

# Linking community and citizen science with environmental education: A systematic review of evidence and effective strategies

Christopher Jadallah, Amanda Lindell, Erin Bird, and Heidi Ballard

## Background & Rationale

This review will summarize the evidence of impacts and effective strategies for promoting environmental education (EE) through participation in community and citizen science (CCS). As the field of CCS grows exponentially, we ask how CCS can be used to further multiple goals such as advancing scientific understanding, improving science and environmental learning outcomes, and supporting community action related to environmental challenges.

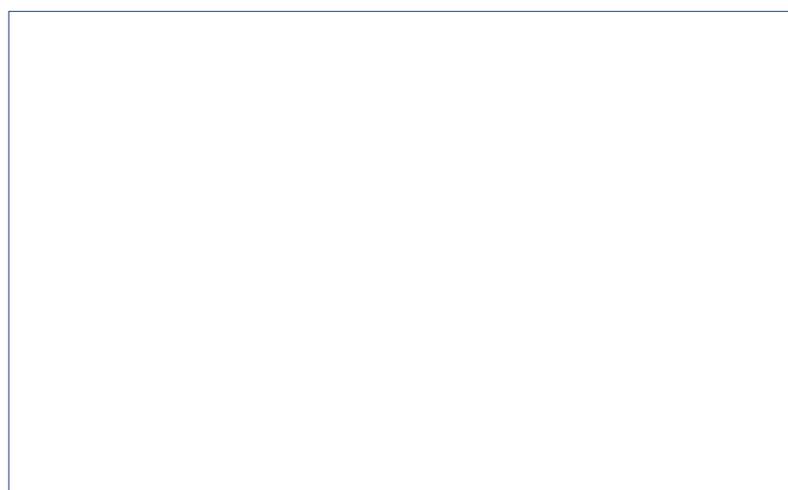
**Our objective is to propose a research agenda based on our findings with the aim of understanding how CCS can address EE goals.**



To this end, we ask the following research questions in our larger study:

1. What are the key ways in which CCS and EE are aligned theoretically, with respect to pedagogy, approach, and outcomes?
2. What common environmental and educational outcomes have been measured with in the context of CCS?
3. What are the recommendations for design and implementation of CCS for EE or EE for CCS?
4. What are the identified directions for future research?

**In this poster, we present our research methods and our preliminary findings on the state of the literature at the convergence of CCS and EE.**



What would you like to learn from this review?

## Research Methods

To conduct our **systematic literature review**, we used EBSCOhost to search 50 online databases for articles using the following keywords:

"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"

AND

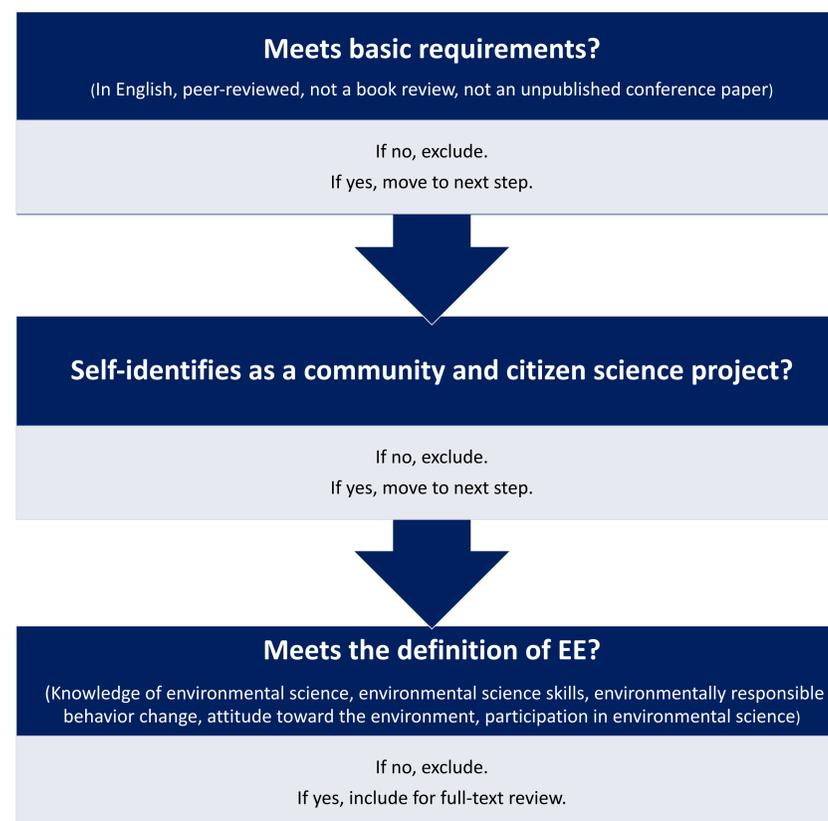
"learning" or "education" or "student" or "engagement" or "development"

AND

"environment\*" or "sustain\*" or "ecology" or "conservation" or "biodiversity"

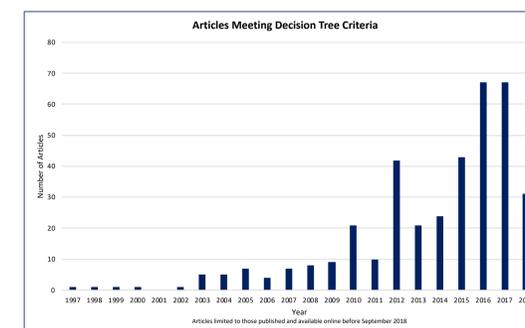
We intentionally cast a broad net with our search terms to capture articles that may have not have used the phrase "community and citizen science" but involved some type of public participation in scientific research.

Each abstract was read independently by two reviewers who used the following decision tree to decide whether or not each abstract met the criteria for full-text review.



## Preliminary Findings

Our search yielded **1650** articles, **373 (23%)** of which ultimately met our criteria for full-text review.



**Top Journals**  
(Number of Articles)  
**197 Journals Total**

Biological Conservation (15),  
Conservation Biology (15),  
Ecology & Society (14),  
Journal of Science  
Communication (10)

## Implications for the Field

### 1. What counts as citizen and community science?

INCLUDED	EXCLUDED
<ul style="list-style-type: none"> <li>• Citizen and community science</li> <li>• Community-based participatory</li> <li>• Participatory action research</li> </ul>	<ul style="list-style-type: none"> <li>• Passive crowdsourcing</li> <li>• Participatory approaches not intended for research or monitoring</li> </ul>

### 2. What counts as environmental education?

INCLUDED	EXCLUDED
Education related to: <ul style="list-style-type: none"> <li>• Social-ecological systems</li> <li>• Natural resources</li> <li>• Environmental health</li> </ul>	Education related to: <ul style="list-style-type: none"> <li>• Urban planning</li> <li>• Food access</li> <li>• Cartography</li> </ul>

### 3. Empirical or Speculative?

We estimate that less than a quarter of the articles included for full-text review use empirical evidence to establish a connection between CCS and EE.

We plan to focus our initial analysis on empirical articles. Some key themes that we plan to explore in this next step include:

1. Settings (in-school, out-of-school, etc.)
2. Learning outcomes (science content, science process, etc.)
3. Conservation outcomes
4. Evaluation methods
5. Project design