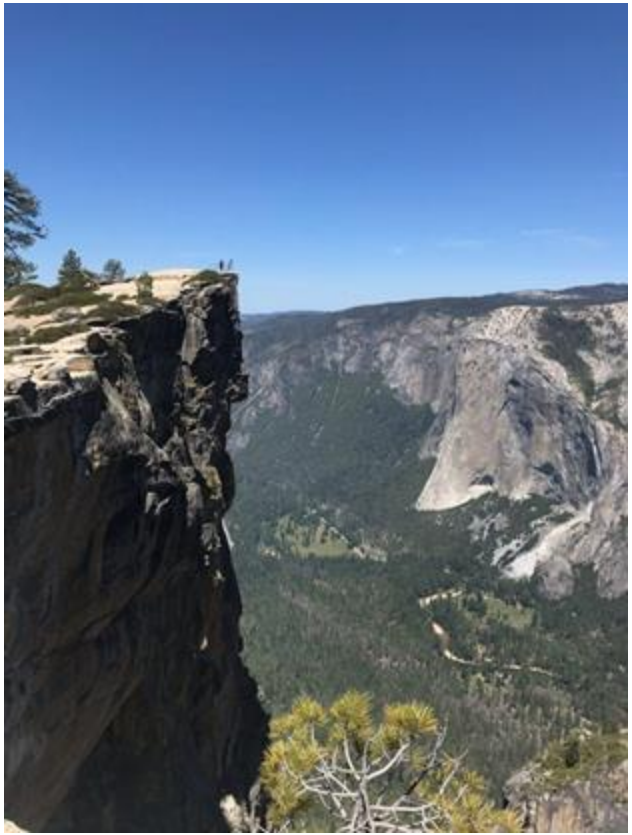
Theme 6: Collaborating with experts

Types of collaborations

- Scientists
- Resource managers
- Universities
- Community groups
- Government agencies

Benefits:

- Access to current research
- Real-world data
- Professional insights
- Networking opportunities
- Mentorship possibilities



Noted Concerns

- Publication bias
- Main audiences of study were often from WEIRD populations (with exception of climate change review)
- Measurement challenges
  - Long-term follow-up is rare
  - Difficult to directly measure behavior
  - Even more difficult to measure changes in environment
- Reviews are out of date the moment they begin!

Implications for Practice

- Focus on authentic learning experiences
- Include opportunities for direct action (good for the environment and learning)
- Build evaluation into program design
- Support long-term engagement
- Consider both individual and collective impacts

Implications for Research

Need for:

- Larger-scale, extended timeframe studies
- More diverse populations
- Better measurement of long-term impacts
- Documentation of direct environmental outcomes
- Publication of null/negative results

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Key Takeaways

- No one-size-fits-all model, but suggested strategies
  - Use diverse approaches
  - Emphasize participation
  - Connect to local
  - Include action
  - Make it personal
  - Partner with experts
- Field demonstrates methodological rigor **and** practical relevance
- Lots of work still to be done; we need to share what we learn!

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Value of Partnerships

- Funders
- University partners
- NAAEE
  - Connection to practitioners
  - Staff support for outreach
  - Momentum and inspiration

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Questions, reactions, or thoughts?

Thank you!!

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What We Have Learned *and* Why It Matters

Recording coming soon!

bit.ly/eeWORKS2025