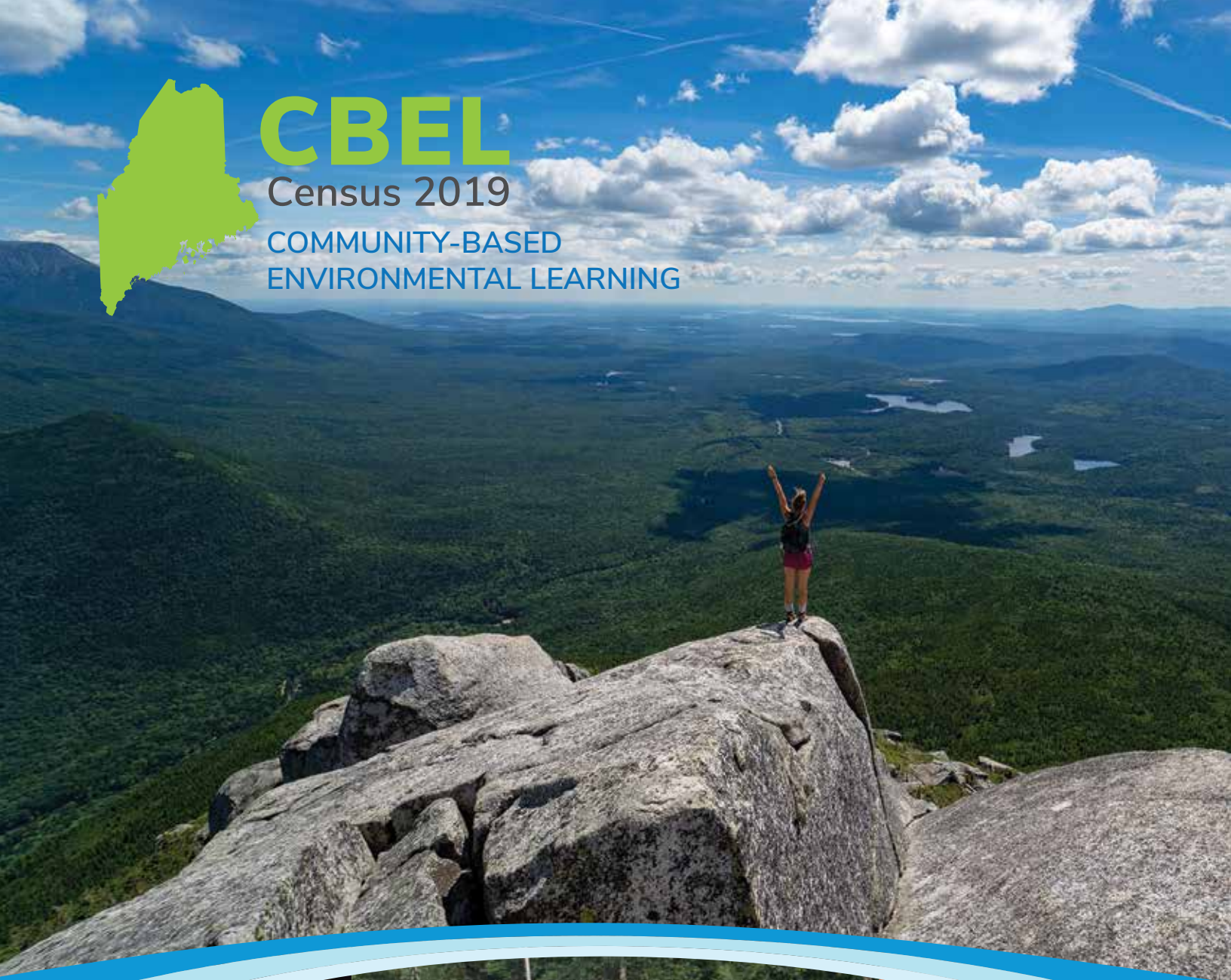




CBEL

Census 2019

COMMUNITY-BASED
ENVIRONMENTAL LEARNING



Census of
Community-Based Environmental Learning in Maine
SUMMARY REPORT



ACKNOWLEDGEMENTS

The Census of Community-Based Environmental Learning is a project of Maine Mathematics and Science Alliance and Maine Environmental Education Association. We would like to thank the following for important contributions to this project:

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Elmina B. Sewall
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The State of Maine offers a wealth of Community-Based Environmental Learning (CBEL) initiatives for youth, in both in-school and out-of-school time contexts. The extensive list of creative and innovative programming includes school gardens, Forest Fridays, student sustainability groups, investigations of local ecosystems, summer marine science camps, and much more. We are lucky to live in a state with access to some of the most pristine and beautiful natural landscapes in the United States, providing the setting and inspiration for these youth programs. Unfortunately, many of these initiatives work in isolation from other similar initiatives, lack resources or training, and do not measure the impact of the educational experiences they offer. The CBEL community in Maine has yet to identify or work in unison towards any overarching learning goals. The *Census of Community-Based Environmental Learning in Maine* documents a baseline understanding of the strengths and weaknesses in the field, and provides guidance and a clearer understanding of how to build capacity to equitably meet the needs of learners today and tomorrow.

What is Community-Based Environmental Learning?

We define Community-Based Environmental Learning as including any educational initiative, occurring in either in-school settings or out-of-school time settings, that works to educate youth about their environment while connecting them to their communities. These learning experiences do not necessarily have to take place outdoors, but they do need to connect to locally relevant content. There are numerous terms for this type of learning, including “Nature-Based Education,” “Environmental Education,” and “Place-Based Education.”

Rationale

Research shows that connecting youth learning to the environment has a number of potential positive impacts: from improving academic performance and emotional well-

being, to enhancing critical thinking skills, to increasing civic engagement.¹ Young people report that participating in activities connected to their communities and the environment is engaging and rewarding. By ensuring that Maine’s environmental education field has the information and targeted focus on increasing the access and quality of those learning experiences, not only will the individuals involved benefit, but so will the communities and ecosystems in which they live.

1 Ardoin, N.M., Bowers, A.W., Wyman Roth, N., & Holthuis, N. (2018). Environmental education and K-12 student outcomes: A review and analysis of research. *The Journal of Environmental Education*, 49(1), 1-17.

Chawla, L., (2015). Benefits of nature contact for children. *Journal of Planning Literature*, 30(4), 433-452.



Goals

This 2019 report provides an initial snapshot of the current state of CBEL throughout Maine. The intention of this project is to replicate this initiative every three to five years to see how the field progresses over time, understand where inequities in access still exist, and continue to build professional development offerings for educators that meet the needs of the community and field as they progress to increase impact. The immediate goals of this baseline report are:

1. Describe challenges to implementing CBEL and identify creative solutions to overcome these barriers
2. Identify any inequities in access to CBEL programs
3. Understand current practices and provide opportunities for improvement
4. Determine professional development needs of the field
5. Gather and share success stories that highlight creativity and innovation in the field across in-school and out-of-school time sectors

Orientation to the Report

This report is intended to provide practical information to the field that can be immediately applied to support the development of new Community-Based Environmental Learning initiatives as well as to improve those that already exist.

We hope that in using this report:

- ▶ Educators will glean information on how to improve their practice and concrete examples of projects in action that can be implemented in their schools or other educational settings
- ▶ Administrators will better understand the potential benefits of CBEL to support their staff in implementing these types of programs
- ▶ Funders will learn more about the needs in the State of Maine and understand how their support can be directed to increase accessibility and positive impacts of this type of learning

- ▶ State policymakers will better understand the landscape of CBEL in Maine and support these programs, many of which teach youth at an early age what it means to be civically engaged and responsible members of their communities

This report is divided into several sections based on themes:

1. School and Organization CBEL Landscape
2. Community-Based Environmental Learning in Action
3. Productive Partnerships in CBEL
4. Building on Best Practices
5. Advancing the CBEL Field

Following this report are seven case studies of programs across Maine that document best practices in Community-Based Environmental Learning in a diversity of settings and topics. These case studies are described in a narrative style and include visual representations of the projects. They are intended to be used as inspiring, realistic, on the ground examples for educators, administrators, and the entire education community.



METHODOLOGY AND SAMPLE

Project Leadership

This project convened a stakeholder advisory group of leaders across a variety of fields to accomplish the goals of the Census. Advisors represented both in-school and out-of-school time settings, including public schools, universities, land trusts, and environmental organizations. This advisory group was engaged in the entire process, including developing and revising the survey instrument, marketing the survey to potential respondents, and discussing initial findings.

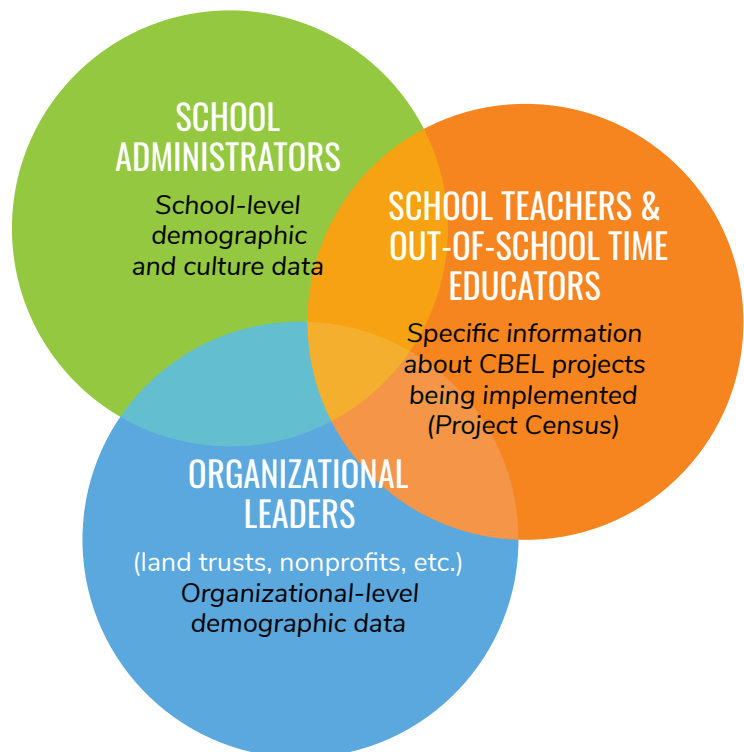
Survey Development

The CBEL survey instrument targeted three main audiences representing both in-school and out-of-school time educational environments: school administrators, teachers and out-of-school time educators, and organizational leaders (executive directors, education directors, etc.). Each audience responded to a customized set of questions based on their assumed knowledge of the scope of environmental programs occurring in their settings to get at different levels of information we felt were important for this baseline study.



School administrators and organizational leaders were given the option, along with teachers and educators, to contribute to the Project Census and provide specific details about the CBEL projects occurring in their respective settings. However, they were encouraged to either work together with educators to fill in the specific details or to recommend educators from their schools/organizations to provide information about CBEL projects they were facilitating. All respondents were asked to provide individual demographic data and to contribute their thoughts in a section on professional development needs of the field.

TARGETED AUDIENCES *for the* Census of **Community-Based Environmental Learning**



RECRUITMENT & SURVEY ADMINISTRATION

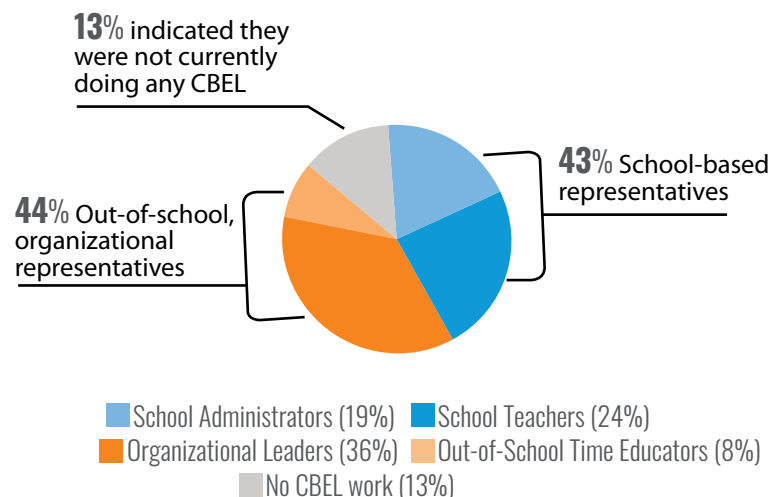
The *Census of Community-Based Environmental Learning in Maine* was an online survey administered through SurveyMonkey. The advisory group was instrumental in the messaging and marketing of this initiative, and leveraged their own personal connections and networks to inform the public about the Census. Project staff worked with statewide networking groups, including the Maine Principals' Association, Maine Land Trust Network, Maine Science Teachers Association, and Maine Curriculum Leaders' Association to spread the word about the Census. Communication initiatives targeted several lists, including all public and private schools, libraries, land trusts, and camps in Maine. In addition, project staff created a list of nonprofit organizations in Maine that may be doing CBEL projects with youth based on the Maine Environmental Education Association (MEEA) listserv and personal networks from individuals involved with the project. A short video introduction to the project was embedded in emails, listserv posts, and on partner websites.

To view the video, visit:

[\(https://mmsa.org/projects/cbel/\)](https://mmsa.org/projects/cbel/)

Of those respondents who indicated that their school or organization was not doing any Community-Based Environmental Learning, the majority were libraries and schools. Responses from schools/organizations who were not doing CBEL ranged across all 16 counties, but counties that had higher representation of settings not doing CBEL included Cumberland, Penobscot, and Aroostook counties.

RESPONDENTS to the CBEL CENSUS



CENSUS TIMELINE

AUGUST 2018

Recruited **stakeholder advisory group** of leaders in the field of EE. Identified other survey instruments and initiatives.

OCTOBER 2018

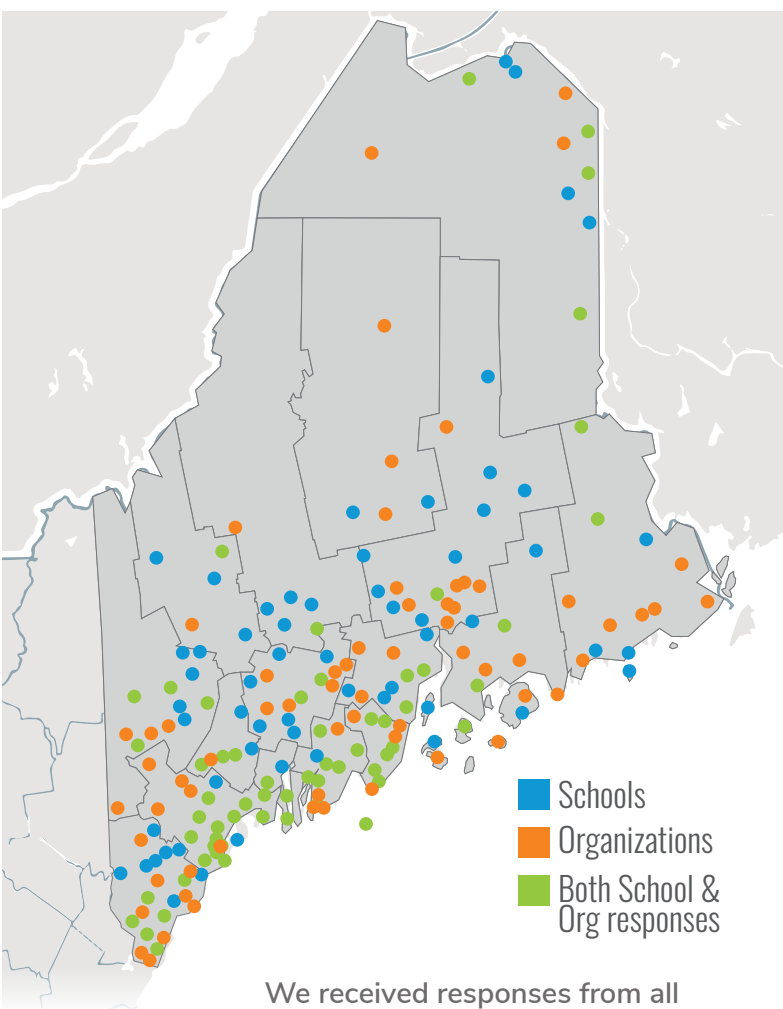
Finalized **survey items** and produced **short video** to market the initiative.

SEPTEMBER 2018

Defined **Community-Based Environmental Learning** and drafted **survey items**. Developed contact lists and marketing strategy.

NOVEMBER 2018

Survey deployed on November 9, 2018. Marketed the survey through mass email blasts, personalized individual emails, social media marketing, newsletter announcements, listserv posts, attending network meetings, and personal communications.



- Schools
- Organizations
- Both School & Org responses

We received responses from all **16 Maine counties**. Responses were generally representative of Maine's population per county.

RESPONDENT & SAMPLE INFORMATION



479
individuals



from **434**
schools & organizations

reported on

405 PROJECTS

responses represented



20%
of schools
in Maine



30%
of the
libraries
in Maine



40%
of the
land trusts
in Maine



28%
of the
camps
in Maine



numerous
environmental
and/or
educational
nonprofits

The Census of Community-Based Environmental Learning engaged a stakeholder advisory group of leaders in Environmental Education in Maine throughout the entire process.

FEBRUARY 2019

Survey closed on February 28, 2019. **Initial results** presented to advisory group and discussed.

MAY 2019

Case Study candidates selected by advisory group to be featured in exemplar reports for the field.

AUGUST 2019

Final report drafted.

MARCH 2019

First annual Maine Environmental Education Association **Research Symposium** on March 14, 2019 where initial results were presented and discussed.

JUNE 2019

Case Study interviews and program observations conducted. **Full analysis** of survey dataset.

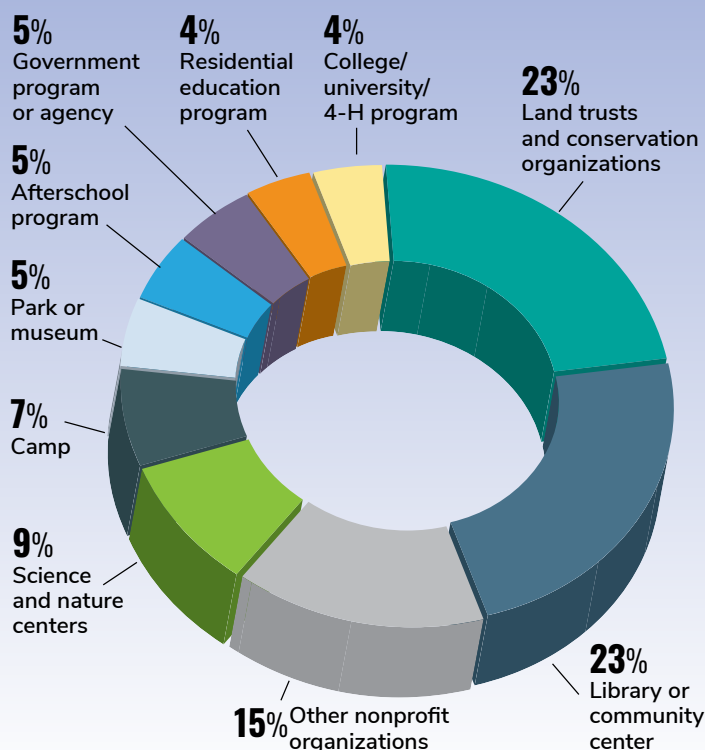
SCHOOL AND ORGANIZATION CBEL LANDSCAPE

Community-Based Environmental Learning (CBEL) is occurring in a variety of settings, both in-school and out-of-school, throughout Maine. Responses came from a diverse array of organizations, including public schools, private schools, land trusts, environmental nonprofits, libraries, and government agencies, among others. To characterize the overall culture of CBEL across different schools and organizations, administrators and leaders of each (school principals, executive directors, education directors, etc.) responded to a set of general school and organizational level demographic questions. These questions provided insight into how CBEL was generally being valued and implemented in schools and organizations.

Responses came from

93 school administrators | 173 organizational leaders

Organizations represented included the following



LESSONS LEARNED FROM THE DATA

➔ Finding 1. *Valuing CBEL*

Schools and organizations in Maine value Community-Based Environmental Learning in many ways. Approximately half of school administrators responded that it was an academic priority. In addition, there is a wide variety of community organizations providing CBEL to youth in Maine, ranging from large, well-resourced nonprofits and science centers, to university programs (including 4-H), government agencies, land trusts, local libraries, and community centers. While there is a large difference in the capacity and reach of these organizations in implementing CBEL, they represent a diverse toolkit of resources that youth, both in-school and out-of-school, can access for exposure to CBEL.

Is CBEL a school goal?

51% YES ✓
42% NO X
7% UNSURE

HOW IS IT DEFINED?

- General school commitment to experiential learning
- Connection to curricula or standards including the *Next Generation Science Standards (NGSS)*
- Inclusion of community partners
- High school credits in sustainability
- Often not formally defined but woven into the values of their school and interdisciplinary

Example CBEL Academic Goals

"Community-based experiential education is a central tenet of our approach to education. Whether via direct activity or related extensions, environmental learning occurs within most every theme."

—School Administrator

"It is not formally defined. However, this goal is embedded in curricular structures across our programming."

—School Administrator

➔ Finding 2. *Funding CBEL*

Local financial support is vital for Community-Based Environmental Learning programs. While many of the responding schools had dedicated money in their budget for these projects, they also relied on parent-teacher organizations and individual donations. Organizations were heavily reliant on localized philanthropic efforts including individual donations, family foundations, and in-kind support.

Main CBEL Funding Sources



SCHOOLS

- ▶ School budget
- ▶ Parent-teacher org. (PTO/PTA)
- ▶ Individual donations



ORGANIZATIONS

- ▶ Individual donations
- ▶ Family foundations
- ▶ In-kind donations

CASE STUDY CONNECTION ▶

Read more about a school-based CBEL initiative in the [Courtyard Case Study of South Portland High School](#).



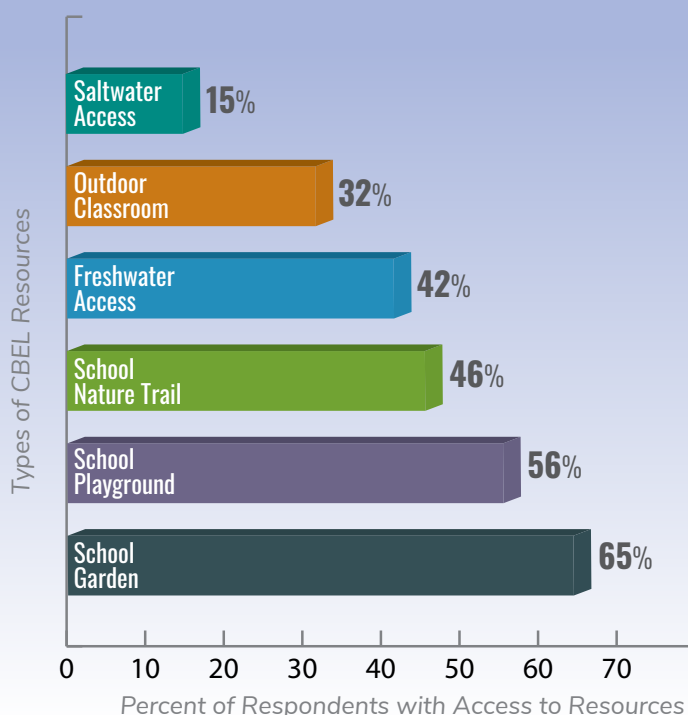
"It is defined as a component of the school's vision. Towards this goal, we have developed a number of partnerships with community-based environmental education programs."

—School Administrator

➔ Finding 3. *Resources for CBEL*

Schools often have access to resources on or within walking distance of school grounds that can provide the setting for a variety of Community-Based Environmental Learning programming. These spaces are underutilized. At the same time, one of the most significant barriers to implementing CBEL is access to transportation.

CBEL Resources within Walking Distance to Schools



How often do teachers at your school utilize these spaces?

TYPICAL ANSWER ▶ SOMETIMES
(once or twice a month)

★ RECOMMENDATION:

It is clear that CBEL can be done, and done well, right on the school campus—which would negate the transportation barrier to doing CBEL. Situating these projects on school grounds, if funds or resources are limited, provides an opportunity to implement CBEL in all schools, especially those with fewer resources.

➡ Finding 4: *CBEL Methods*

Short-term partnerships and field trips were reported by both schools and organizations as the most common methods of implementing Community-Based Environmental Learning. While these experiences can be important and transformative for youth, the greatest youth impacts come from more extended and in-depth programming.²

Most Commonly Used CBEL Methods by Schools and Organizations

SCHOOLS



55% Day programs offsite
(field trip)

40% Day programs onsite
(i.e. presentation)

39% Long term
partnerships

ORGANIZATIONS



47% Field trips

40% School presentations

31% Long term partnerships

★ RECOMMENDATION:

Short-term programming can provide an effective entry point for schools and organizations to begin implementing CBEL, however as the field looks to improve practice and quality of programs, long-term partnerships and extended programming should be encouraged and supported.

➡ Finding 5: *Equity in CBEL*

One of the goals of the Census was to identify inequities in access to Community-Based Environmental Learning programming for youth across Maine. This report examines inequities related to socioeconomic status and geographic location of youth with the intention of surfacing effective strategies and supports needed to support CBEL for all youth.

Socioeconomic status

There are some unsurprising differences in schools when comparing by socioeconomic status of students using Free and Reduced Lunch eligibility numbers as a proxy. Poorer schools less often had money allocated in their budget for CBEL programming, and also had less capacity to apply for grants. However, they did receive donations and individual contributions more often than wealthier schools. Fewer poorer schools had resources available to them within walking distance and also rated higher levels of challenges to implementing CBEL.

★ RECOMMENDATION:

Efforts should be made to level the playing field by increasing support to lower-resourced schools in order to ensure equitable access to CBEL. Later, we will explore how quality programming is not necessarily related to higher-resourced schools and examine strategies for supporting CBEL programs in communities with less access to financial resources.

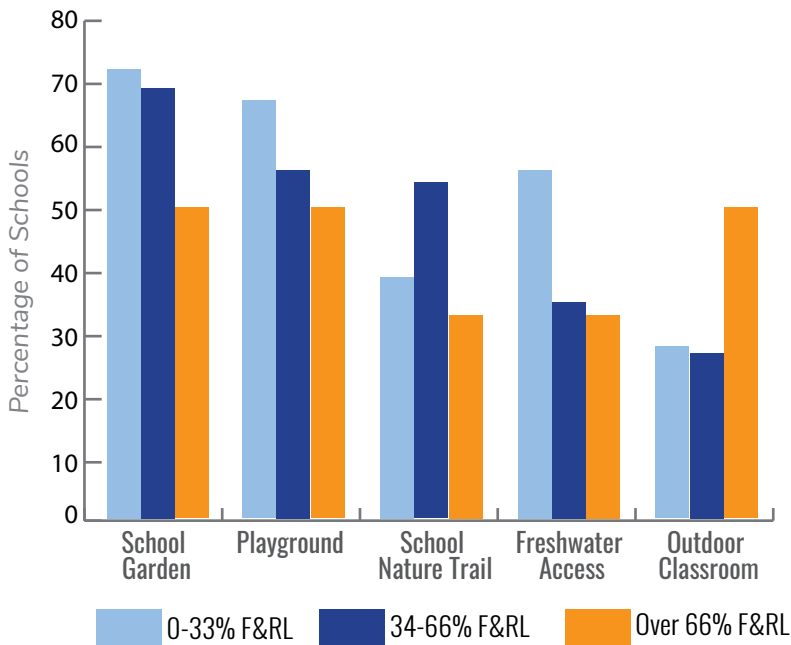
2 Chawla, L., & Cushing, D. F. (2007). Education for strategic environmental behavior. *Environmental Education Research*, 13(4), 437-452.

Rickinson, M. (2001). Learners and learning in environmental education: A critical review of the evidence. *Environmental Education Research*, 7(3), 207-320.

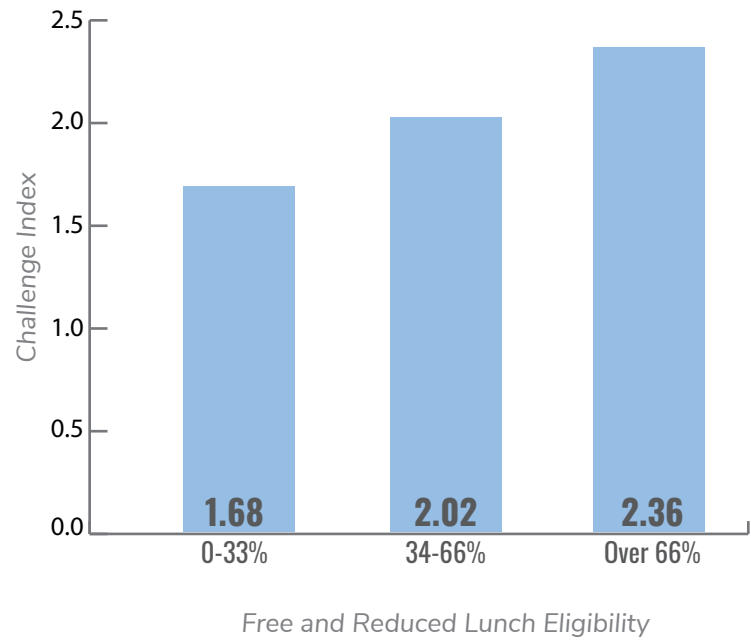
Schultz, P. W., & Tabanico, J. (2007). Self, identity, and the natural environment: Exploring implicit connections with nature. *Journal of Applied Social Psychology*, 37(6), 1219-1247.



CBEL Resources by Free and Reduced Lunch Eligibility at Schools



CBEL Challenge Index by Free and Reduced Lunch Eligibility at Schools



Geography

Maine is a large state with vast areas of land that have a geographically dispersed population. It is unsurprising that counties with larger populations and more city centers have access to seemingly more apparent resources than more rural counties.

★ RECOMMENDATION:

Rural counties with fewer apparent resources in the form of organizations serving them should be supported to better understand their communities' CBEL assets. Many of the respondents to this survey have a commitment to work statewide, and there are Soil and Water Conservation Districts and Cooperative Extension offices represented in each county, along with local expertise of community members.

CASE STUDY CONNECTION ➤

Read the [Composting Case Study of Houlton Southside School](#) to learn more about a project in Aroostook County that utilized a SWCD training as inspiration for a decades-long program.



The "challenge index" was created by aggregating levels of challenge ratings across all challenge categories (time, scheduling, funding, pedagogical expertise, etc.) for an overall challenge score between 1-4.

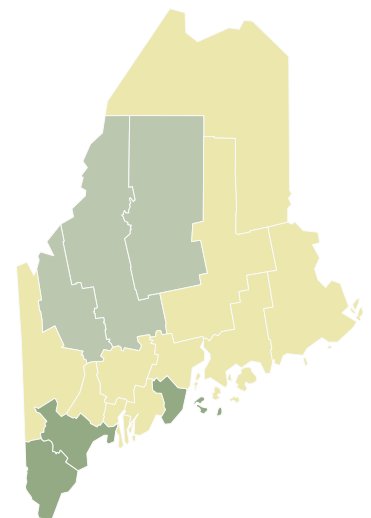
Responding Organizations Serving Youth by County

MOST SERVED COUNTIES

27% Cumberland
16% Knox
13% York

LEAST SERVED COUNTIES

5% Somerset
5% Piscataquis
4% Franklin





➔ Finding 6. *Overcoming Challenges in CBEL*

In exploring the challenges to implementing Community-Based Environmental Learning in schools, the top responses were scheduling/time, funding, and access to transportation. These were consistent across grade level, size of school, and socioeconomic status of school. However, administrators offered innovative and creative methods of overcoming these challenges that other schools can learn from.

CHALLENGE

INNOVATIVE SOLUTION EXAMPLE

#1 FUNDING

Materials for projects, equipment, speakers, or fee-based programming all require dedicated sources of funding.

GEAR EXCHANGES

“We work regularly to develop partnerships with organizations who possess critical equipment we do not have.” —School Administrator

#2 SCHEDULING/TIME

Teachers, especially elementary teachers who teach all subjects, have a lot of material they need to cover over the school year. It can be difficult to find the time and coordinate projects in an often inflexible school schedule.

DEDICATED SUPPORT STAFF

“Our greenhouse manager and service-learning coordinators look for curricular connections and help teachers see how environmental/experiential/service learning could enrich instruction without feeling like an add on or overwhelming work.” —School Administrator

#3 TRANSPORTATION

Transportation to off-site field locations or field trips requires time, coordination, and money.

UTILIZING RESOURCES WITHIN WALKING DISTANCE

“We live close to the Sandy River as well as many geological locations which helps. Students are able to walk or use district buses to arrive.” —School Administrator

#4 PEDAGOGICAL EXPERTISE

Teachers who do not have a background in environmental topics or experience taking students outside may feel overwhelmed by something new.

VOLUNTEER COMMUNITY EXPERTS

“We have a community “Green Team” composed of community members who are interested in supporting our work to connect to the outdoors.”
—School Administrator





CASE STUDY CONNECTION ▲

Read more about the Green Team project in the [Green Team Case Study of Cushing Community School](#).

Overcoming Other Challenges

"We have been fortunate to have several opportunities to work with agencies, both local and state, to accomplish our experiences."

—School Administrator

"We have a very supportive board, with an incredible staff that is knowledgeable and 100% supportive of our science work. We also have a partnership with a local environmental organization where their educators co-teach with the teachers here at school once a week."

—School Administrator

"Training opportunities for teachers to help them become more familiar with experiential learning - Farm to School Institute at Shelburne Farms, Service Learning Institute with help from Tanglewood, staff retreat to Hurricane Island. These have been optional experiences and have built capacity, but usually has the same people attending (and oftentimes the ones who need the training least because they already are doing it. . .)."

—School Administrator



COMMUNITY-BASED ENVIRONMENTAL LEARNING IN ACTION

The majority of this survey delved deep into the Community-Based Environmental Learning projects that are occurring in both schools and organizations, including partnerships between the two, across Maine. School administrators, organizational leaders, and both school-based and out-of-school time educators contributed information to the “Project Census” portion of the survey. They provided detailed information about the types of learning experiences that schools and organizations across Maine are using to connect youth to the environment and to their communities. These questions provided an in-depth insight into when, where, and with whom these projects were occurring; how partnerships contributed to projects; and how they aligned with best practices in environmental action and science inquiry.

► Finding 1. *Linking Projects to Place*

CBEL projects in Maine often connect students to local natural resource-based economies, culture, or environmental assets in a community to engage them in learning. The “place-based” nature of these projects is a common design feature that others can learn from as they seek to implement more CBEL in their schools or communities.

Projects Linked to Place across Maine



Aroostook County

(agriculture economy)

40% of projects related to agriculture/gardening

Hancock County

(longest coastline & fisheries-based economy)

24% of projects related to marine and fisheries

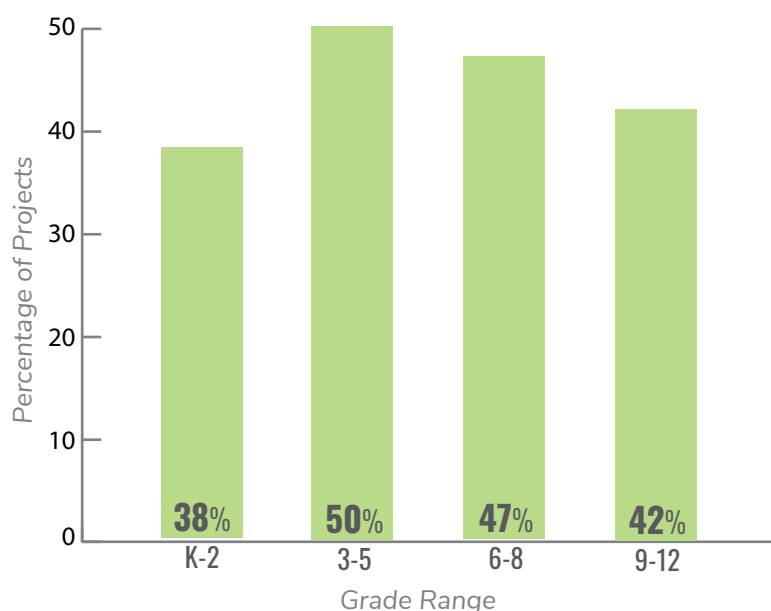
20% Gardening and agriculture
11% Forestry and forest ecosystems
11% Marine ecosystems, fisheries, and aquaculture
11% Freshwater and watersheds

► Finding 2. *Structural Characteristics of CBEL Projects in Maine*

Grade Levels

CBEL projects and programming in Maine span all grade levels, from elementary to high school. This should be highlighted as a strength of CBEL programming for the state, and a way to inspire future programming that can be done with any population of students, regardless of grade.

Distribution of CBEL Projects by Grade Range



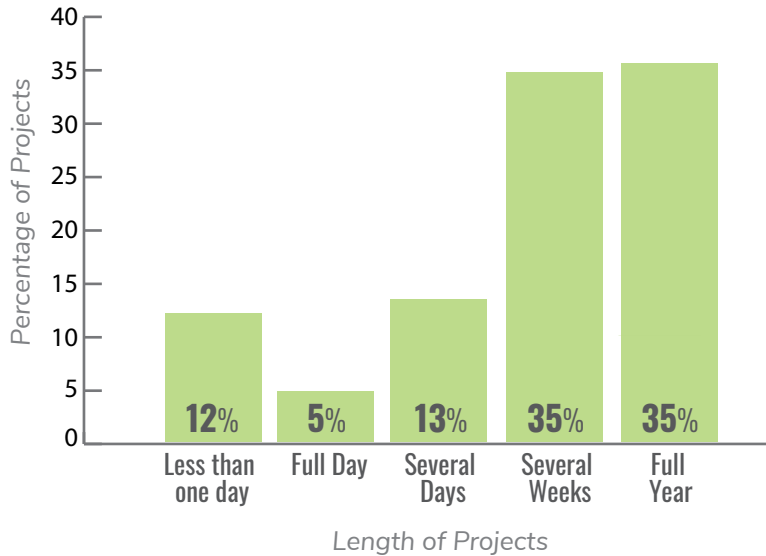
*Percentages do not add up to 100% because some projects involved multiple grade bands.

CASE STUDY CONNECTION ►

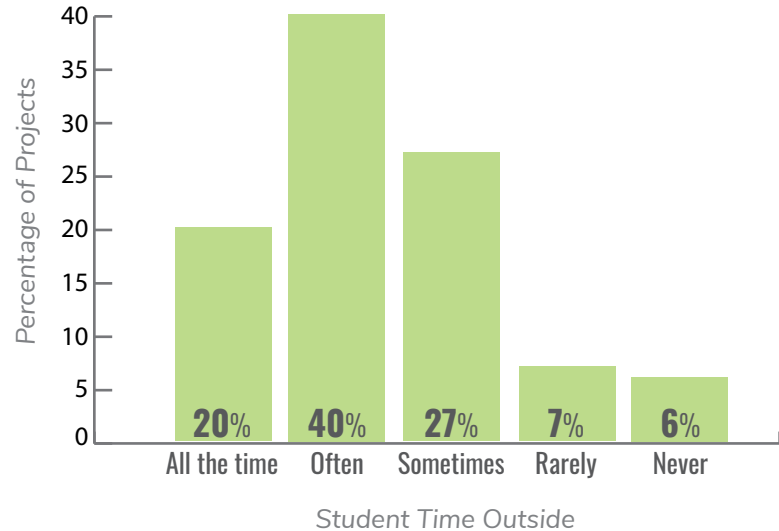
The *Eco-Pond and Orchard Case Study of Indian Township School* incorporates Indigenous planting practices (Three Sisters Garden and traditional herbs) into their CBEL project.



Length of CBEL Projects



How Often Students Were Outside (with a learning goal) during CBEL Projects



Length of Programming

Respondents most often highlighted extended programming and projects (projects that occurred over several weeks to a full year) in the Project Census. This implies that educators are placing a higher value on these extended experiences, despite organizational and school leaders responding that CBEL programming most often takes the form of short-term field trips and experiences. Administrator respondents may not be entirely aware of how teachers are tying the field trip requests that come across their desks for CBEL programming to more extended learning before and afterwards in the classroom. Efforts should be made to reconcile these two different views of CBEL and make extended programming the goal when feasible.

Time Outside

Most projects involved having students outside at least sometimes during CBEL programming. However, there were many projects in which students were outside rarely or never, yet still were learning in connection to their environment and community. These projects can be highlighted as examples to overcome barriers that may be present preventing students from going outside or as effective entry points to CBEL for schools who may not be comfortable yet getting students outside for learning purposes regularly.



CASE STUDY CONNECTION ◀

Read the [Sustainable Seas Case Study of Bath Middle School](#) for an in-depth description of an extended, interdisciplinary CBEL program.

CASE STUDY CONNECTION ▶

Read the [Composting Case Study of Houlton Southside School](#) to learn more about a project primarily focused within the school building.



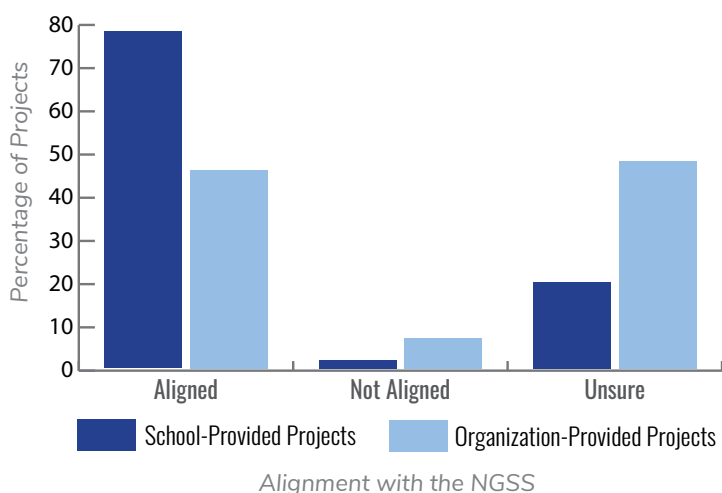
➡ Finding 3. *Connections to Standards*

Projects from school respondents were more often aligned with the Next Generation Science Standards (NGSS) than organization-provided projects. In addition, there seems to be a lack of knowledge of the science standards for organizational representatives - close to 50% were unsure whether their project aligned to the NGSS.

★ RECOMMENDATION:

Efforts should be made to support organizations in learning the common language of schools with regards to science standards, to facilitate collaborations between the two.

Project Alignment with the Next Generation Science Standards



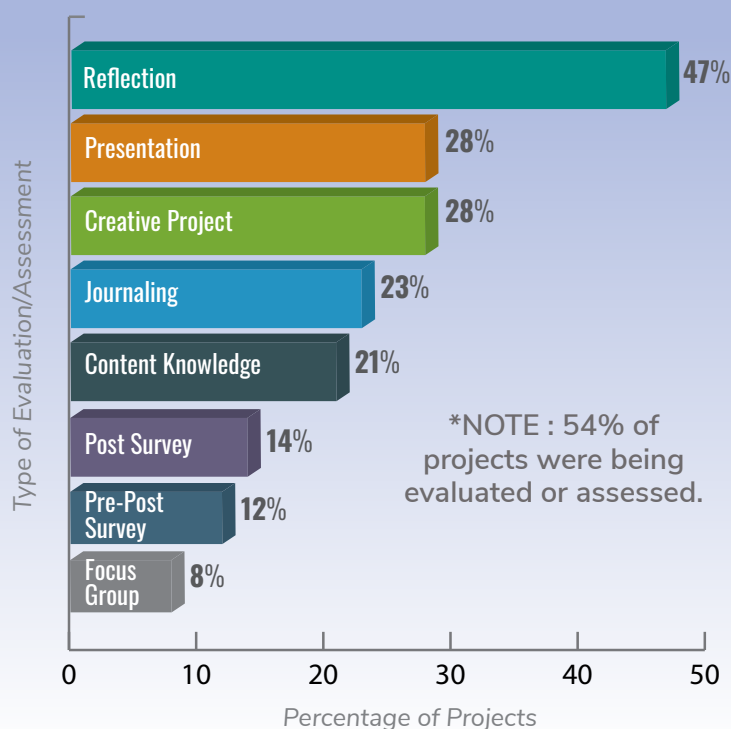
➡ Finding 4. *Understanding & Evaluating Impact*

Slightly over half of the projects are being evaluated or assessed in some way, and there is a wide range of evaluation methods used. Evaluation efforts tended toward less time or resource intensive methods, such as reflection activities, presentations, and creative projects. Evaluation methods that are most commonly used in research and most effectively capture impact, such as pre-post surveys and focus groups, were utilized in only 20% of evaluated projects.

★ RECOMMENDATION:

The CBEL field in Maine needs some common measures or tools that can be used to assess and evaluate program outcomes for this type of student learning. While many educators provided compelling anecdotal evidence of student impacts, many funders and state leaders that are integral to supporting this type of education in Maine want to see measurable results.

Evaluation Methods for CBEL Projects



Examples of Student Impacts of CBEL Programs

"Students were highly engaged, were focused in using scientific equipment and in inquiry; in engineering and design practices, and in problem solving a local issue. Students also presented and shared with local organizations!"

—School Teacher

"Student pre/post tests reflect much growth in the understanding of impacts of invasive species on biodiversity."

—School Teacher

➡ Finding 5. *Geographic Landscape of Projects*

Areas of the state that were underrepresented in the Project Census (Penobscot, Kennebec, Androscoggin, and Somerset counties) need to be studied further to identify why this occurred. Is CBEL really just not as present in these counties? Did educators in those areas not feel compelled to fill out this survey, or are they not linked into existing networks that were used for messaging?

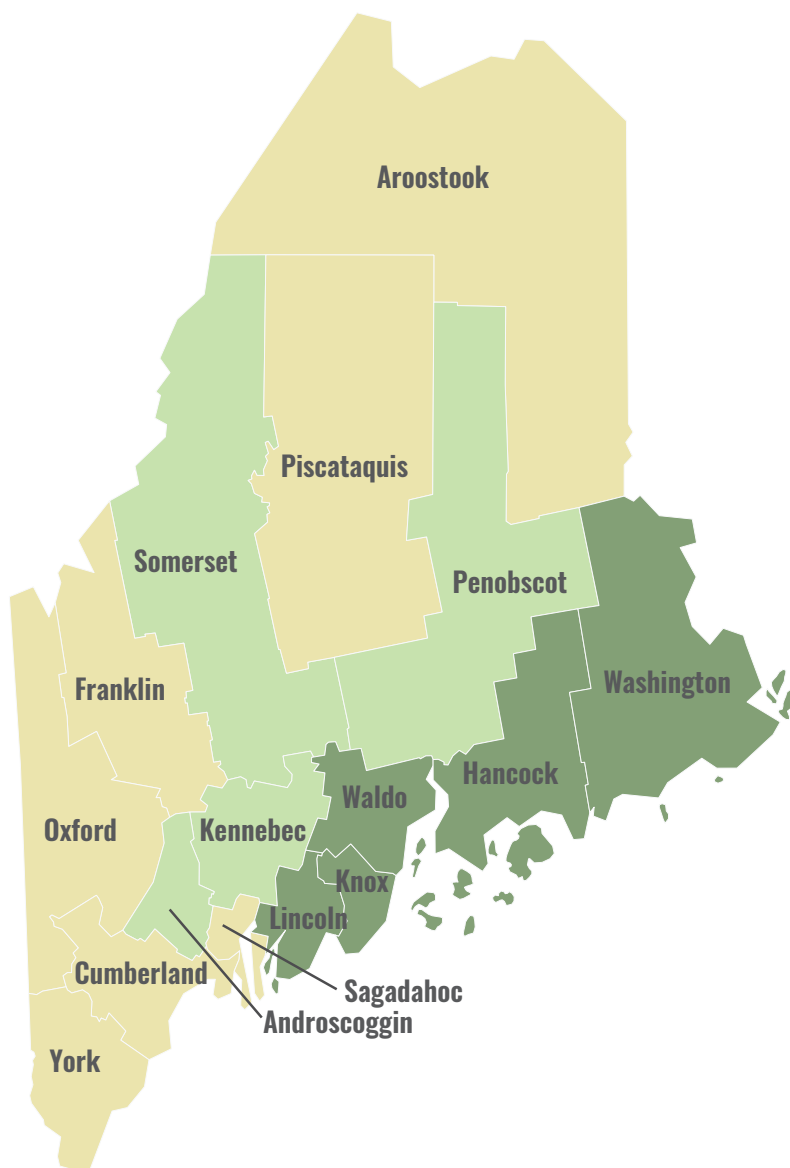
Percent of Projects Compared with Percent State Population by County

Representation by County

- Overrepresented
- Underrepresented
- Representative

★ RECOMMENDATION:

Efforts should be made to identify how to engage underrepresented communities more, either existing educators that may be working on CBEL projects in isolation or ways to support more CBEL programming across these regions of the state.



PRODUCTIVE PARTNERSHIPS IN CBEL

Partnerships can serve a variety of functions and provide support to projects through funding, access to youth, curriculum development, environmental knowledge, instructional support, providing equipment, etc. Partners can supplement and enrich Community-Based Environmental Learning projects in ways that educators working individually do not have the capacity to do. In addition, for school-based projects, partnerships that bring the community into the classroom (or bring the classroom out into the community), can benefit both teachers and students, providing clear connections to real-world issues for students and increasing their motivation and interest and supporting teachers in strengthening their own content knowledge, interest, and confidence in facilitating CBEL projects.

A consistent theme throughout the census has been the importance of partnerships and collaborations in CBEL projects. As evidence for how critical partnerships are, **over 80% of the projects provided in the Project Census had at least one additional partner engaged and contributing to the project, and over one third of projects had at least three partners engaged.** This section will explore findings related to partnerships in CBEL projects.



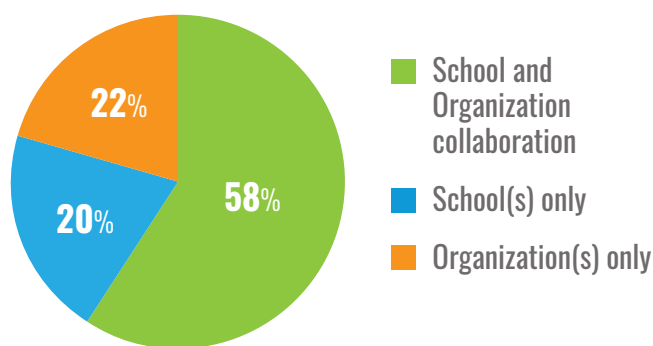
CASE STUDY CONNECTION ▲

All of the case studies involve some degree of partnerships that support student learning. For an in-depth description of a school and land trust collaboration, read the [Harpswell Community School Case Study](#) about their partnership with Harpswell Heritage Land Trust.

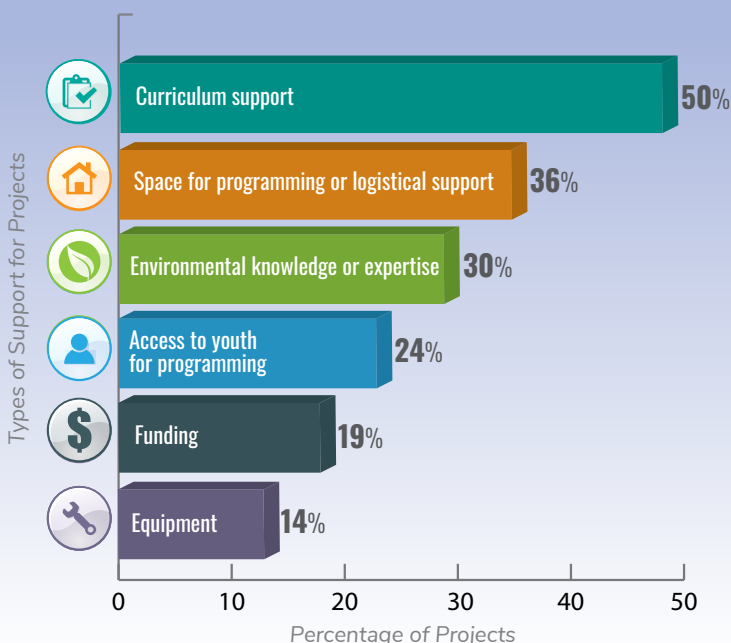
➔ Finding 1. *Partnership Characteristics*

CBEL project partnerships are widely used to help educators fill gaps in their resources and/or expertise, and to enrich youth learning experiences. Most of the projects in the Census included some sort of collaboration between a school and organization(s), demonstrating the importance of partnerships between in-school and out-of-school time education settings. The most common partnerships in CBEL projects involved providing curriculum support, supporting program logistics, and providing environmental expertise.

Partnership Structures in CBEL Projects



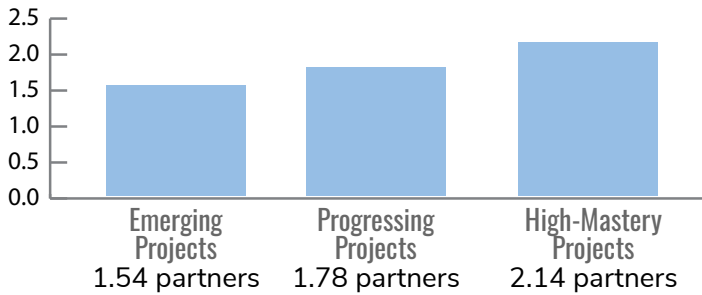
Types of Partnerships and Support



➔ Finding 2. *Partnerships & Quality Programming*

High-Mastery CBEL projects (that incorporate science inquiry and environmental action best practices to the greatest extent, explored in the next section) utilize the most partnerships. This indicates a strong connection between number of partners and quality of programming.

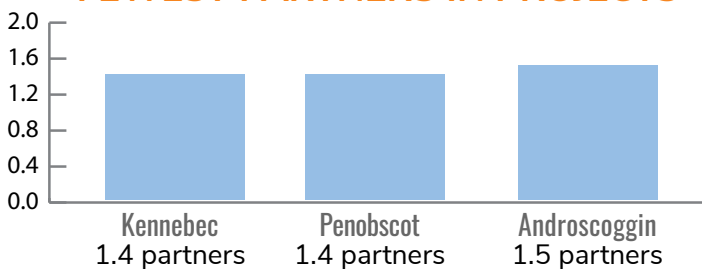
AVERAGE NUMBER OF PARTNERS



➔ Finding 3. *Geography and Partnerships*

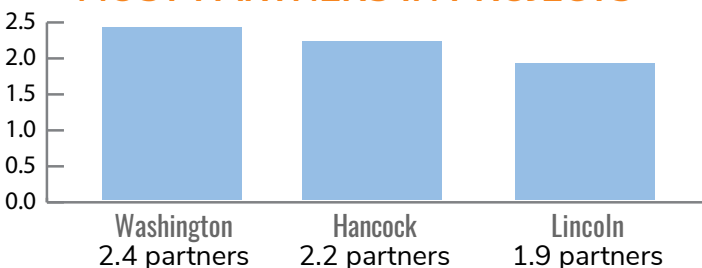
Counties with the fewest projects per capita, including Penobscot, Kennebec, and Androscoggin counties, also had the fewest numbers of partners on their projects, indicating that these areas may need additional support to promote and sustain CBEL learning experiences for youth.

FEWEST PARTNERS IN PROJECTS



Underrepresented Counties by Projects

MOST PARTNERS IN PROJECTS

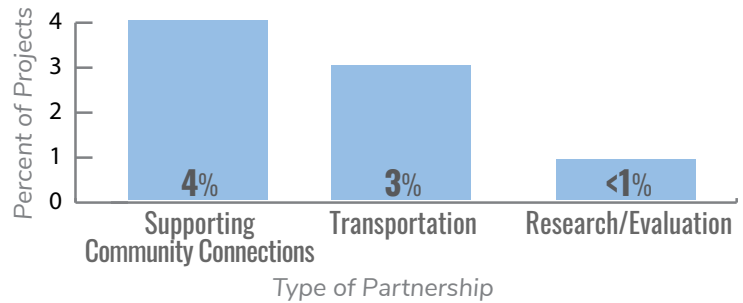


Overrepresented Counties by Projects

➔ Finding 4. *Opportunities for Partnerships*

The Census data illuminated opportunities for partnerships that could address some of the systemic barriers to CBEL. For example, a key challenge to CBEL is support for transporting youth, and only 3% of partnerships currently support transportation.

LEAST COMMON PARTNERSHIPS



★ RECOMMENDATION:

The Census identifies gaps in partnership opportunities (above) that could be addressed to improve the field in Maine. For example, youth impacts are only evaluated in about half of the projects provided in the Census, and the evaluation methods most commonly used are relatively basic. Creative partnerships could fill this gap and contribute research and evaluation expertise to projects, supporting the implementation of more common research-grounded methods, such as surveys and focus groups. This would provide an enormous contribution to the field and support continued CBEL programming by demonstrating the benefits of this type of learning.

❖ OVERALL RECOMMENDATION:

While partnerships appear to be a critical component of CBEL projects, admittedly we don't know much about partnering dynamics, like:

- ▶ How do partnerships lead to good programs?
- ▶ Do good programs partner to get better?
- ▶ How often are partnerships one-way vs. reciprocal?

Partnership dynamics should be studied to make recommendations for the field. At the same time, the data in the Census illustrates some low-hanging fruit to quickly increase the opportunities and lessen the gaps, such as developing networks of potential partnerships and supporting programs in exploring underutilized partnership opportunities in research, evaluation, and transportation.



BUILDING ON BEST PRACTICES

To identify best practices in Community-Based Environmental Learning, the Census drew on the North American Association for Environmental Education's *Guidelines for Excellence in K-12 Environmental Education*, and specifically focused on **Strand 1: Questioning, Analysis, and Interpretation Skills** and **Strand 3: Skills for Understanding and Addressing**.³ Strand 1 focuses on scientific inquiry skills which parallel the Next Generation Science Standards' Science and Engineering Practices.⁴ Strand 3 focuses on skills for environmental action.

We consider High-Mastery CBEL to incorporate many of these best practices within a project, linking both science inquiry practices and environmental action practices in ways that produce an engaging learning experience for the youth they serve. And, while we do not consider the implication of this research to suggest that the goal be incorporation of all practices within a project, our hope is that these best practices are leveraged and incorporated in such a way to fit the community-based and environmental learning objectives of the projects themselves.

We used this research to frame questions designed to yield better knowledge about the best practices themselves, allowing us to see how educators were deploying them and how they might co-occur in projects. In addition, we were interested in learning how the use of best practices was related to alignment with the Next Generation Science Standards (NGSS), evaluation of impacts, partnerships, and professional development needs and opportunities for educators.

➔ Finding 1: *Patterns of Best Practice Use*

Across the 366 projects contributing best practice data, some patterns emerge in the use of the science inquiry and environmental action practices in projects described by organizational respondents and school respondents. The most commonly used science inquiry practices across all projects were **Questioning, Collecting Information, and Drawing Conclusions and Developing Explanations**. The most commonly used environmental action practices were **Identifying and Investigating Locally Relevant Issues, Sorting Out the Consequences of Issues, and Understanding Societal Values and Principles**. Overall, projects described by school respondents rated their use of the practices consistently higher than projects described by organizational respondents.

3 North American Association for Environmental Education, & National Project for Excellence in Environmental Education (US). (2019). *K-12 Environmental Education: Guidelines for Excellence*. North American Association for Environmental Education. Retrieved from https://cdn.naaee.org/sites/default/files/eeoproducts/files/k-12_ee.lr_.pdf

4 NGSS Lead States. (2013). *Next Generation Science Standards: For States, By States*. Washington, DC: The National Academies Press.

STRAND 1: Questioning, Analysis, and Interpretation Skills

Science Practices

QUESTIONING

Learners develop questions that help them learn about the environment.

DESIGNING INVESTIGATIONS

Learners design investigations to answer particular questions about the environment.

COLLECTING INFORMATION

Learners collect information for their environmental investigations.

EVALUATING ACCURACY AND RELIABILITY

Learners understand the need to use reliable information to answer their questions.

ORGANIZING INFORMATION

Learners describe data and organize data to help them with analysis and interpretation.

WORKING WITH MODELS AND SIMULATIONS

Learners use, create, and/or evaluate models to understand environmental phenomena.

DRAWING CONCLUSIONS AND DEVELOPING EXPLANATIONS

Learners develop explanations that address their questions about the environment.

STRAND 3: Skills for Understanding and Addressing Environmental Issues

Environmental Action Practices

IDENTIFYING AND INVESTIGATING LOCALLY RELEVANT ISSUES

Learners identify and investigate an issue in their local community.

SORTING OUT THE CONSEQUENCES OF ISSUES

Learners identify the consequences of specific environmental issues.

IDENTIFYING AND CRITIQUING ALTERNATIVE SOLUTIONS AND COURSES OF ACTION

Learners understand potential solutions & barriers to resolving a specific environmental issue.

PLANNING AND TAKING ACTION

Learners plan and carry out an activity to address the environmental issue.

EVALUATING THE RESULTS OF ACTIONS

Learners analyze whether the activity they completed produced the intended results.

UNDERSTANDING SOCIETAL VALUES AND PRINCIPLES

Learners understand how community values and norms influence the discussion and solutions to the environmental issue.



➡ Finding 2: *Project Clusters*

The data showed very distinct differences in the extent to which projects incorporated these best practices. Some were just beginning, others focused more on science inquiry or environmental action practices, and others were bridging the science and environmental practices in interesting and productive ways. **We found the following statistically significant distinct clusters:**

1. **Emerging projects** implement few science and/or environmental action practices but are connecting students to CBEL.
2. **Progressing projects** more fully incorporate the practices but may struggle to bridge the gap between science and environmental action practices. The three progressing subgroups include:
 - **Emergent Progressing projects** incorporate practices to a slightly higher level than the emerging group
 - **Progressing Environmental Action-Focused projects** incorporate more environmental action practices than science practices
 - **Progressing Science Inquiry-Focused projects** incorporate more science practices than environmental action practices
3. **High-Mastery projects** incorporate many of the practices in ways that bridge science and environmental action practices.

Community-Based Environmental Learning Project Clusters

	Emerging
PRACTICE USE	Low level of practice use, many struggled to understand practices and were unable to answer question
CBEL AS A SCHOOL GOAL	25% of projects provided by schools (40% report CBEL as a school goal)
NGSS ALIGNMENT	26% of projects aligned with the NGSS 60% didn't know if projects were aligned
EVALUATION	Lowest evaluation levels
PARTNERSHIPS	Lowest partnership levels (1.54/3)

★ Emerging Practice Advancement Opportunities

Build on strengths of connecting students to CBEL projects and the use of questioning and data collection

- General instruction on best practices
- Introduce additional practices as next steps (i.e. build off of student questions to design investigations they can then collect data to address)
- Incorporate more environmental action practices such as focusing on locally relevant issues—an entry point for environmental action practices

Advancement Opportunities Across All Groups

BUILD PARTNERSHIPS

The data show that High-Mastery projects have the most partnerships compared to Progressing and Emerging groups. Partnerships seem to be a key factor in successful projects and contribute capacity and resources in ways that individuals alone cannot. Support for all groups should include training on strategies to build and sustain partnerships in order to support and advance their projects.

BUILD LEADERSHIP AROUND CBEL AS A GOAL *(for schools)*

The data show that schools contributing High-Mastery projects to the Census almost always (91%) had CBEL defined as a goal in their academic programming compared to 40% for Emerging project schools. Including administrators in conversations about a school-wide vision for CBEL may be a key pathway to advance toward High-Mastery projects. Administrator support and teacher leadership in CBEL could generate more resources and enthusiasm for this type of learning and move projects beyond a single school champion, and toward creating a school culture of CBEL that is sustained even after an individual may leave.

Emergent Progressing	Progressing <i>Env-Action Focus</i>	Progressing <i>Sci-Inquiry Focus</i>	High-Mastery
Focused on Asking Questions, Collecting Information, and Drawing Conclusions; struggle to incorporate environmental actions	Incorporate more environmental action practices than other progressing subgroups; but incorporate science practices at a lower level (beyond Questioning)	Incorporate science practices at a very high level, but struggle at linking those practices with environmental actions	Higher levels of practice incorporation across all science and environmental action practices
38% of projects provided by schools (50% report CBEL as a school goal)	33% of projects provided by schools (75% report CBEL as a school goal)	52% of projects provided by schools (50% report CBEL as a school goal)	61% of projects provided by schools (91% report CBEL as a school goal)
57% of projects aligned with the NGSS	47% aligned with the NGSS	71% aligned with the NGSS	81% aligned with the NGSS
Qualitative and reflection-based assessments	Qualitative and reflection-based assessments	More likely to do research-grounded pre-post surveys	Greatest evaluation of impacts
More partnerships than emerging group (1.79/3)	More partnerships than emerging group (1.84/3)	More partnerships than emerging group (1.84/3)	Most partnerships of all groups (2.14/3)



INTEGRATE THE NEXT GENERATION SCIENCE STANDARDS *(for organizations)*

Aligning with the NGSS is a clear design element for projects that incorporate many of the practices. Alignment occurred in 81% of High-Mastery projects compared to 26% of Emerging projects. While NGSS alignment is typically associated with school projects, we believe that organizations will also benefit from alignment and thinking about the practices in new and innovative ways. Alignment to standards may be especially important for collaborations with schools to support academic learning outcomes.

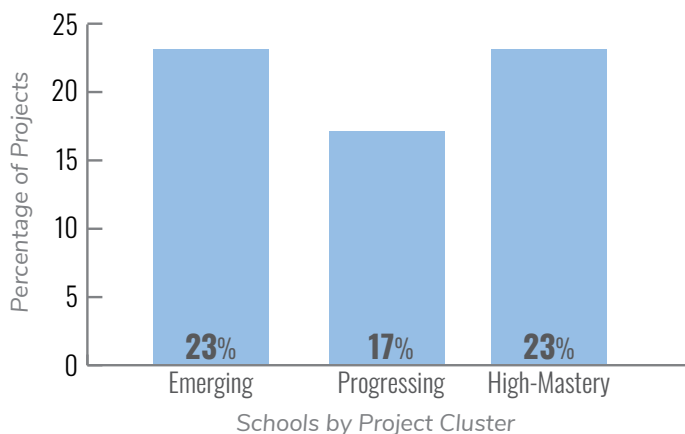
DEVELOP METHODS FOR EVALUATION OF CBEL PROJECTS

Evaluation and assessment of impacts is also a characteristic of High-Mastery projects. Projects that use multiple and/or more evidence-driven methods seem to be able to iterate and optimize their projects in ways that they would not be able to do without those evaluative methods. The CBEL field should support training on how to evaluate and assess impacts of CBEL projects as well as how to incorporate that feedback into revising project design to support continued project growth and development.

➔ Finding 3: *Socioeconomic Status and Best Practices*

When looking at just in-school projects, schools providing High-Mastery projects had roughly the same distribution of Free and Reduced Lunch eligibility as the other groups. Thus, High-Mastery projects are **not** just limited to schools with more resources. A more important feature of High-Mastery projects is that they seem to be able to leverage resources and partnerships in creative ways to enhance and enrich the experiences youth have in those projects, not necessarily by spending more money. By looking towards High-Mastery projects in lower-resourced school districts, we may be able to identify more concrete methods to address issues of inequity and accessibility of CBEL to our students, such as increasing partnerships to address gaps in resources, building leadership around shared CBEL values, and developing methods to evaluate and assess impacts so that programs can be revised and improved.

Percentage of Projects at High Free and Reduced Lunch Schools



◀ CASE STUDY CONNECTION

All of the exemplar case studies highlighted later in this report are either in the middle Free and Reduced Lunch group (34-66% of students eligible) or high Free and Reduced Lunch group (over 66% eligibility). These case studies can be used as a starting point to providing clear examples of paths for spreading CBEL that circumvent the barriers present for higher-poverty schools.

Notably, [Houlton Southside School](#) has over 90% Free and Reduced Lunch student eligibility. The teacher leading that program was able to leverage knowledge gained from free training at a local Soil and Water Conservation District, find creative sources of outside funding for materials, and advocate for the composting project with her students by collecting data on financial savings by the school district.

[Indian Township School](#) also has over 90% Free and Reduced Lunch student eligibility and leveraged local support for the school and youth in the community to support their projects. Teachers supported students in advocating for the Eco-Pond and orchard project by creating presentations for the Passamaquoddy Tribal Council, utilizing parental expertise in heavy equipment to volunteer to dig the pond, and connecting with nonprofit groups across the state to provide additional capacity and expertise.

LOWERING BARRIERS TO EQUITY

High Free and Reduced Lunch schools (over 66% eligibility) have used some creative methods to leverage resources and implement projects that effectively incorporate best practices in science inquiry and environmental action including:

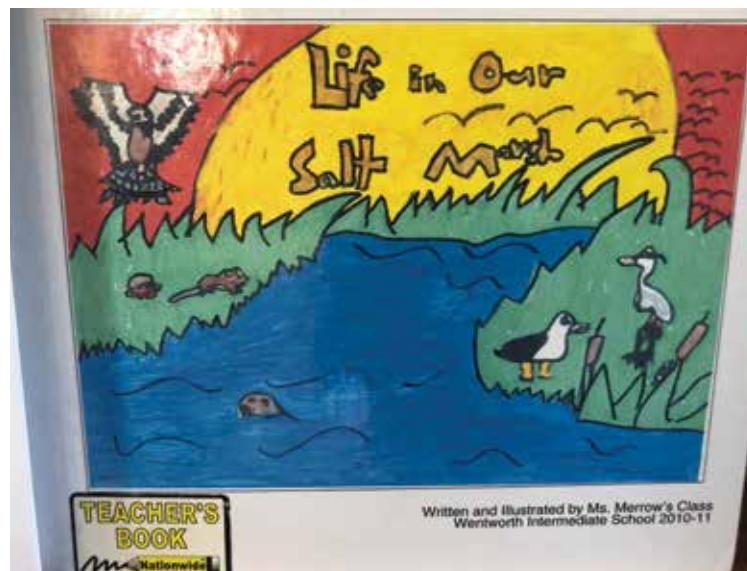
- ▶ Gaining knowledge of environmental topics from free and accessible professional development offerings
- ▶ Partnering with other organizations to support projects
- ▶ Applying for grants and fundraising for materials and equipment
- ▶ Utilizing parental support and in-kind donations of time and expertise
- ▶ Advocating for CBEL as a priority for youth in their communities

➡ Finding 4: *Bridging Practices in High-Mastery Projects*

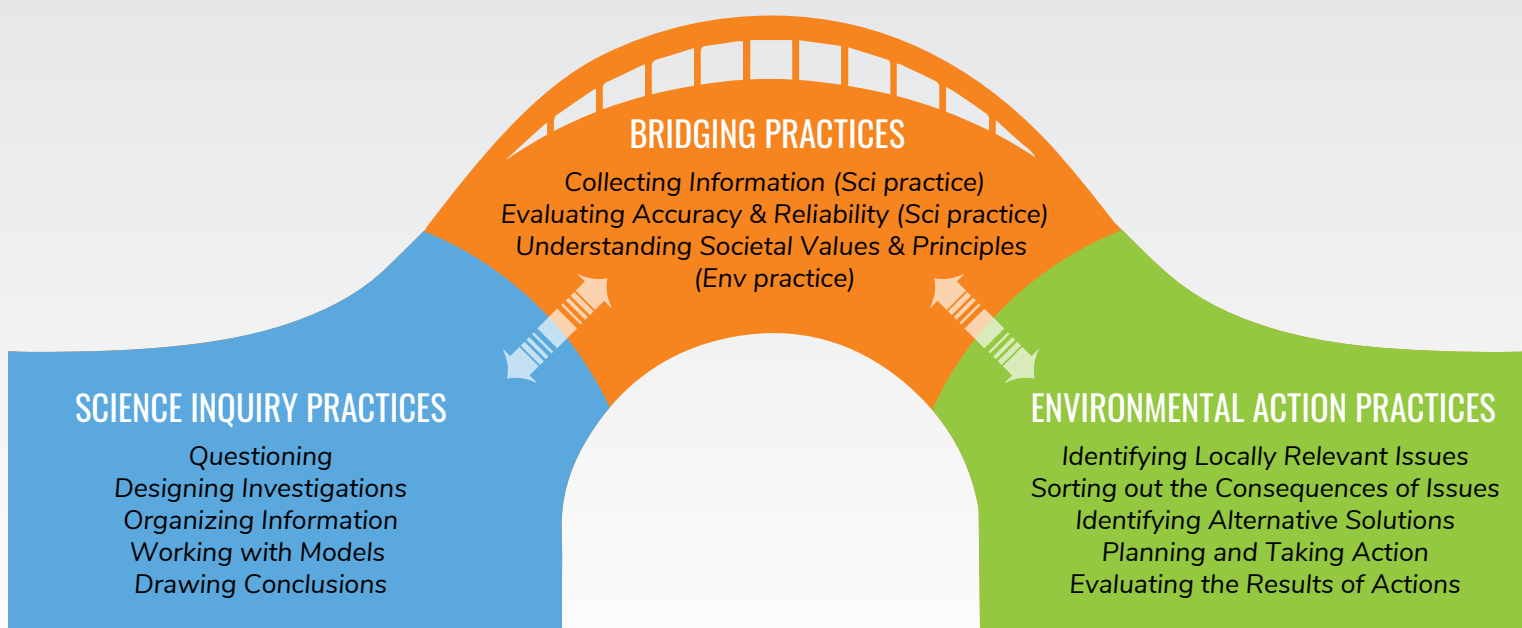
By examining the use of and connections between practices in the High-Mastery group, we were able to identify several “crossover” or “bridging” practices that connect science inquiry and environmental actions in projects.⁵ These crossover practices give us insight into the various methods by which the practices might be more effectively incorporated into projects. For the Emerging and Progressing project groups, there were no significant crossovers between the two categories of practices- therefore this seems to be a feature of High-Mastery projects that are incorporating practices to a greater extent.

⁵ See the full report to learn about analysis methods for determining the crossover practices.

The strongest bridging practices were **Collecting Information, Evaluating the Results of Actions, and Understanding Societal Values and Principles**. These practices may be the most successful starting practices to support projects in integrating either more environmental action or science inquiry best practices into their projects.



BRIDGING Science Inquiry and Environmental Action Practices in High-Mastery Projects



ADVANCING THE CBEL FIELD

The Census of Community-Based Environmental Learning in Maine has provided a number of insights into ways that the field can advance to increase the access and quality of learning experiences for our youth.

Maine offers a multitude of professional development (PD) offerings available to CBEL educators from organizations both within Maine as well as nationally, however less than half of respondents have participated in PD that they would consider “impactful” to their practice. The professional development to date has been insufficient in availability and quality.

RECOMMENDATION #1

Generate targeted opportunities for project advancement by scaffolding best practices

Based on profiles of best practice use, we can target professional development opportunities to key leverage points to support educators in advancing their projects and supporting continued, gradual improvements in projects, educator practice, and ultimately student outcomes. Specific implications for project groups or clusters (High-Mastery, Progressing, and Emerging) are discussed in the previous section.

Across all projects, the most common science inquiry practices were **Questioning**, **Collecting Information**, and **Drawing Conclusions and Developing Explanations**. For environmental action best practices, the most commonly used across projects were **Identifying and Investigating Locally Relevant Issues**, **Sorting out the Consequences of Issues**, and **Understanding Societal Values and Principles**. Because these were the most commonly used, we can make the assumption that they are accessible starting points for CBEL projects. Professional development for beginning CBEL educators therefore should focus on addressing these skills/practices.

In addition, by identifying “bridging” or “crossover” practices that are commonly used in projects incorporating both science inquiry and environmental action practices, we can isolate potential connections between the two sets of practices. For projects looking to incorporate either more environmental action practices or more science inquiry practices, these are some concrete, evidence-based strategies that could enhance project connections. Some potential example pathways are:



Potential CBEL Pathways to Link Science Inquiry and Environmental Action Practices

BIG PICTURE PATHWAY

Builds on Environmental Action Practice of Understanding Societal Values and Principles

Educators could leverage interest and strength in incorporating local issues into projects and use that interest to bridge to societal-level environmental issues.

Students could discuss how their identified local issue is influenced by larger societal values and plan a science investigation to collect data to address and understand that local issue. Data collected from a science inquiry project could then link back to environmental action, students could then use that data to plan and evaluate an action that could make a change in their community.



▲ CASE STUDY CONNECTION

The [Power Plants Case Study at Mesalonskee Middle School](#) utilized a pressing local issue of water quality in their school retaining pond to connect students to larger societal values of nutrient pollution and the effects of erosion control and lawn care practices on properties abutting local lakes.

CITIZEN SCIENCE PATHWAY

Builds on Science Inquiry Practice of Collecting Information for Investigations

Educators could leverage project strength in collecting and evaluating local data and work on relating that process to environmental actions and solutions.

Students could collect data for a citizen science project utilizing their own questions and designing their own investigations. Based on the data they collect, they could plan and design an environmental action project that either informs their community about what they learned or takes concrete steps to mitigate an environmental issue.



▲ CASE STUDY CONNECTION

The [Sustainable Seas Case Study at Bath Middle School](#) started with a strong basis in science inquiry and data collection on green crabs. They linked science inquiry to environmental action by using their data to inform others about the impacts of green crabs through a community showcase and by publishing their findings in a student journal.

DEBATING ALTERNATIVES PATHWAY

Builds on Science Inquiry Practice of Evaluating Accuracy and Reliability

Educators could introduce an environmental issue and facilitate a process of identifying and critiquing alternative solutions and courses of actions.

Students could identify potential solutions and debate how accurate and reliable their data sources are that they are using to generate their solutions.

► RECOMMENDATION #2

Emphasize the patterns of High-Mastery projects in supporting CBEL across all project groups

High-Mastery CBEL projects have important patterns and key features that can help support educators in advancing their projects and supporting continued, gradual improvements in projects and educator practice and student outcomes. The “on-ramps” and capacity building opportunities that emerged from the data provide clear implications for professional development. Notably, the High-Mastery group included representation by **all** socioeconomic levels of schools from very high Free and Reduced Lunch eligibility to very low Free and Reduced Lunch eligibility. It is possible to do CBEL and to do it well without significant expense.

THESE CHARACTERISTICS INCLUDE

1 : Project Partnerships

The data show that High-Mastery projects have the most partnerships, compared to Progressing and Emerging groups. Partnerships seem to be a key factor in successful projects and contribute capacity and resources in ways that individuals alone cannot. Support for all groups should include training on strategies to build and sustain partnerships to support and advance their projects. Making connections to the community to support partnerships was also identified as a top professional development need by respondents to the Census.

2 : Evaluation of Outcomes

Evaluation and assessment of impacts also characterize High-Mastery projects. Projects that use multiple and/or more evidence-driven methods can iterate and optimize their projects in ways that they would not be able to do without those evaluative methods. The CBEL field should support training on how to evaluate and assess impacts of CBEL projects as well as how to incorporate that feedback into revising project design to support continued project growth and development.

3: Alignment to the NGSS

NGSS-aligned projects had consistently higher ratings of use of best practices than those that were not aligned or not sure whether the project was NGSS-aligned. High-Mastery projects had the highest alignment with the NGSS out of all project clusters. Organization-based projects, unsurprisingly, were less likely to be NGSS-aligned. This provides another justification for NGSS training in CBEL projects, especially for out-of-school time educators who we have found are less familiar with the standards than school teachers. Connections to standards was also an area that both teachers and out-of-school time educators requested support for.

“I would love to find more ways to take the NGSS and MEA standards and help connect them to the local community and its issues.”

—Teacher

“I would be interested in PD that focuses on teaching educators like myself activities that support the NGSS outcomes the schools are trying to meet. Our programs are almost exclusively organized through the school so opportunities to learn how to best forge those partnerships are a great help.”

—Out-of-School Time Educator



► RECOMMENDATION #3

Build on educator-identified needs

When asked what needs educators have in professional development topics related to Community-Based Environmental Learning, responses ranged across a variety of topics. The biggest need was for instruction around specific activities—concrete subjects that could be taught in the classroom. Over a third of responding teachers identified instruction on concrete topics as a professional development need, with gardening (planting gardens, pollinator monitoring, composting, etc.), ocean science, and forestry topics among the most requested.

However, far and away the most requested topic was instruction around climate change/sustainability/energy issues. Nearly 20% of teachers (and 14% of respondents overall) identified a need for some sort of instruction around this topic.

Another common theme in responses to the question of CBEL professional development needs was **making connections to the local community**, including connecting and identifying local environmental issues, and connecting with community partners/scientists/experts who could assist with studying local issues.

“Incorporating experiential, place-based learning opportunities that can exist within an existing environmental science curriculum, that includes involved and invested community partners that are willing to work within the confines of a school day, its scheduling, and the red tape of public high schools.”

—Teacher





► RECOMMENDATION #4

Build structures to support continued professional growth for educators

Given the multitude of ever-changing professional development opportunities around Maine, multiple respondents requested a more centralized way of accessing information on available professional development opportunities.

One respondent explained,

"I also would like to know if there is a way to learn about PD opportunities more easily because right now, I do not see a lot of opportunities advertised...and I have a hard time hunting down opportunities on my own."


Another respondent suggested,

"One calendar of the EE Professional Development Training offered throughout state... so only one place to check to find all EE related professional development offerings."

CONCLUSION

The intention of this report was to provide a snapshot of the Community-Based Environmental Learning field as it stands today and therefore provide a pathway for advancement of the field as a whole across the State of Maine. The cross-section of the State that we have data on provides an excellent representative sample to address the goals of this report. Stellar examples and stories from education leaders designing innovative solutions and overcoming challenges to generate empowering learning experiences for our young people quickly became apparent in the data. This report's intention is to increase the volume of the voices in those stories of success to enable more schools, organizations, and educators to expand these learning experiences for all of Maine's youth.

Using this strong research-based foundation, we hope to activate a diverse group of statewide stakeholders toward a vision of systemic change where all Maine students are given the opportunity to become environmentally literate, civically engaged, and understand how their health is connected to that of the natural world. These findings are just the beginning of developing a common road map for improving access to CBEL and the quality of educational experiences so that all Maine students reap the benefits in addition to the communities and ecosystems in which they live.

As this report is released to the public in early 2020, we hope to begin a series of listening sessions around the State to share the findings of this report, receive feedback from communities about what these findings mean to them, and learn how this process can be improved in the future. At the same time, we hope to partner with a variety of organizations throughout the State to begin addressing many of the recommendations outlined in this report. It will be exciting to see how the information shared here empowers organizations and educators throughout Maine to work together toward shared goals to increase access to CBEL for young people in Maine. 



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