2019 Status and Needs of Non-Formal and Formal (K-12) Environmental Educators Across Pennsylvania

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Executive Summary

Sometimes the only difference between a polluter and an environmental steward is education. When a Pennsylvanian pours oil from a lawnmower into a storm drain, hoses off excess fertilizer into a stream, or leaves the faucet running unnecessarily, they may understand their actions are "bad for the environment," but they may not know the specific impacts of these actions. They may not see the oil polluting our waters; the fertilizer killing millions of organisms in a dead zone; or the water overdrawing our aquifers. The environment is such a complex system that it can be easier for us to simply ignore the rippling effects of our actions. Educators, formal and not formal, have a unique role in our communities - they help us to understand the environment and its complexity, which may change how we perceive our actions. The Environmental Education (EE) community continues to refine curricular models and programs to better meet the educational needs of students and the community. Disseminating these curricular reforms are challenged by limited funding for professional development and by the vast number of EE teachers and EE providers.

The National Oceanic and Atmospheric Administration (NOAA) supports watershed and EE through Bay Watershed Education and Training (B-WET) grants. B-WET grants fund locally relevant, authentic experiential learning for K-12 students and educators through Meaningful Watershed Educational Experiences (MWEEs) for students. The MWEE framework includes four essential elements:
1. *Issue Definition,* where "students focus on an environmental question, problem, or issue requiring background research and investigation"
2. *Outdoor Field Activities,* where "Students participate in multiple outdoor field activities sufficient to collect the data or make observations required for answering the research questions and informing student actions"
3. *Synthesis and Conclusions,* where "Students analyze and evaluate the results of projects and investigations"
4. *Stewardship Action Projects,* where "Students participate in an age-appropriate project during which they take action to address environmental issues at the personal or societal level"

The MWEE framework was developed by the Chesapeake Bay Program in 2011[1]. MWEEs have the potential to enhance EE in Pennsylvania and throughout the PA watersheds. Citizens across the commonwealth use and abuse our water resources without considering

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[1]
https://www.chesapeakebay.net/what/publications/meaningful_watershed_educational_experience1

their impact on larger environmental systems, including the Chesapeake Bay[2] and other major PA water basins. One way to improve watershed health is to improve PA students' environmental literacy using the MWEE framework, which will ultimately improve knowledge of how to respect local watersheds[3]. The key to creating more robust, impactful EE is understanding how prepared our educators are to teach MWEEs. The purpose of this survey was to assess both non-formal and formal (K-12) educators' knowledge of the MWEE framework, their preferred methods of professional development training, and the overall status and needs of EE in the commonwealth in order to both expand the reach of the MWEE framework, and increase the impact of EE statewide.

In late spring and early summer of 2019, supported by the NOAA B-WET PA capacity-building grant #NA17NMF4570274, PA Watershed Education Task Force representatives created and disseminated the 2019 Pennsylvania Statewide Environmental Education Survey (2019 PA SEES). This survey sought to fulfill three goals:
1. Determine how well non-formal and formal (k12) educators understand the MWEE framework
2. Determine areas of need and preferred methods of training with regards to EE
3. Determine the overall status of EE in the commonwealth

The status of educators' understanding of MWEEs was not currently known, so this survey functioned as a litmus test of educator knowledge of MWEEs. Equally important, educators often feel that they lack proper preparation to teach many EE topics, which impacts instruction[4]. Therefore, the survey includes several questions on professional development, so that we can determine not just what is missing from EE curricula, but what and how assistance can be provided to educators to fill in these gaps.

Results of the 2019 PA SEES show that non-formal and formal (k12) educators have a mixed understanding of the MWEE framework. Non-formal educators overall are roughly split between having some knowledge and having no knowledge of it, while formal (k12) educators overwhelmingly do not know about it. Regardless of their knowledge, both educator types implement some of the MWEE Essential Elements, most often the *Outdoor Field Activities*. The survey also asked their preferred method of training. Both educator types prefer training that is conducted in-person, and by professionals, such as state agencies, from outside of their respective organizations.

The educator types have different training needs, but overall have similar preferred methods of training. Non-formal educators requested training in Air Quality,

[2] http://d-scholarship.pitt.edu/37711/1/Water%20Quality%20in%20Southwestern%20Pennsylvania.pdf
[3] Educators Guide to MWEE updates 6.10.19.indd
[4] https://files.eric.ed.gov/fulltext/ED552871.pdf p. 320

Understanding School Initiatives/ Speaking School Language, and Academic Standards Alignment; Formal (K-12) educators' gaps are Air Quality, Geocaching/ Orienteering, and Using Environmental Sensors in Programming.

Results of the 2019 PA SEES occasionally point to a more verdant future, but also show gaps in environmental educators' knowledge that need to be filled. Partnerships between non-formal and formal (k12) educators are low, but overall participation in community EE organizations is reported to be increasing. Formal (k12) educators largely believe that support from administration is crucial to improving EE in Pennsylvania's schools. Overall, participation in EE in PA is in a state of growth, and increased instruction is directed towards upper grade-level students (especially grades 9-12), but less funding is available to enact programming. More detailed results can be found in the Key Findings section.

Materials and Methods

The 2019 PA Statewide Environmental Education Survey was an initiative of the NOAA funded Pennsylvania Environmental Literacy and MWEE Programming Capacity Building grant. The grant leadership team, PA Watershed Education Task Force of statewide representatives, and survey initiative committee created several questions for this survey; other questions were adapted from recent three University of Wisconsin Environmental Education surveys[5] (2014, 2017, 2019), the NOAA's 2017 Environmental Literacy survey[6] (Center for Schools and Communities, 2015), PA's 2015 Environmental Literacy survey[7] (PA Department of Education, 2015), and a recent Environmental Education Inventory of Currcent Practices in Rhode Island survey report[8] (Gracia, 2018). Questions were organized and made electronically available via Qualtrics survey design tool.

The survey was administered to two groups of educators: non-formal educators, or educators who work at an environmental education provider organization (e.g. educators at Stroud Water Research Center, PA state parks, nature centers), and formal (k12) educators (e.g. teachers at public, private, parochial, charter schools). Questions were designed to investigate the status of environmental education, MWEE awareness and implementation, as well as professional development needs for non-formal and formal (k12) educators, across the commonwealth. Non-formal educators additionally answered questions about the economics of their organization (for example, operating budget), and organizational skills areas. Surveys were limited to one survey response per non-formal environmental education provider organization. In instances where several educators from the same organization answered the survey, redundant responses were removed, keeping the most complete survey response. All formal (k12) educators in PA could respond to the survey, including multiple responses from teachers at the same school.

The survey was conducted from May to June 2019. The survey was made available to members of the task force via online links, and members of the taskforce distributed it to EE organizations and educators across the commonwealth. The survey link was also made available online via the Stroud Center's website.

The 2019 PA SEES had high participation across the commonwealth, with 580 unique participants completing the survey. Of these, 232 were non-formal educators, 240 were formal (k12) educators, and 108 were school administrators (for whom no data was

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[5] http://www.waee.org/state-wide-ee-survey
[6] https://naaee.org/our-work/programs/environmental-literacy-framework
[7]
[8]

collected). Geographic coverage of respondents was well dispersed throughout the state, and therefore representative of the state as a whole. The largest group of respondents fell within the Susquehanna River Basin (35.76%), followed by the Delaware River Basin (30.38%), and followed by the Ohio River Basin (25.35%). Other watersheds made up a very small portion of total respondents.
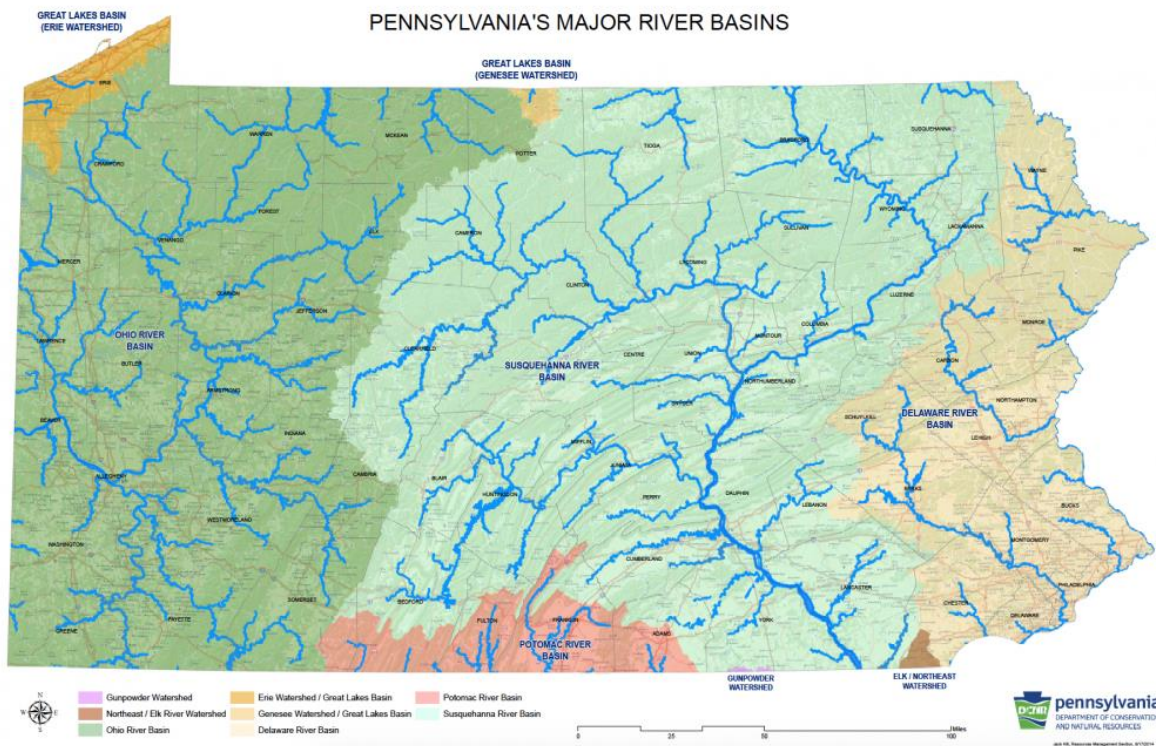
Figure 1. Pennsylvania's major river basins

Table 1. Survey participants from each PA river basin

#	Answer	%	Count
1	Great Lakes Basin	4.51%	26
2	Ohio River Basin	25.35%	146
3	Susquehanna River Basin	35.76%	206
4	Potomac River Basin	2.43%	14
5	Gunpowder Watershed	0.17%	1
6	Elk/Northeast Watershed	1.39%	8
7	Delaware River Basin	30.38%	175
	Total	*100%*	*576*

Key Findings

Several questions included in the survey were repeated for both non-formal and formal (K-12) educators. For ease of comparison, non-formal and formal (K-12) educator responses are shown together below. Other questions on the 2019 PA SEES were targeted specifically to non-formal educators, in order to gauge how they see participation in EE. They represent a unique view of EE, as they serve a wider range of people, often with a greater focus on a specific subject within the environmental field. Due to differences in duties and capacity of non-formal educators (versus formal [K-12] educators), certain questions targeted non-formal educators to determine specific needs. Formal educators were targeted with other specific questions.

Knowledge of MWEE Framework

The data shows an overall paucity of knowledge of the Meaningful Watershed Educational Experience (MWEE) framework in the EE community across the commonwealth. There is substantial room for improvement in familiarizing both non-formal and formal (k12) educators about the MWEE framework. The finding is most obvious for formal (k12) educators, who are three times more likely to be unfamiliar with MWEEs than they are to be familiar. 42.65% of non-formal educators and 75.25% of formal (k12) educators were unfamiliar with MWEEs. 57.35% of non-formal educators were familiar with MWEEs, while only 24.75% of formal (k12) educators were familiar. Of those educators that had heard of MWEEs, 38.24% of non-formal, and 13.13% of formal (k12) educators heard of them from a NOAA funded/B-WET program or event. NOAA and the B-WET program are succeeding in teaching educators about MWEEs; but training to date has focused more on non-formal environmental education providers.

Q14/37 - Is your organization familiar with the Meaningful Watershed Educational Experience (MWEE) framework/Instructional Model?

non-formal educators:
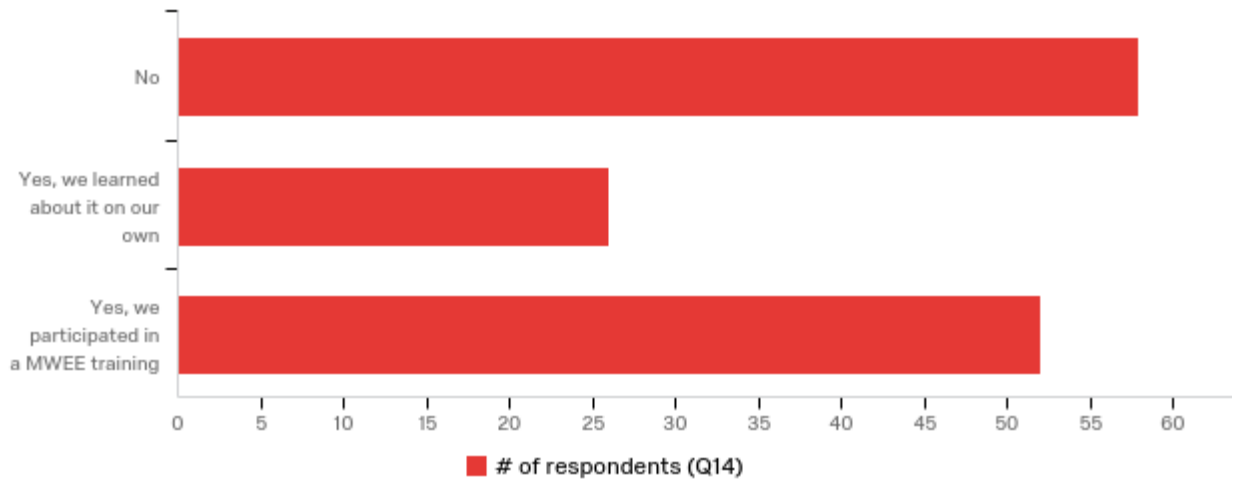
formal (k12) educators:
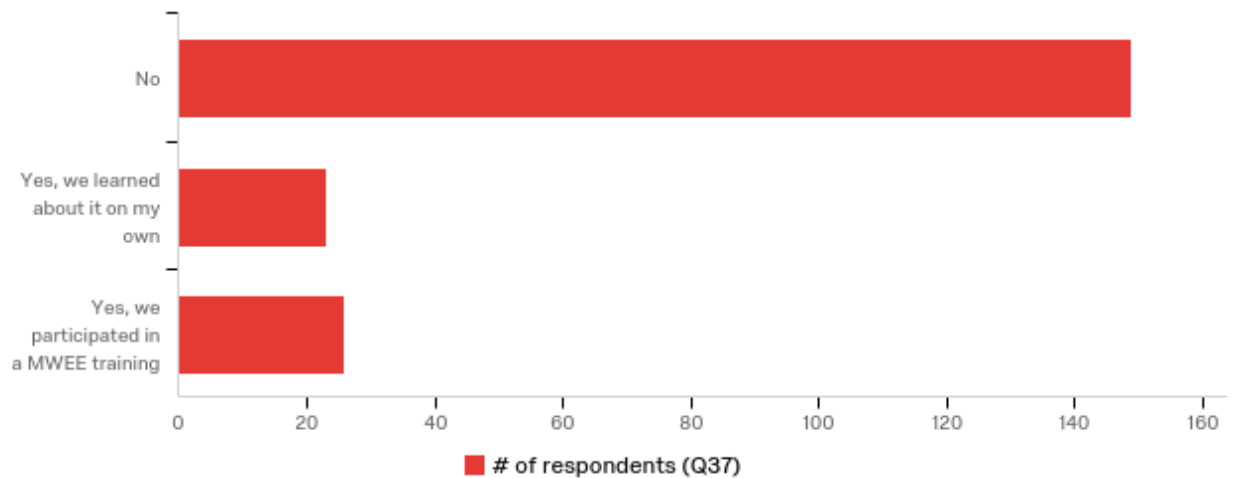
labels on y-axis correspond to Answers in table, below.

Answer	Non-formal		Formal (k12)	
	%	**count**	**%**	**count**
1 - No	42.65%	58	75.25%	149
2- Yes, we learned about it on our own	19.12%	26	11.62%	23
3- Yes, we have staff that have participated in NOAA funded Bay Watershed Education and Training (B-WET) grant projects or MWEE trainings such as Chesapeake Bay Foundation workshops, PA MWEE Ambassador, or other training workshops.	38.24%	52	13.13%	26
Total	100%	136	100%	198

Figure 2. Familiarity of surveyed educators with the MWEE Framework

Implementation of MWEEs varies in percentages between non-formal and formal (k12) educators, but the trend in implementation of MWEE Essential Elements is very similar. Both groups were most comfortable implementing Outdoor Field Experiences, followed by Issue Definition, and followed by Synthesis and Conclusion in this order (non-formal educators implemented Synthesis and Conclusion and the Action project equally). A higher percentage of non-formal educators implement outdoor field experience than formal (k12) educators (40.74% versus 34.51%). It is worth noting that the four elements of the MWEE framework were defined in the survey, so educators taking the survey could identify which Essential Element they utilized without knowing what a MWEE is. Overall, 135 non-formal educators answered this question, versus 142 formal (k12) educators; this indicates that non-formal and formal (k12) educators implement MWEEs at similar levels (when they are told what an MWEE is), despite formal (k12) educators having far less familiarity with the actual term "MWEE."

Q15/38 - Which of the following Essential Elements of the MWEE framework do your organization implement in programming for schools? Please check all that apply.

non-formal educators:
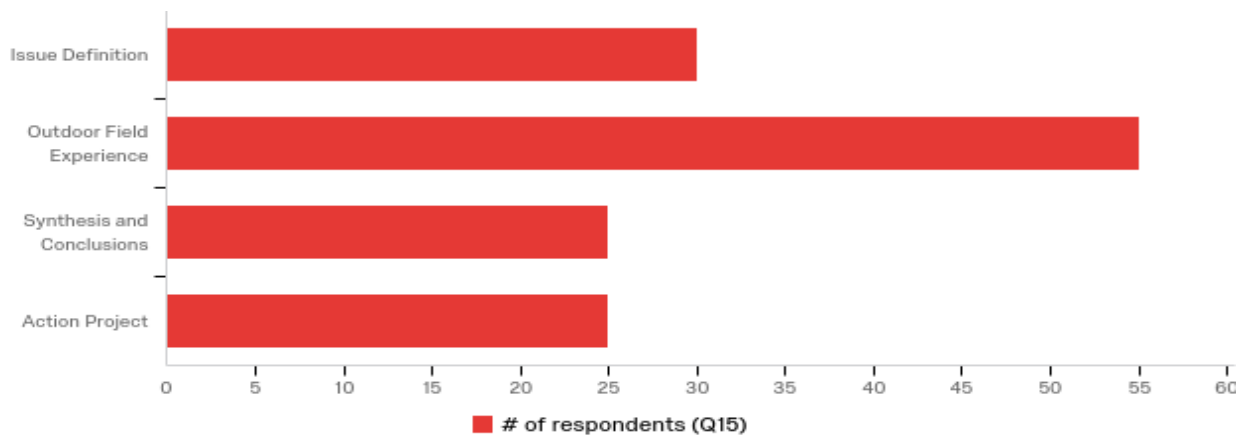
formal (k12) educators:

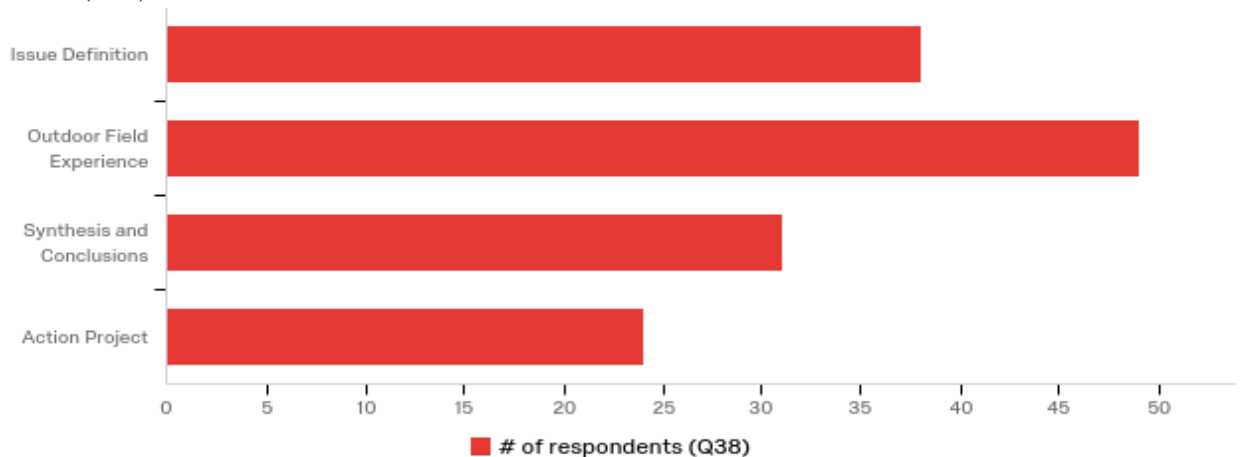*labels on y-axis correspond to MWEE - Essential Elements in table, below.*

MWEE - Essential Elements	Non-Formal		Formal	
	%	count	%	count
1 - Issue Definition	22.22%	30	26.76%	38
2 - Outdoor Field Experiences	40.74%	55	34.51%	49
3 - Synthesis and Conclusions	18.52%	25	21.83%	31
4 - Action Project	18.52%	25	16.90%	24
Total	100%	135	100%	142

Figure 3. Present level of comfort in MWEE implementation by non-formal educators.

The survey collected comfort level data regarding each of the four essential elements of MWEEs. These ranged from 1 to 5, ranging from "Not at All Comfortable" to "Very Comfortable." The MWEE essential element with which most non-formal educators were the most comfortable was Outdoor Field Experiences (Mean: 3.84). The MWEE essential element with which they were least comfortable was Action Project (Mean: 3.27). Issue Definition and Synthesis and Conclusion had similar levels of comfort (Means: 3.42 and 3.40, respectively). Therefore, the MWEE with the largest knowledge gap in non-formal educators is "Action Project."

Q15.5 - Please indicate your comfort level implementing lessons focused on each of the following MWEEs.
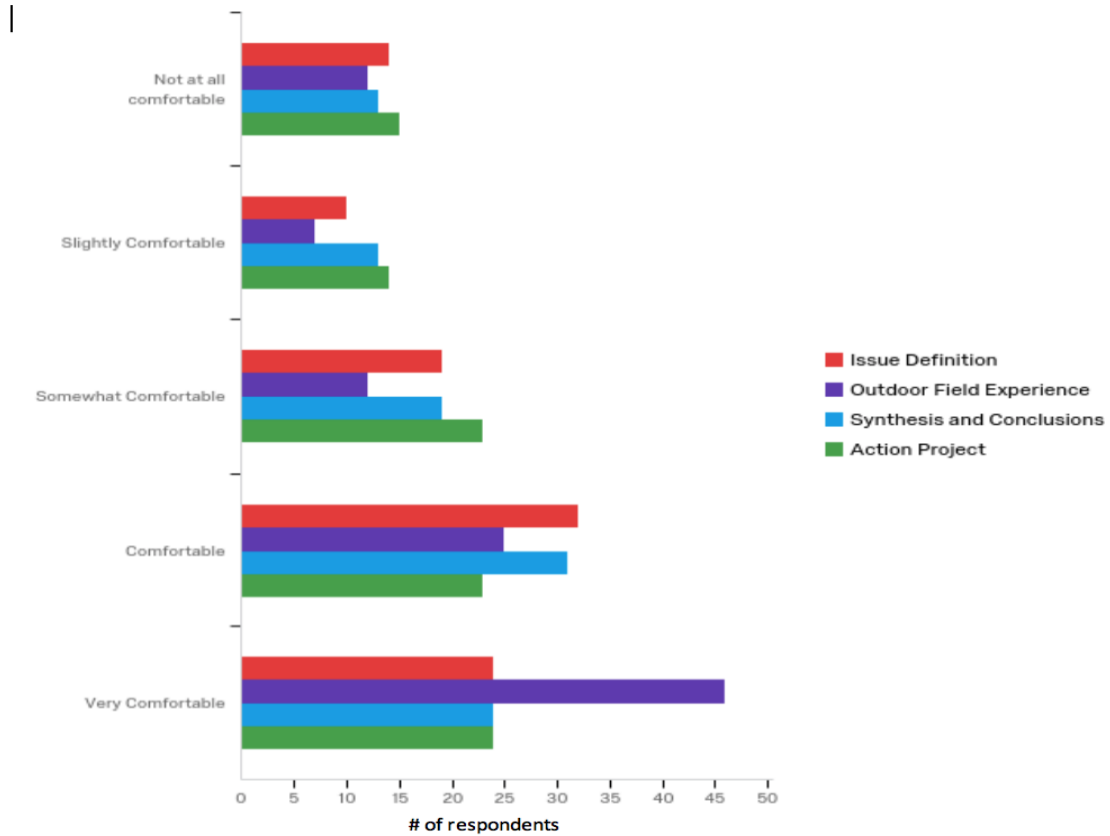
Field	Min	Max	M	SD	Variance	Count
Issue Definition	1	5	3.42	1.33	1.78	99
Outdoor Field Experience	1	5	3.84	1.37	1.88	102
Synthesis and Conclusions	1	5	3.4	1.33	1.76	100
Action Project	1	5	3.27	1.37	1.88	99

Figure 4. Non-formal educators' comfort in implementing MWEE Essential Element

As Q14 established, more non-formal educators are familiar with the MWEE framework than those who are not. In an ideal world, we would expect all non-formal educators who are familiar to implement programs including all of the essential elements, which is quantified in Q16. Instead, we found 59 total respondents indicated implementing no programs with all four essential elements and only 23 implemented 1 or more programs.

This indicates a huge gap between non-formal educators who are familiar with the MWEE framework, and those who are actually implementing the MWEE essential elements. Further data is needed to understand whether there are significant programs that implement one to three of the essential elements, but regardless, non-formal EE organizations can improve how fully they teach the MWEE framework.

Q16 - How many programs or series of programs with the same students did you lead in the last year that included all four MWEE Essential Elements?
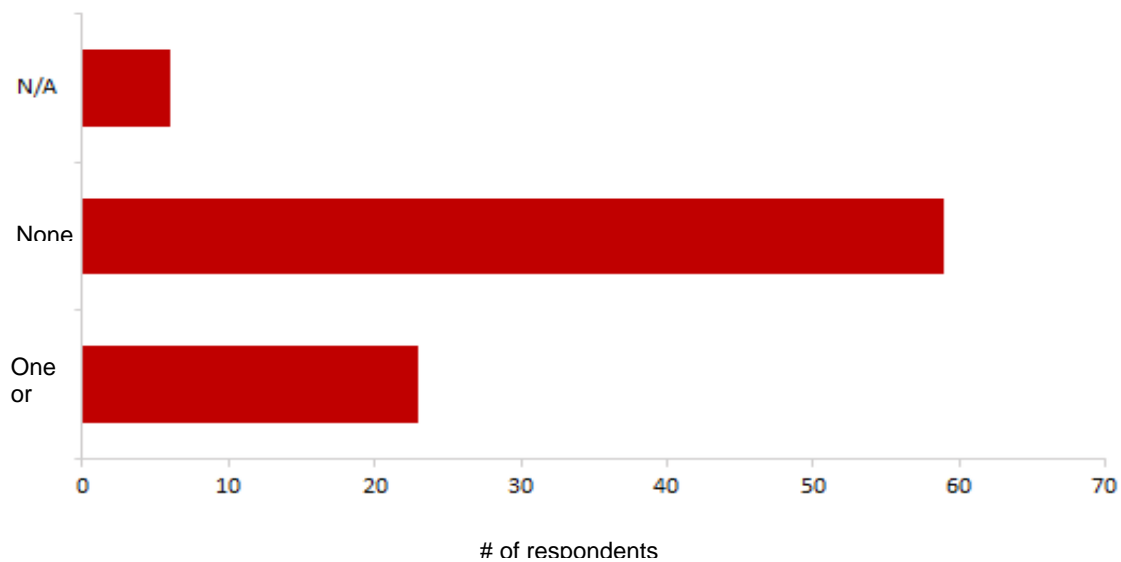

Figure 5. Programs implemented with MWEE Essential Elements

Staff Development and Training

One of the keys to successful, sustainable, long-term MWEE education is training and developing our educators. The survey sought to capture a snapshot of educator preferences when it came to professional development. The results will help us to better serve the professional development needs of environmental educators in Pennsylvania.

Non-formal educators prefer training that is led by outside providers and is conducted in-person (29.08% prefer this format). Online certification programs are the least desirable of options listed, with 12.5% of non-formal educators prefer this format. Formal (k12) educators had similar results for preferred methods of professional development. "In-person training provided by outside providers" was listed as a preferred method by 36.46% of formal (k12) educators. A far higher number of formal (k12) educators listed "Online certification programs" (19.83%), and far fewer listed "In-person training led by internal staff" (9.81%) as preferred methods of professional development. Some formal (k12)

educators listed "Other" methods, which tended to include some sort of "off-site" component. An interesting trend emerges - non-formal educators are more inclined to seek training led by their coworkers, while formal (k12) educators are more likely to seek training through online certifications. This may relate to the convenience of online webinars, or how educators view their peers.

Q20/28 - What format is your preference for staff professional development? Select all that apply.
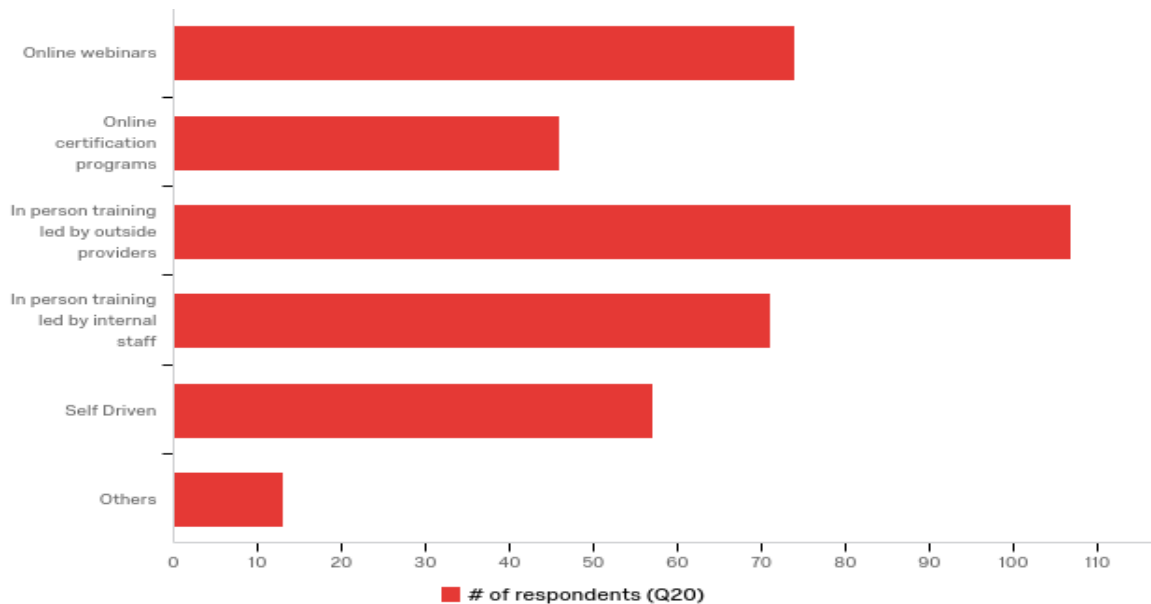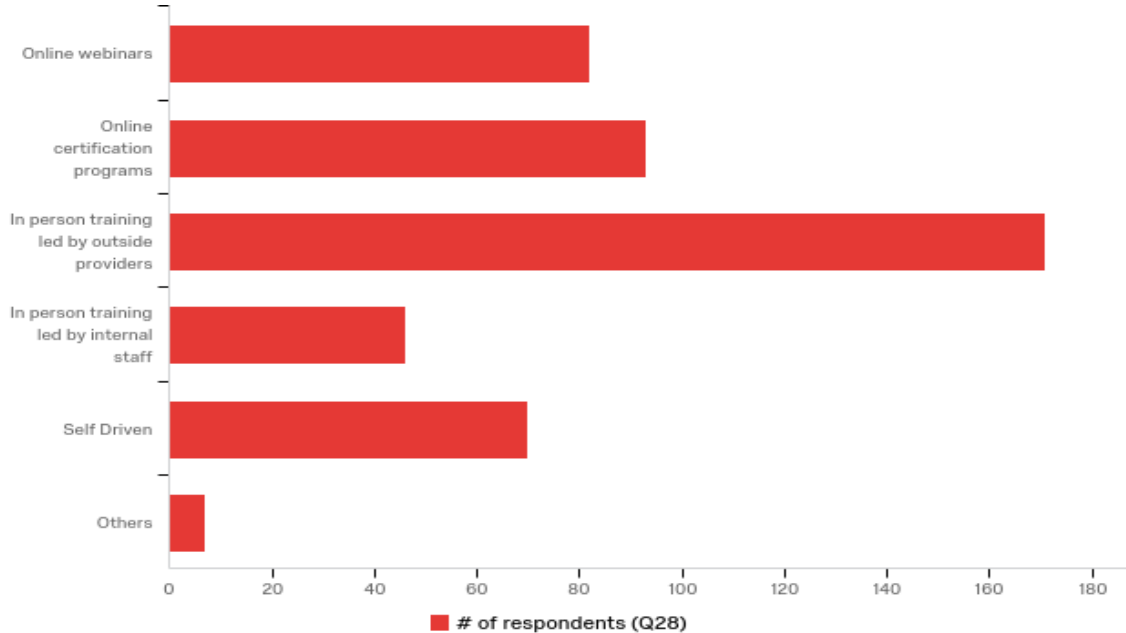
non-formal educators:

formal educators:

non-formal educators:

Preference - PD	Non-formal		Formal	
	%	Count	%	Count
1 - Online webinars	20.11%	74	17.48%	82
2 - Online certification programs	12.50%	46	19.83%	93
3 - In-person training provided led by outside providers	29.08%	107	36.46%	171
4 - In-person training led by internal staff	19.29%	71	9.81%	46
5 - Self-Driven - Books, magazines, journals, web-based research	15.49%	57	14.93%	70
6 - Other, please list	3.53%	13	1.49%	7
Total	100%	368	100%	469

Figure 6. Preferences for staff PD

State and federal agencies represent the largest share of professional development providers for non-formal educators, with 24.94% of participants selecting them. Local and national non-government organizations also represent a large driver of EE professional development for non-formal educators. For-profit companies represent the least utilized of the listed options, at 3.49%. Similar to non-formal educators, formal (k12) educators preferred State Government agencies to fulfill professional development needs, with 24.53% of formal (k12) educators listing them as a preference. Formal (k12) educators listed "higher education organizations" as a preferred provider of PD compared to "Non-Governmental organizations," which is opposite to the trend for non-formal educators. This may reflect a number of factors, including more outreach from higher-education providers to high schools; the need for graduate credits; missional similarities (as educational organizations); or just more knowledge of NGOs in non-formal educational settings.

Q21/29 - What types of organizations do you utilize for your professional development needs? Select all that apply.

non-formal educators:

# of respondents (Q21)

formal (k12) educators:

# of respondents (Q29)
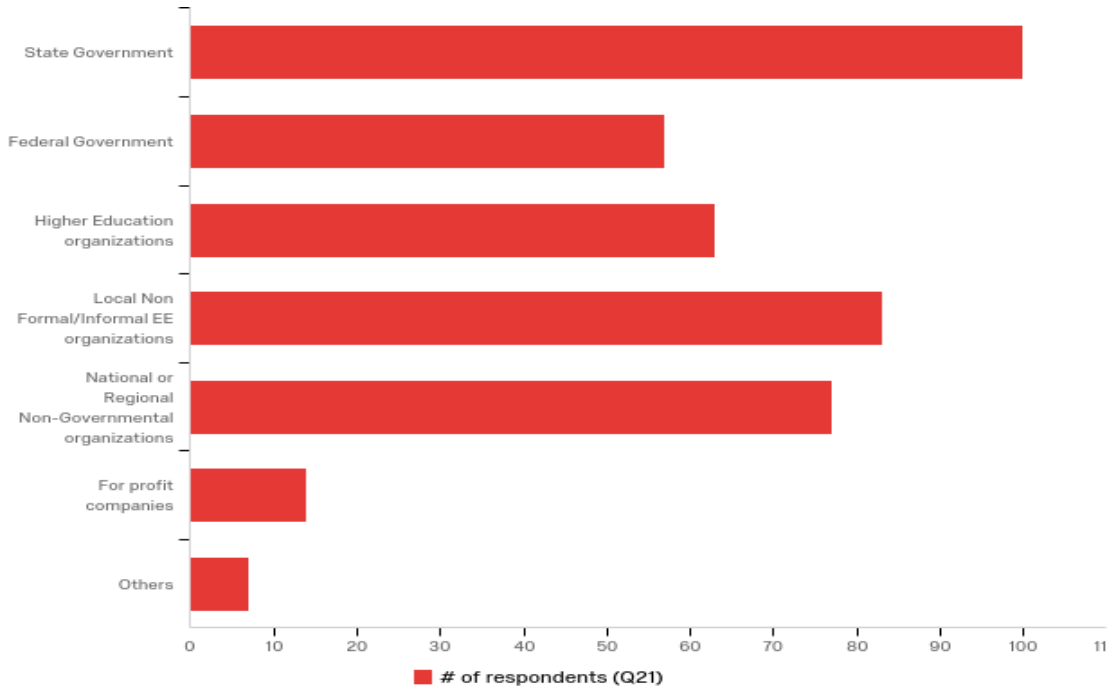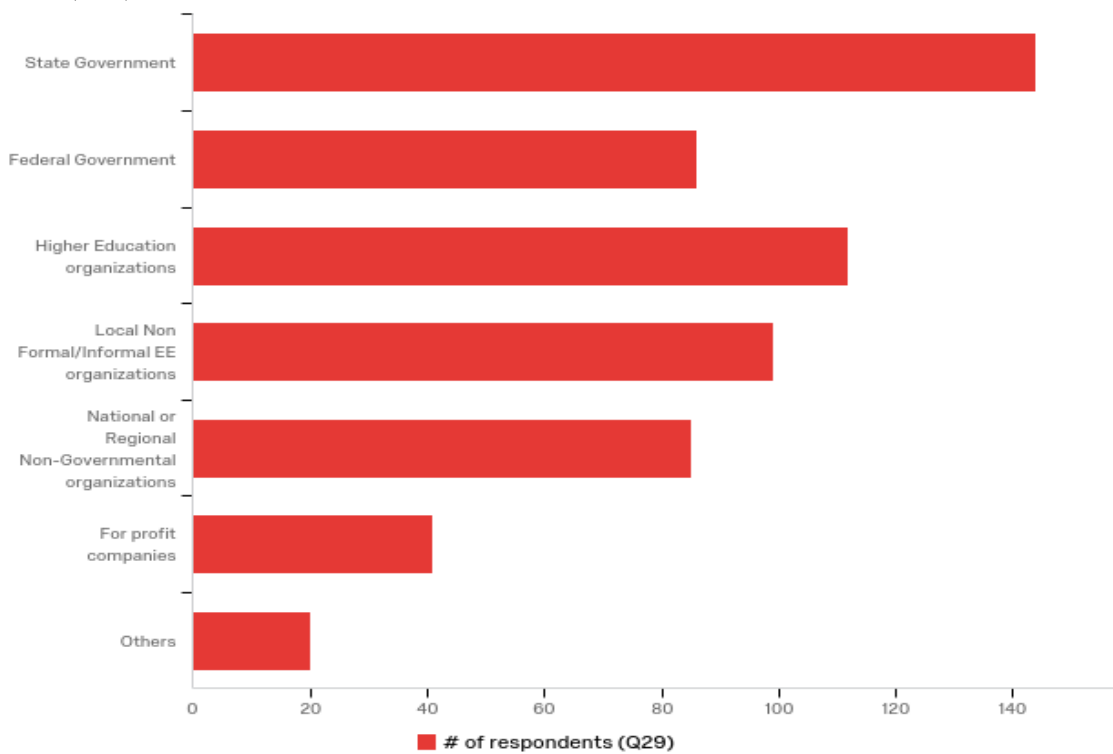
Organization Utilized	Non-formal		Formal	
	%	Count	%	Count
1 - State Government Agencies (PDE, DCNR, DEP, Department of AG, PSU Extension, etc.)	24.94%	100	24.53%	144
2 - Federal Government Agencies (NOAA, NASA, USGS, etc.)	14.21%	57	14.65%	86
3 - Higher Education organizations (Community Colleges and Technical Schools, Colleges, Universities)	15.71%	63	19.08%	112
4 - Local non-formal/Informal EE organizations	20.70%	83	16.87%	99
5 - National or Regional Non-Governmental organizations (e.g. Chesapeake Bay Foundation)	19.20%	77	14.48%	85
6 - For profit companies (Publishers, Google, etc.)	3.49%	14	6.98%	41
7 - Other, please list	1.75%	7	3.41%	20
Total	100%	401	100%	587

Figure 7. Utilization of different organizations for PD

Both non-formal and formal (k12) educators identified their largest gaps in EE knowledge. For the sake of brevity, the top 10 gaps for each educator type is listed below. Notably, both educator types overwhelmingly feel they could benefit from training about Air Quality, including 96.15% of non-formal, and 92.94% of formal (k12) educators. Generally, formal (k12) educators feel as though there are more EE subjects on which they need training than do non-formal educators. formal (k12) educators also feel less equipped to lead trainings on EE subjects. The subject non-formal educators felt most equipped to teach was general watershed education at 76.92%; by comparison, the subject formal (k12) educators felt most equipped to teach was general instructional methods at 48.76%.

One subject is an area of training need for non-formal educators, but is listed as a subject in which formal (k12) educators are relatively more comfortable leading a training: "Essential Questions, Performance Tasks, Learning Objectives - Designing and Using in Programming." This indicates an area where both educator types will benefit from a more robust relationships.

There were also areas where both non-formal and formal (k12) educators indicated they could lead trainings in subjects. These subjects, in which both educator groups feel comfortable, include: "General Watershed Education" and "Water Quality Assessments." This indicates that both audiences have basic understanding of Watershed and Water Quality content. While general content knowledge is present, both audiences indicated in Q14/17 that they lack familiarity with the MWEE framework. Increased MWEE training is

needed to enable formal and non formal educators to apply their watershed knowledge to the creation of MWEE experiences for students.

Q22/30 - In the first column select all of the specific EE programming areas in which you and your staff would benefit from training. In the second column select all of the specific EE programming areas in which you and your staff could lead training workshops.

Table 2. Areas of Training Need:

	Non-Formal Educators		Formal Educators	
Rank	*Subject*	*Percent*	*Subject*	*Percent*
1	Air Quality*	96.15%	Air Quality*	92.94%
2	Understanding School Initiatives and Speaking School Language	91.25%	Geocaching and Orienteering	92.67%
3	Academic Standards Alignment	86.67%	Using Environmental Sensors in Programming*	92.31%
4	Using Environmental Sensors in Programming*	86.25%	Geographic Information Systems (GIS) for Education Programming*	90.78%
5	Astronomy*	84.42%	Sustainable Design and Green Technologies or Buildings	88.82%
6	Energy Efficiency	83.53%	Team Building or Ropes Course	87.88%
7	Instructional Technology in Outdoor Education*	80.00%	Astronomy*	87.25%
8	Geographic Information Systems (GIS) for Education Programming*	79.76%	Instructional Technology in Outdoor Education*	86.23%
9	Geology and Fossils*	79.75%	Geology and Fossils*	85.71%
10	Essential Questions, Performance Tasks, Learning Objectives - Designing and Using in Programming** Sustainable Design and Green Technologies or Buildings	79.01%	Other	85.71%

* ***Training need for both non-formal and formal (k12) educators***
** ***Training need for one educator type that other educator type could lead***

Table 3. Areas where educators could lead training:

|	Non-Formal Educators:		Formal Educators:	
Rank	*Subject*	*Percent*	*Subject*	*Percent*
1	Other	76.92%	Instructional Methods - General	48.76%
2	Watershed Education - General***	70.21%	Classroom/Group Management	47.59%
3	Water Quality Assessments***	55.56%	Inquiry-based Teaching and Learning	42.11%
4	Land Animals	54.32%	Program and Curricula Development	39.23%
5	Aquatic Ecology	53.85%	Essential Questions, Performance Tasks, Learning Objectives - Designing and Using in Programming**	33.80%

6	Curriculum Training in National and State Curricula (Project WILD, Project WET, Project Learning Tree, etc.)	52.69%	Watershed Education - General***	33.13%
7	Leave No Trace Principles	52.56%	Litter and Recycling	30.63%
8	Water Sports, Kayaking, and Canoeing	50.00%	Water Quality Assessments***	28.83%
9	Natural History	48.75%	Current Environmental Issues	28.73%
10	Interpretive Skills	48.10%	Gardening, Agriculture, and Soils	27.68%

*** *Training need for one educator type that other educator type could lead*
**** *Both non-formal and formal (k12) educators could lead training*

To best understand which strategies work best to reach our non-formal and formal (k12) educators, we asked all survey participants to indicate how they heard about our survey. Seven of the listed options were EE organizations across the state. Participants indicated that they heard about our survey mostly by means not listed, representing 35.48% of responses, and were asked to indicate what those other means were. The most often listed reasons were by email or by word of mouth, indicating a strong word-of-mouth campaign for this survey.

Q49 - How did you hear about this survey?
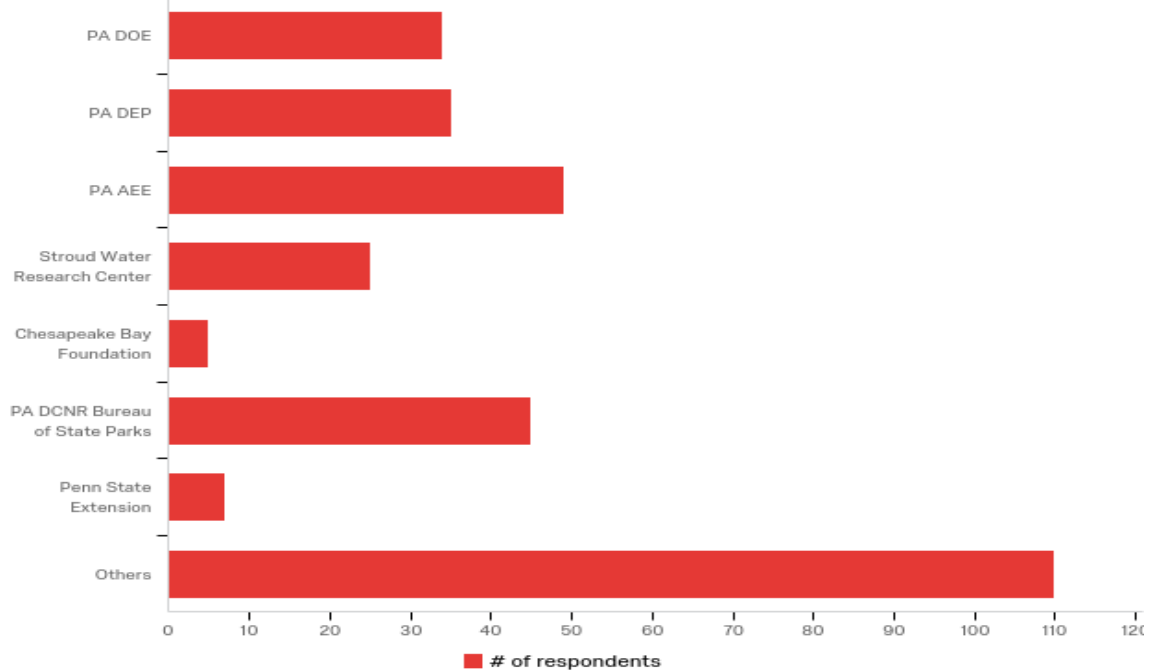
labels on y-axis correspond to Sources in table, below.

| Source	%	Count
1 - PA Department of Education (PDE)	10.97%	34
2 - PA Department of Environmental Protection (DEP) office of environmental education	11.29%	35

3 - PA Association of Environmental Educators (PAEE)	15.81%	49
4 - Stroud Water Research Center	8.06%	25
5 - Chesapeake Bay Foundation	1.61%	5
6 - PA DCNR Bureau of State Parks	14.52%	45
7 - Penn State Extension	2.26%	7
8 - Other, please describe	35.48%	110
Total	100%	310

Figure 8. How participants heard about the survey

Participation Trends

The trend for participation in EE programs among non-formal educators has increased over the past five years. A majority (55.7%) have seen either a slight or great increase in participation. (32.21% of participants saw a slight increase, which is the highest selected response.) Publicity, advertising, and social media outreach are the most commonly listed reasons for this increase.

Q6 - How would you characterize overall participation in your programs in the last five years? The number of participants has…
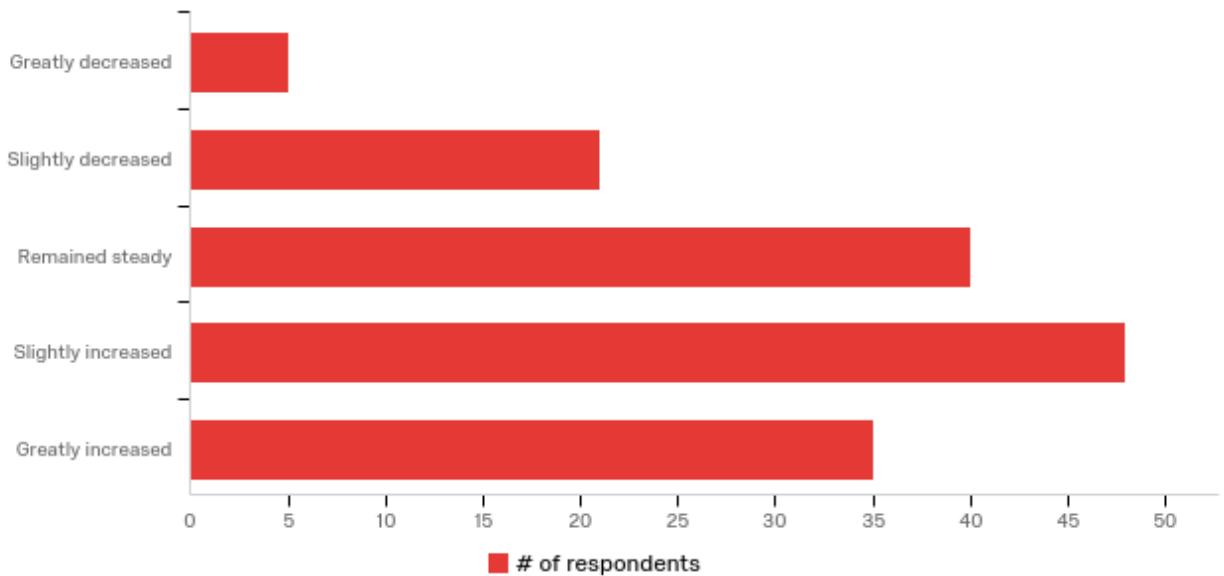
labels on y-axis correspond to Participation Trends in table, below.

Participation Trend	%	Count
1 - Greatly decreased	3.36%	5
2 - Slightly decreased	14.09%	21
3 - Remained steady	26.85%	40
4 - Slightly increased	32.21%	48

5 - Greatly increased	23.49%	35
Total	100%	149

Figure 9. Trends in participation in non-formal educators' programs

Non-formal education organizations had wide-ranging levels of participation. Most non-formal educators (59) indicated that they educate between 1,001 and 10,000 students. The largest organizations, with between 10,001 and 100,000 participants were the least selected response, selected by 16 participants. Given the logarithmic nature of these ranges, it is possible that more students are overall educated by the largest organizations, despite being the least selected response.

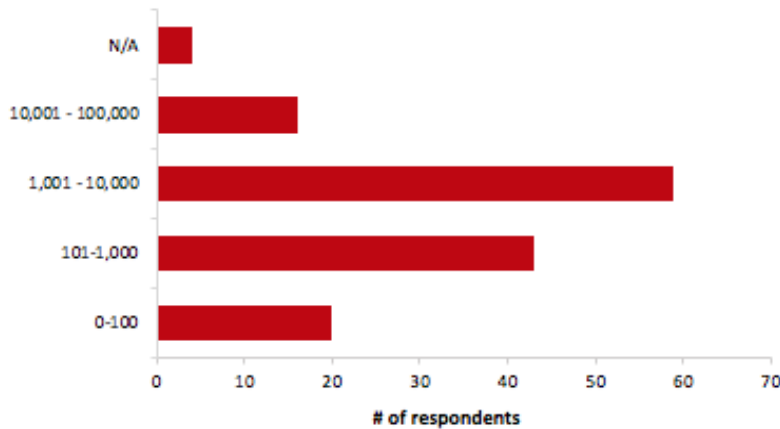*Q8 - Approximately how many PreK-12 students participated in your programs during the last year?*

Figure 10. PreK-12 student participation in non-formal educators' programs

Given that many EE organizations cater towards educating school-aged students, it is unsurprising that we found non-formal educators generally had fewer adult participants over the past year. 58 non-formal educators indicated that they had between 101 and 1,000 adult participants over the past year; representing the highest selected response. By contrast, only 8 had between 10,001 and 100,000 adult participants; representing the lowest selected response. Many adults will benefit from understanding the environment, and can impart this knowledge on their children, or become active in environmental directives.

Q12 - Approximately how many adults participated in your programs during the last year?
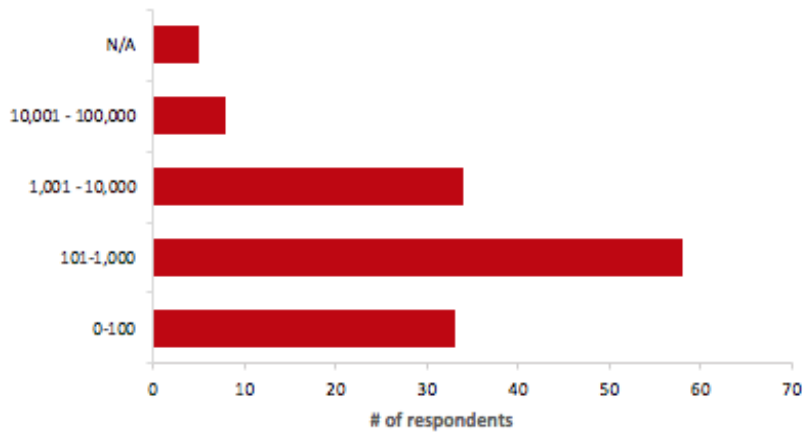

Figure 11. Adult participation in non-formal EE programs

EE organizations also had a concentration of visitors who did not participate in their programs, but visited their organization. Most non-formal respondents indicated that they had between 0 and 100 general visitors (34); a large concentration (27) also indicated that this question was not applicable. This may be because their organization offers programming on a sign-up basis, and therefore would not have visitors who do not participate. The least selected response was between 101 and 1,000 participants (11).

Q13 - Approximately how many other general visitors did you have at your site in the last year? General visitors are ones that did not participate in specific programs led by staff (e.g. hike trails, walk through a nature center building on their own, etc.)
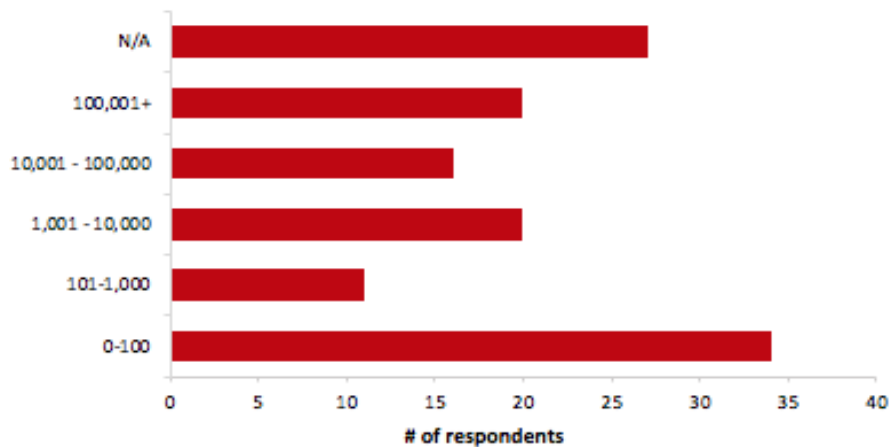

Figure 12. General visitors to non-formal EE organizations

Program Alignment and Development

Academic standards are implemented to limit the variation in how a subject is taught across an area. The most widely-met academic standard, as indicated by responses to Q9, are the PA Academic Standards in Environment and Ecology, met by 32.05% of non-formal educators. PA Standards in Math and PA Standards in Arts & Humanities represented the least-aligned standards, with 5.77% meeting these standards. This trend with Arts & Humanities standards is unsurprising - the survey targeted non-formal EE educators, and so we expect fewer of these educators to meet non-scientific standards. The trend with Math standards represents room for significant growth; mathematics is the language of science, and thus are a key skill to possess while studying to become an environmental scientist. The least-selected response to this question was "None of our programs are aligned to standards," with 5.45% selecting this response. This is a very positive finding - most non-formal EE educators are teaching according to some educational standard.

Q9 - Are your school programs aligned to standards? Select all that apply…
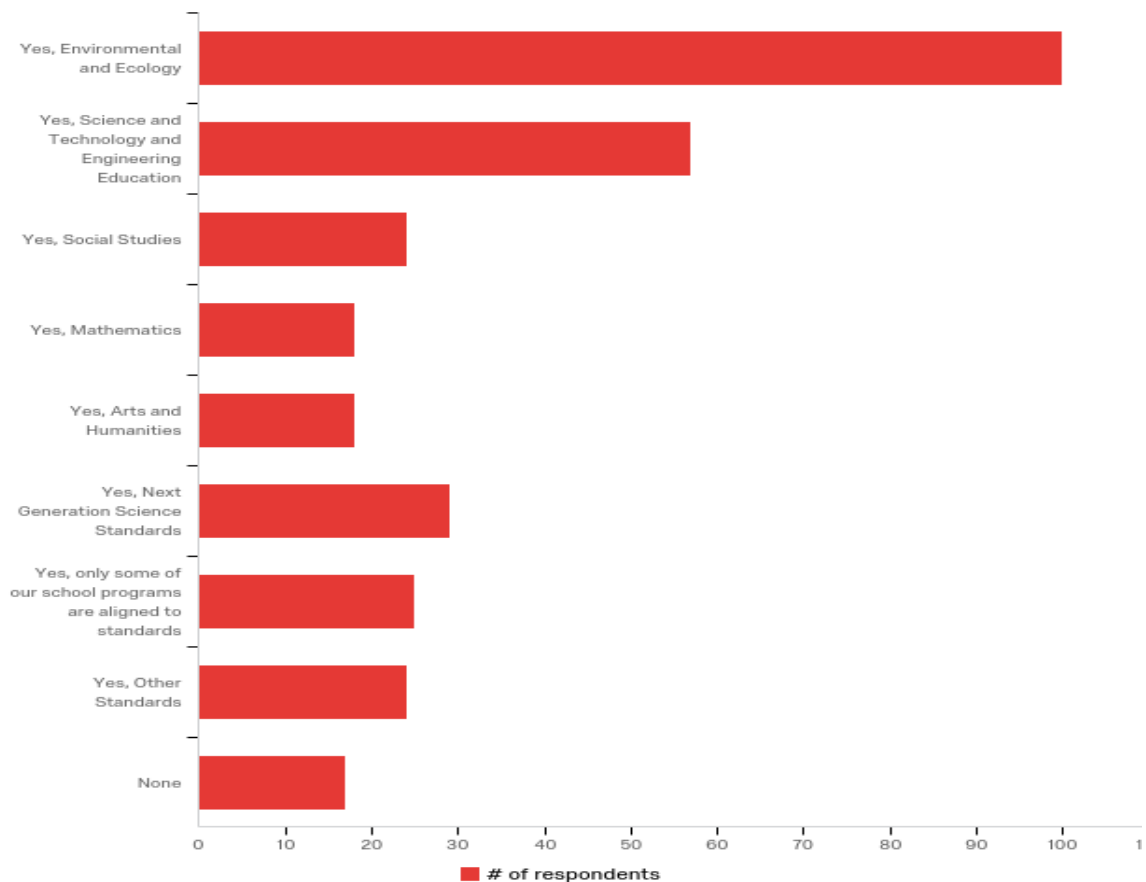
Standards	%	Count
1 - Yes, PA Academic Standards in Environmental and Ecology	32.05%	100
2 - Yes, PA Academic Standards in Science and Technology and Engineering Education	18.27%	57
3 - Yes, PA Academic Standards in Social Studies	7.69%	24
4 - Yes, PA Academic Standards in Mathematics	5.77%	18
5 - Yes, PA Academic Standards in Arts and Humanities	5.77%	18
6 - Yes, Next Generation Science Standards	9.29%	29
7 - Yes, but only some of our school programs are aligned to standards	8.01%	25
8 - Yes, Other Standards. Please list	7.69%	24
9 - None of our school programs are aligned to standards	5.45%	17
Total	100%	312

Figure 13. Non-formal educators' program alignments to standards

The number of K-12 participants in non-formal EE education programs varied greatly. Respondents ranged from organizations with zero K-12 participation (they specialize in adult education), to as high as 30,000+ K-12 participants, representing a broad range of perspectives. These responses were self-reported in survey Question 8, which asks: "Approximately how many PreK-12 students participated in your programs during the last year?"

More non-formal EE organizations indicated that they have not assisted schools with curriculum or course development (47.97) than those who indicated they have (52.03%). Non-formal EE organizations exist to inform the public, and specifically, school-aged students. They represent an invaluable tool that can be utilized by schools to inexpensively expose students to experts in the environmental field. It is important for us to work towards allying more non-formal organizations with formal (k12) organizations, in order to best educate our students. Course and curriculum development is an excellent way for non-formal educators to impart their expertise on students through their teachers.

Q11 - Has your organization provided schools with assistance in curriculum or course development?
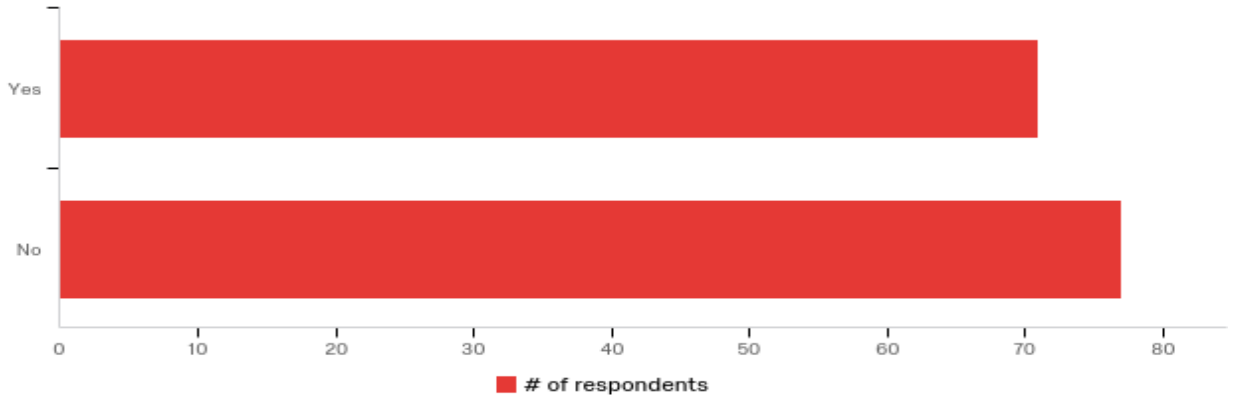

Figure 14. Non-formal education organizations providing curriculum or course development

Operating Budgets for Non-formal EE Organizations

The operating budgets for non-formal EE organizations overwhelmingly trended towards the lowest option given in our survey. 65% of non-formal educators indicated a yearly operating budget of $0 to $100,000. The three lowest selected responses were the three highest ranges of operating budgets offered as responses. From this result we can see that many organizations may benefit from increased grant funds, such as from NOAA's B-WET program. It may benefit our statewide EE by improving how we disseminate information about the B-WET program, and by targeting non-formal EE organizations.

Q18 - What was your total environmental education organization (or environmental education department, if a larger organization with other parts to your mission) yearly operating budget last year?
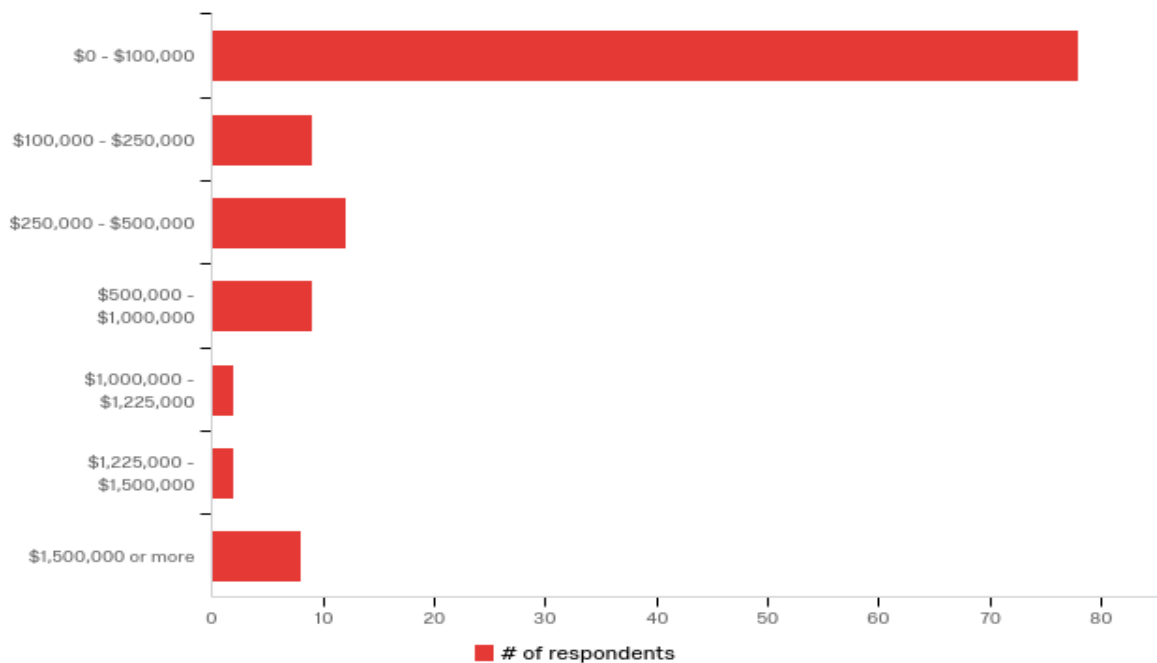
Operating Budget	%	Count
$0 - $100,000	65.00%	78
$100,000 - $250,000	7.50%	9
$250,000 - $500,000	10.00%	12
$500,000 - $1,000,000	7.50%	9
$1,000,000 - $1,225,000	1.67%	2
$1,225,000 - $1,500,000	1.67%	2
$1,500,000 or more	6.67%	8
Total	100%	120

Figure 15. Operating budget of non-formal EE organization

Present Capacity of Formal (k12) Educators

Formal (k12) educators represented 41.4% of total respondents, and 50.1% of responses for which data was collected. 73.31% of respondents taught middle- or high-school aged students, which may indicate that education about the environment occurs more in grades 6 through 12, or may be a function of which grade level's educators responded to the survey. It is worth studying this trend more to determine if educators at lower grade levels should teach more about the environment.

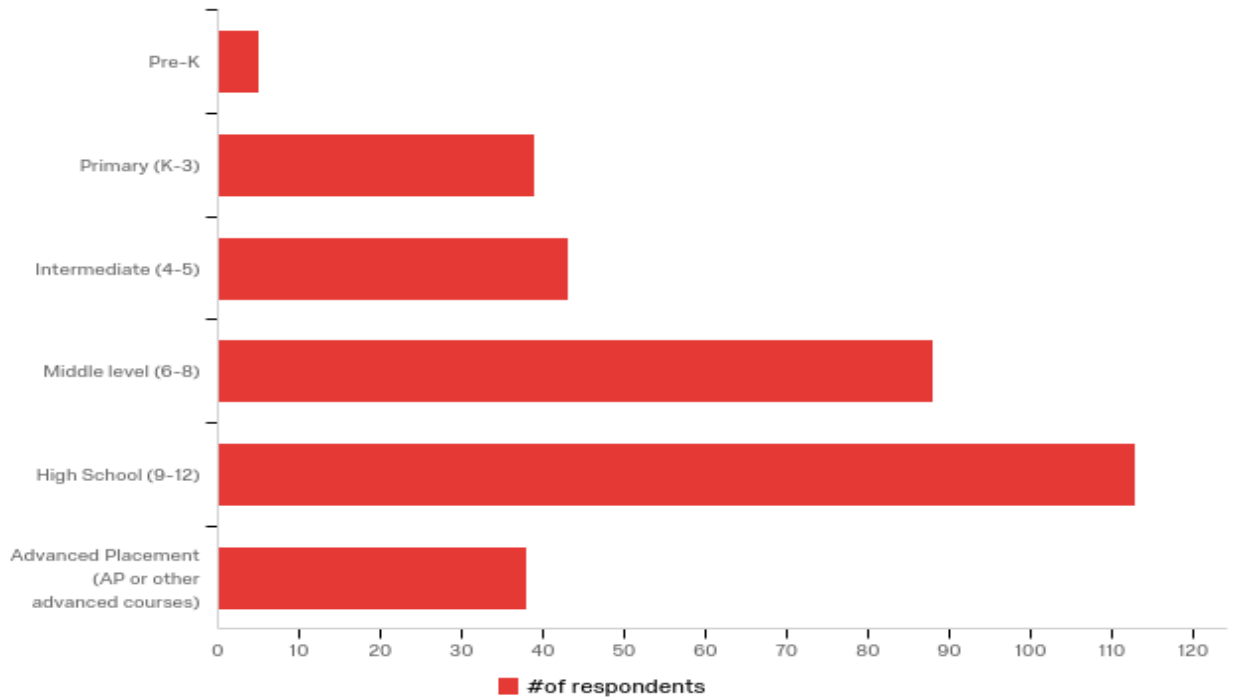*Q26 - Grade levels of students you teach (select all that apply)*

Figure 16. Number of students in each grade level category taught by formal (k12) educators

One key to determining the status of EE is to survey how formal (k12) educators feel it could be improved. Priorities to increase/improve EE were rated from 1 (lowest) to 5 (highest) priority. According to the results of Question 27, formal (k12) educators view gaining "Support from Administration" as the highest priority in increasing/ improving EE, with a mean of 3.20. Perhaps most telling about this number is the fact that it is 0.4 higher than the next closest priority, "Partnerships with Environmental Providers in the Community," which had a mean of 2.80. 221 out of 240 formal (k12) educators listed "Support from Administration" as a priority, and 22.62% listed it as a high priority. This indicates that formal (k12) educators strongly desire increasing support from administration at their schools. The lowest priority was "Sustainable Schools Technical Assistance," attaining a mean of 2.13.

Q27 - Which of the following are priorities to increase/improve EE in your school district? Please select how highly your school district prioritizes each component of EE, ranging from low to high.

Table 4. Formal (k12) educators' priorities to improve EE in their school district

Field	Min	Max	M	SD	Variance	Count
Support from Administration	1	5	3.2	1.32	1.75	221
Partnerships with EE Providers in the Community	1	5	2.8	1.44	2.06	220
Alignment/Integration of EE in an Interdisciplinary Way Across the Curriculum	1	5	2.69	1.33	1.78	216
Outdoor Classrooms	1	5	2.61	1.45	2.09	218
Established Program, Teacher, or Administrative Leader for EE in Place Providing Regular Leadership	1	5	2.59	1.39	1.93	221
Other	1	5	2.53	1.67	2.78	15
Regular Communication Among Staff Responsible for EE Curriculum and Program Implementation	1	5	2.5	1.32	1.73	220
Teacher Professional Development in EE	1	5	2.43	1.38	1.89	221
District Funding for EE Curriculum Planning/Integration	1	5	2.42	1.34	1.8	220
Sustainable Schools Technical Assistance	1	5	2.13	1.31	1.7	219

Non-formal and Formal (k12) Partnerships

Non-formal educators often provide EE services to k-12 schools at the classroom, school or system-wide level. School or system -wide participation in an EE program serves more students, can standardize student learning about the environment, and allows experts in more narrow fields to impart their knowledge to students. 72.41% of non-formal educators indicated system-wide participation in their EE programs. Given that this was reported as a "yes or no" question, we cannot determine the exact number of schools that participate at a system-wide level from this question, as some organizations likely have many schools participating; there also may be organizations that have the same school participate in the programs by more than one non-formal organization.

Q10 - Do any schools participate in any of your EE programs at a system-wide level (entire grade level or all students in a school district at sometime within their K-12 career)?
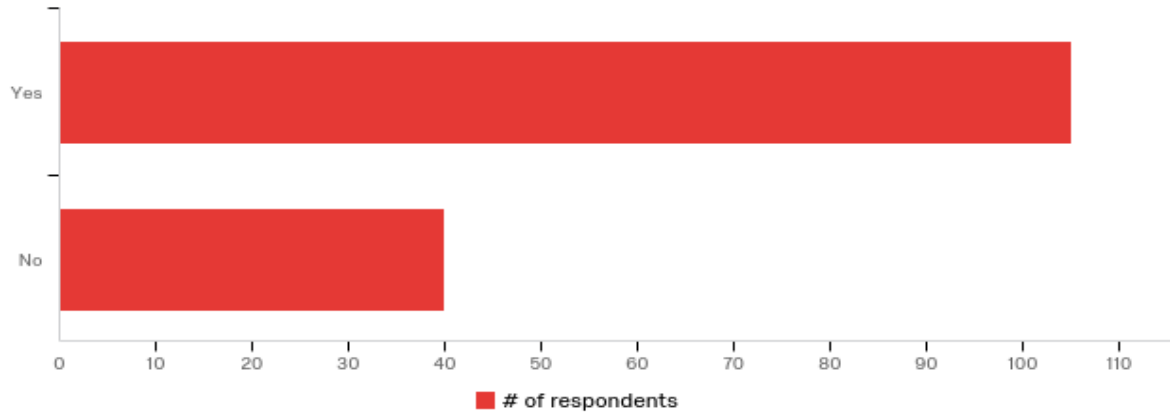

Figure 17. System-wide school participation in non-formal education programs

Question 10 for non-formal educators indicated a high number of EE organizations work system-wide with schools. To view this trend from the perspective of formal (k12) educators, we asked about their established partnerships with community EE providers in Q39. Of surveyed formal (k12) educators, 74.43% said that they have no established partnership with EE providers. Of those few who are partnering with EE organizations, 3.98% have them fully teaching all four MWEE essential elements. This represents a huge area for growth in MWEE education - by increasing partnerships between non-formal and formal (k12) education organizations.

Q39 - Does your school have established partnerships with EE providers in your community (partnerships with nature centers, state parks, and similar organizations for EE programs) for MWEE programs or elements of MWEE programs?
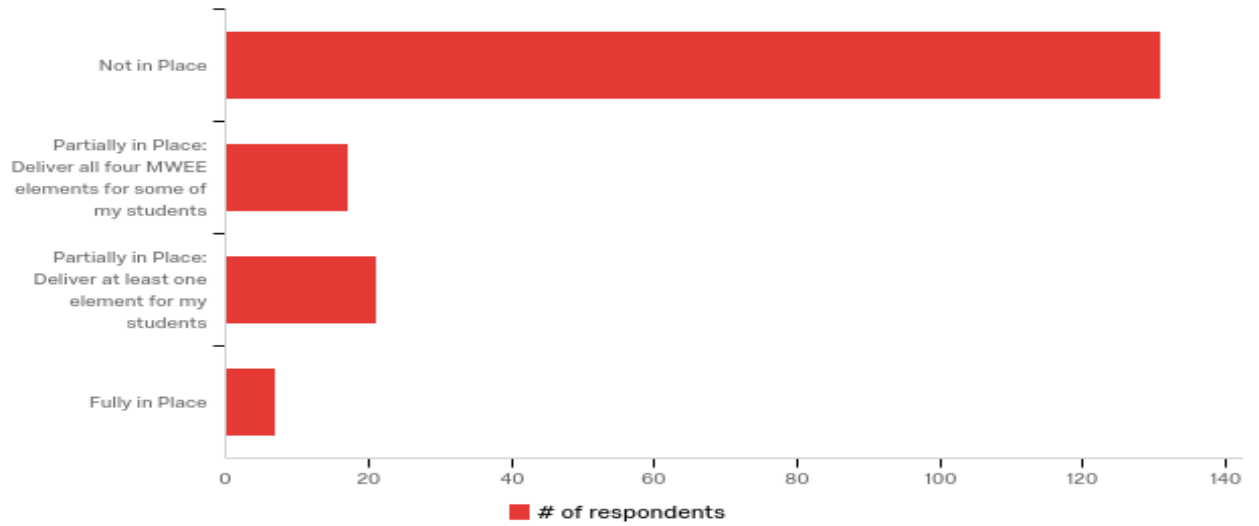
labels on y-axis correspond to Partnership Level in table, below.

Partnership Level	%	Count
1 - Not in Place	74.43%	131
2 - Partially in Place: I am partnering with a local EE provider to deliver at least one but not all four MWEE elements for my students	11.93%	21
3 - Partially in Place: I am partnering with a local EE provider to deliver complete MWEE programs (all four MWEE elements) for some but not all of my students	9.66%	17
4 - Fully in Place: I am working with a local EE provider to deliver a full MWEE program with all four elements	3.98%	7
Total	100%	176

Figure 18. Partnerships between formal (k12) and non-formal EE providers

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Appendix - 2019 PA Statewide Environmental Education Survey

Q1 **2019 Pennsylvania Statewide Environmental Education Survey**

Purpose:
This project will assess the current status and needs of environmental education (EE) in Pennsylvania through a survey focused on understanding statewide organizations and schools engaged in teaching and learning about the environment. Results will be used to increase the capacity of environmental education, including addressing high needs areas for professional development. You will be asked to provide information such as: EE programming and operations, professional development needs, and knowledge of watershed education practices. This survey asks for personal identifiable information. This information will only be available to the evaluation staff in order to allow them to follow up with questions or to confirm the individual's existence within the organization or school being surveyed. By completing and submitting this survey you are consenting to have your answers, not including personal identifiable information, used in future reporting and used in evaluating environmental education in Pennsylvania.

Participation is voluntary, and can be terminated at any time with no negative consequences. Your confidentiality will be maintained and data will only be reported in aggregate. All survey responses will be kept in a secure, password protected server sponsored by Millersville University. In compliance with Federal law, they will be kept for three years, at which time any content with identifying information will be destroyed. Questions about the Institutional Review Board (IRB) and IRB oversight can be directed towards Dr. Rene Munoz, Millersville University Director of Sponsored Research rene.munoz@millersville.edu, 717-871-4457.
 Please note this survey may take about 15 minutes to complete. Providing estimates for answers is fine, in depth research by you or your organization or school is not necessary. One response should be submitted for each non-formal environmental education provider organization. Classroom teachers should respond individually, not limited to one per school.

This survey is an initiative of the statewide PA Environmental Literacy and Watershed Education Task Force led by Stroud Water Research Center, PA Department of Education, PA Department of Environmental Protection, PA Bureau of State Parks, PA Association of Environmental Educators, Millersville University, and Chesapeake Bay Foundation – Harrisburg, PA Office with funding from NOAA Chesapeake Bay Office.

Do you consent to have your answers, not including personal identifiable information, used in future reporting, and used in evaluating environmental education in Pennsylvania?

◯ Yes (1)

◯ No (2)

End of Block: Consent

Start of Block: Introduction

Q2 **General Information:**

Please begin by providing the name of your organization, your name and position, and email. This information will NOT be included in any reports, publications, or presentations.

◯ Name of environmental education-related organization or school: (1)

_____

◯ Your Name: (2) _____

◯ Your Position: (3) _____

◯ Your Email Address: (4)

_____

◯ County: (5) _____

P1

Q3 Which PA Major River Basin is your organization or school located in? Please refer to this map to identify your PA Major River Basin.

○ Great Lakes Basin (1)

○ Ohio River Basin (2)

○ Susquehanna River Basin (3)

○ Potomac River Basin (4)

○ Gunpowder Watershed (5)

○ Elk/Northeast Watershed (6)

○ Delaware River Basin (7)

Q4 How would you best categorize your primary job role or responsibility in education?

○ Non-Formal Environmental Education Organization (1)

○ Formal educator (classroom teacher) (2)

○ School administrator (Assistant Principal, Superintendent, Curriculum Director, etc.) (3)

End of Block: Introduction

Start of Block: Non-Formal Directions

T1 *Reminder: Answer the following questions with information about the operations of your entire environmental education organization. Only 1 response to this survey per organization please. If your organization has multiple sites then one response*

should be submitted for each site (e.g. all PA State Parks with environmental education programming should submit a separate response for each park).

End of Block: Non-Formal Directions

Start of Block: Questions for Non-Formal Environmental Education Organizations:

Q5
Questions for Non-Formal Environmental Education Organizations:

Program Participation:

What are the major environmental education programs offered by your organization? (please list up to 3 major program names)

○ 1. (1) _____

○ 2. (2) _____

○ 3. (3) _____

Q6 How would you characterize overall participation in your programs in the last five years?
The number of participants has…

○ Greatly decreased (1)

○ Slightly decreased (2)

○ Remained steady (3)

○ Slightly increased (4)

○ Greatly increased (5)

Q7 If your participation numbers have changed, what factors do you believe account for this change?

_____

_____

_____

_____

_____

Q8 Approximately how many PreK-12 students participated in your programs during the last year? Please report this number as participant days. For example, 20 students attend a 3 day program = 60 participant days. Also if you have programs that are partial day programs we will still count them as participant day programs.

_____

Q9 Are your school programs aligned to standards? Select all that apply...

☐ Yes, PA Academic Standards in Environmental and Ecology (1)

☐ Yes, PA Academic Standards in Science and Technology and Engineering

Education (2)

☐ Yes, PA Academic Standards in Social Studies (3)

☐   Yes, PA Academic Standards in Mathematics (4)

☐   Yes, PA Academic Standards in Arts and Humanities (5)

☐   Yes, Next Generation Science Standards (6)

☐   Yes, but only some of our school programs are aligned to standards (7)

☐   Yes, Other Standards. Please list (8)

_____

☐   None of our school programs are aligned to standards (9)

Q10
Do any schools participate in any of your environmental education programs at a system-wide level (entire grade level or all students in a school district at sometime within their K-12 career)?

○ Yes (1)

○ No (2)

Q11 Has your organization provided schools with assistance in curriculum or course development?

○ Yes (1)

○ No (2)

Q12 Approximately how many adults participated in your programs during the last year? Please report this number as participant days. For example, 20 adults attend a 3 day program = 60 participant days. Also if you have programs that are partial day programs we will still count them as participant day programs.

_____

Q13 Approximately how many other general visitors did you have at your site in the last year? General visitors are ones that did not participate in specific programs led by staff (e.g. hike trails, walk through a nature center building on their own, etc.)

_____

End of Block: Questions for Non-Formal Environmental Education Organizations:

Start of Block: MWEEs

Q14 **Watershed Education Programs and Meaningful Watershed Educational Experiences (MWEEs):**

Is your organization familiar with the Meaningful Watershed Educational Experience (MWEE) framework?

○ No (1)

○ Yes, we learned about it on our own (2)

○ Yes, we have staff that have participated in NOAA funded Bay Watershed

Education and Training (B-WET) grant projects or MWEE trainings such as Chesapeake Bay Foundation workshops, PA MWEE Ambassador, or other training workshops. Grant project in which you participated/ training your staff members completed: (3) _____

Q15 Which of the following Essential Elements of the MWEE framework do your organization implement in programming for schools? Please check all that apply.

☐ Issue Definition: Students focus on a locally relevant environmental issue,

problem, or phenomenon requiring background research and investigation. (1)

☐ Outdoor Field Experience: Students participate in one or more outdoor field

experiences sufficient to investigate the issue, problem, or phenomenon. (2)

☐ Synthesis and Conclusions: Students identify, synthesize, and apply evidence

from their investigations to draw conclusions and make claims about the issue, problem, or phenomenon. (3)

☐ Action Project: Students identify, explore, and implement solutions for action. (4)

Display This Question:

If Which of the following Essential Elements of the MWEE framework do your organization implement in... = Issue Definition: Students focus on a locally relevant environmental issue, problem, or phenomenon requiring background research and investigation.

Q15A

○ About how many of your school programs in the last year included Issue

Definition?   (1) _____

Display This Question:

If Which of the following Essential Elements of the MWEE framework do your organization implement in... = Outdoor Field Experience: Students participate in one or

more outdoor field experiences sufficient to investigate the issue, problem, or phenomenon.

Q15B

○ About how many of your school programs in the last year included Outdoor Field Experience?   (1) _____

Display This Question:

If Which of the following Essential Elements of the MWEE framework do your organization implement in... = Synthesis and Conclusions: Students identify, synthesize, and apply evidence from their investigations to draw conclusions and make claims about the issue, problem, or phenomenon.

Q15C

○ About how many of your school programs in the last year included Synthesis and Conclusions?   (1) _____

Display This Question:

If Which of the following Essential Elements of the MWEE framework do your organization implement in... = Action Project: Students identify, explore, and implement solutions for action.

Q15D

○ About how many of your school programs in the last year included Action Project?
(1) _____

Q15.5 Please indicate your comfort level implementing lessons focused on each of the following MWEEs.

	Not at all comfortable (1)	Slightly Comfortable (2)	Somewhat Comfortable (3)	Comfortable (4)	Very Comfortable (5)
Issue Definition (1)	○	○	○	○	○
Outdoor Field Experience (2)	○	○	○	○	○
Synthesis and Conclusions (3)	○	○	○	○	○
Action Project (4)	○	○	○	○	○

Q16 How many programs or a series of programs with the same students did you lead in the last year that included all four MWEE Essential Elements?

_____

Q17 Please identify the names of any schools that you provide programming to or partner with to implement all four MWEE Essential Elements.

_____

End of Block: MWEEs

Start of Block: Economics & Jobs

Q18 **Economics & Jobs:**

What was your total environmental education organization (or environmental education department, if a larger organization with other parts to your mission) yearly operating budget last year?

○ $0 - $100,000 (1)

○ $100,000 - $250,000 (2)

○ $250,000 - $500,000 (3)

○ $500,000 - $1,000,000 (4)

○ $1,000,000 - $1,225,000 (5)

○ $1,225,000 - $1,500,000 (6)

○ $1,500,000 or more (7)

Q19 How many employees does your organization have?

○ Full Time (1) _____

○ Part time/ seasonal (2)

_____

○ Volunteers (3) _____

○ Interns (4) _____

End of Block: Economics & Jobs

Start of Block: Prof. Dev.

Q20 **Professional Development:**
What format is your preference for staff professional development? Select all that apply.

☐ Online webinars (1)

☐ Online certification programs (2)

☐ In person training provided led by outside providers (3)

☐ In person training led by internal staff (4)

☐ Self Driven - Books, magazines, journals, web based research (5)

☐ Other, please list (6)

_____

Q21 What type of organizations do you utilize for your professional development needs?
Select all that apply.

☐ State Government Agencies (PDE, DCNR, DEP, Department of AG, PSU

Extension, etc.) (1)

☐ Federal Government Agencies (NOAA, NASA, USGS, etc.) (2)

☐ Higher Education organizations (Community Colleges and Technical Schools,

Colleges, Universities) (3)

☐ Local Non Formal/Informal Environmental Education organizations (4)

☐ National or Regional Non-Governmental organizations (e.g. Chesapeake Bay Foundation) (5)

☐ For profit companies (Publishers, Google, etc.) (6)

☐ Other, please list (7)

_____

Q22 In the first column select all of the specific EE programming areas in which you and your staff would benefit from training. In the second column select all of the specific EE programming areas in which you and your staff could lead training workshops.

	Could Benefit from Training (1)	Could Lead Training (2)
Academic Standards Alignment (1)	○	○
Air Quality (2)	○	○
Aquatic Ecology (3)	○	○
Astronomy (4)	○	○
Birds (5)	○	○
Citizen Science (6)	○	○

Classroom/Group Management (7)	○	○
Community Action and Service-Learning (8)	○	○
Compositing and Vermicomposting (9)	○	○
Community-based Learning (10)	○	○
Current Environmental Issues (11)	○	○
Curriculum Training in National and State Curricula (Project WILD, Project WET, Project Learning Tree, etc.) (12)	○	○
Drinking Water and Wastewater (13)	○	○
Energy Efficiency (14)	○	○
Essential Questions, Performance Tasks, Learning Objectives - Designing and Using in Programming (15)	○	○
Gardening, Agriculture, and Soils (16)	○	○
Geocaching and Orienteering (17)	○	○

Geology and Fossils (18)	○	○
Geographic Information Systems (GIS) for Education Programming (19)	○	○
Inquiry-based Teaching and Learning (20)	○	○
Instructional Technology in Outdoor Education (21)	○	○
Instructional Methods - General (22)	○	○
Interpretive Skills (23)	○	○
Land Animals (24)	○	○
Land Use and Conservation (25)	○	○
Learning and Development Theory (Using education theory in design of programming) (26)	○	○
Leave No Trace Principles (27)	○	○
Litter and Recycling (28)	○	○
Meaningful Watershed Educational Experiences (MWEEs) - Program Design and Implementation (29)	○	○

Natural History (30)	○	○
Plants (31)	○	○
Program and Curricula Development (32)	○	○
Stormwater Management (33)	○	○
Sustainability and Resource Consumption (34)	○	○
Sustainable Design and Green Technologies or Buildings (35)	○	○
Team Building or Ropes Course (36)	○	○
Understanding School Initiatives and Speaking School Language (37)	○	○
Using STEM as a Context for Environmental Education (E-STEM) (38)	○	○
Using Environmental Sensors in Programming (39)	○	○
Watershed Education - General (40)	○	○
Water Quality Assessments (41)	○	○

Water Sports, Kayaking, and Canoeing (42)	○	○
Other: (43)	○	○

Q23 If you identified any EE Programming areas in which you or your staff would be able to lead a training session, please provide a brief description of what could be included in the session.

_____

_____

_____

_____

_____

End of Block: Prof. Dev.

Start of Block: Org Skills

Q24 **Organizational Skills Areas:**
   In the first column select all of the organizational skills in which you and your staff would benefit from training. In the second column select all of the specific organizational skills areas in which you and your staff could lead training workshops.

	Could Benefit from Training (1)	Could Lead Training (2)
Accessibility & Inclusion of People with Disabilities (1)	○	○
Budgeting and Finances (4)	○	○

Digital Presence, Website, Facebook, Twitter, etc. (5)	○	○
Exhibit Development (6)	○	○
Field/Outdoor Safety (7)	○	○
Food Services (8)	○	○
Fundraising (9)	○	○
Grant Writing (10)	○	○
Internal Organizational Communications/Collaborations (11)	○	○
Non-profit Management and Working with Executive Boards (12)	○	○
Personnel Management (staff hiring, training, and evaluation) (13)	○	○
Public Relations and Marketing (14)	○	○
Risk Management (15)	○	○
Site Development, Maintenance, and Restoration (conservation practices, forest management plans) (16)	○	○

Strategic Planning (17)

○   ○

Transportation (18)

○   ○

Volunteer Management (19)

○   ○

Other: (20)

○   ○

Q25 If you identified any organizational skills areas in which you or your staff would be able to lead a training session, please provide a brief description of what could be included in the session.

_____

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End of Block: Org Skills

Start of Block: Conclusion

Q49 Thank you for your time and dedication to improving environmental education in Pennsylvania.   How did you hear about this survey?

○ PA Department of Education (PDE) (1)

○ PA Department of Environmental Protection (DEP) office of environmental

education   (4)

○ PA Association of Environmental Educators (PAEE) (5)

○ Stroud Water Research Center (6)

○ Chesapeake Bay Foundation   (7)

○ PA DCNR Bureau of State Parks (8)

○ Penn State Extension (9)

○ Other, please describe (10)

_____

T3
If you are interested, feel free to peruse the following Environmental Education resources:

PA Department of Education: https://www.education.pa.gov/Pages/default.aspx
PA Association of Environmental Educators: http://www.paee.net/
PA DEP Office of Environmental Education: https://www.dep.pa.gov/Citizens/EnvironmentalEducation/Pages/default.aspx
Stroud Water Research Center: https://stroudcenter.org
Chesapeake Bay Foundation: https://www.cbf.org/
PA DCNR Bureau of State Parks: https://www.dcnr.pa.gov/StateParks/Pages/default.aspx
Penn State University Extension: https://extension.psu.edu/

End of Block: Conclusion

Start of Block: Questions for Formal Educators

Q26 **Questions for Formal Educators**

This section is for individual teachers to complete. Multiple teachers from the same school and school district may provide responses.
  Grade levels of students you teach (select all that apply)

☐ Pre-K (1)

☐ Primary (K-3) (2)

☐ Intermediate (4-5) (3)

☐ Middle level (6-8) (4)

☐ High School (9-12) (5)

☐ Advanced Placement (AP or other advanced courses) (6)

Q27 Which of the following are priorities to increase/improve environmental education in your school district? Please select how highly your school district prioritizes each component of environmental education, ranging from low to high.

	Low (1)	Medium-low (2)	Medium (3)	Medium-high (4)	High (5)
Outdoor Classrooms (1)	○	○	○	○	○

Alignment/Integration of Environmental Education in an Interdisciplinary Way Across the Curriculum (2)	○	○	○	○	○
Regular Communication Among Staff Responsible for Environmental Education Curriculum and Program Implementation (3)	○	○	○	○	○
District Funding for Environmental Education Curriculum Planning/Integration (4)	○	○	○	○	○
Support from Administration (5)	○	○	○	○	○
Established Program, Teacher, or Administrative Leader for Environmental Education in Place Providing Regular Leadership (6)	○	○	○	○	○
Teacher Professional Development in Environmental Education (7)	○	○	○	○	○
Sustainable Schools Technical Assistance (8)	○	○	○	○	○

| Partnerships with Environmental Education Providers in the Community (9) | ○ | ○ | ○ | ○ | ○ |
| Other (10) | ○ | ○ | ○ | ○ | ○ |

End of Block: Questions for Formal Educators

Start of Block: Copy for Teachers

Q28 **Professional Development:**
What format is your preference for your own professional development? Select all that apply.

☐ Online webinars (1)

☐ Online certification programs (2)

☐ In person training provided led by outside providers (3)

☐ In person training led by internal staff (4)

☐ Self Driven - Books, magazines, journals, web based research (5)

☐ Other, please list (6)

_____

Q29 What type of organizations do you utilize for your professional development needs? Select all that apply.

☐ State Government Agencies (PDE, DCNR, DEP, Department of AG, PSU Extension, etc.) (1)

☐ Federal Government Agencies (NOAA, NASA, USGS, etc.) (2)

☐ Higher Education organizations (Community Colleges and Technical Schools, Colleges, Universities) (3)

☐ Local Non Formal/Informal Environmental Education organizations (4)

☐ National or Regional Non-Governmental organizations (e.g. Chesapeake Bay Foundation) (5)

☐ For profit companies (Publishers, Google, etc.) (6)

☐ Other, please list (7)

_____

Q30 In the first column select all of the specific EE programming areas in which you and other teachers at your school would benefit from training. In the second column select all of the specific EE programming areas in which you and others at your school could lead training workshops.

	Could Benefit from Training (1)	Could Lead Training (2)
Academic Standards Alignment (1)	○	○

Air Quality (2)	○	○
Aquatic Ecology (3)	○	○
Astronomy (4)	○	○
Birds (5)	○	○
Citizen Science (6)	○	○
Classroom/Group Management (7)	○	○
Community Action and Service-Learning (8)	○	○
Compositing and Vermicomposting (9)	○	○
Community-based Learning (10)	○	○
Current Environmental Issues (11)	○	○
Curriculum Training in National and State Curricula (Project WILD, Project WET, Project Learning Tree, etc.) (12)	○	○
Drinking Water and Wastewater (13)	○	○

Energy Efficiency (14)	○	○
Essential Questions, Performance Tasks, Learning Objectives - Designing and Using in Programming (15)	○	○
Gardening, Agriculture, and Soils (16)	○	○
Geocaching and Orienteering (17)	○	○
Geology and Fossils (18)	○	○
Geographic Information Systems (GIS) for Education Programming (19)	○	○
Inquiry-based Teaching and Learning (20)	○	○
Instructional Technology in Outdoor Education (21)	○	○
Instructional Methods - General (22)	○	○
Interpretive Skills (23)	○	○
Land Animals (24)	○	○
Land Use and Conservation (25)	○	○

Learning and Development Theory (Using education theory in design of programming) (26)	○	○
Leave No Trace Principles (27)	○	○
Litter and Recycling (28)	○	○
Meaningful Watershed Educational Experiences (MWEEs) - Program Design and Implementation (29)	○	○
Natural History (30)	○	○
Plants (31)	○	○
Program and Curricula Development (32)	○	○
Stormwater Management (33)	○	○
Sustainability and Resource Consumption (34)	○	○
Sustainable Design and Green Technologies or Buildings (35)	○	○
Team Building or Ropes Course (36)	○	○
Understanding School Initiatives and Speaking School Language (37)	○	○

Using STEM as a Context for Environmental Education (E-STEM) (38)	○	○
Using Environmental Sensors in Programming (39)	○	○
Watershed Education - General (40)	○	○
Water Quality Assessments (41)	○	○
Water Sports, Kayaking, and Canoeing (42)	○	○
Other: (43)	○	○

Q31 If you identified any EE Programming areas in which you or your staff would be able to lead a training session, please provide a brief description of what could be included in the session.

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End of Block: Copy for Teachers

Start of Block: MWEEs

Q37 **Meaningful Watershed Educational Experiences (MWEEs):**

Are you familiar with the Meaningful Watershed Educational Experience (MWEE) instructional model?

○ No (1)

○ Yes, I learned about it on my own (4)

○ Yes, I have participated in NOAA funded Bay Watershed Education and Training (B-WET) grant projects or MWEE trainings such as Chesapeake Bay Foundation workshops, PA MWEE Ambassador, or other training workshops. Grant project/training in which you participated: (5)
_____

Q38 Which of the following four essential elements of the MWEE instructional model did you implement with your students in the last school year? Please check all that apply.

☐　Issue Definition: Students focus on a locally relevant environmental issue,

problem, or phenomenon requiring background research and investigation. (1)

☐　Outdoor Field Experience: Students participate in one or more outdoor field

experiences sufficient to investigate the issue, problem, or phenomenon. (2)

☐　Synthesis and Conclusions: Students identify, synthesize, and apply evidence

from their investigations to draw conclusions and make claims about the issue, problem, or phenomenon. (3)

☐　Action Project: Students identify, explore, and implement solutions for action. (4)

Display This Question:

If Which of the following four essential elements of the MWEE instructional model did you implement... = Issue Definition: Students focus on a locally relevant environmental issue, problem, or phenomenon requiring background research and investigation.

Q38A

○ About how many of your school programs in the last year included Issue Definition?   (1) _____

○ About how many of your students participated in lessons focused on Issue Definition?   (2) _____

Display This Question:

If Which of the following four essential elements of the MWEE instructional model did you implement... = Outdoor Field Experience: Students participate in one or more outdoor field experiences sufficient to investigate the issue, problem, or phenomenon.

Q38C

○ About how many of your school programs in the last year included Outdoor Field Experience?   (1) _____

○ About how many of your students participated in lessons focused on Outdoor Field Experience?   (4) _____

Display This Question:

If Which of the following four essential elements of the MWEE instructional model did you implement... = Synthesis and Conclusions: Students identify, synthesize, and apply evidence from their investigations to draw conclusions and make claims about the issue, problem, or phenomenon.

Q38E

○ About how many of your school programs in the last year included Synthesis and Conclusions?   (1) _____

○ About how many of your students participated in lessons focused on Synthesis and Conclusions?   (4) _____

Display This Question:

    If Which of the following four essential elements of the MWEE instructional model did you implement... = Action Project: Students identify, explore, and implement solutions for action.

Q38G

○ About how many of your school programs in the last year included Action Project?

(1) _____

○ About how many of your students participated in lessons focused on the Action Project?   (4) _____

Q39 Does your school have established partnerships with environmental education providers in your community (partnerships with nature centers, state parks, and similar organizations for EE programs) for MWEE programs or elements of MWEE programs?

○ Not in Place (1)

○ Partially in Place: I am partnering with a local EE provider to deliver complete MWEE programs (all four MWEE elements) for some but not all of my students (4)

○ Partially in Place: I am partnering with a local EE provider to deliver at least one but not all four MWEE elements for my students (5)

○ Fully in Place: I am working with a local EE provider to deliver a full MWEE program with all four elements (6)

Q84 **Comments**

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End of Block: MWEEs

Start of Block: Admin

T4
Thank you for your willingness to provide information to improve environmental literacy programming in the Commonwealth of Pennsylvania!

 The Pennsylvania Department of Education in partnership with the Chesapeake Bay Program will be sending a survey to school district administrators in May 2019. To prepare for this survey, you may wish to begin collecting information on the following questions:

https://chesapeakebay.noaa.gov/images/stories/education/bwet/elit2017.pdf

If you have any questions, you may contact Shannon Sprague with the Chesapeake Bay Program at shannon.sprague@noaa.gov or 410-267-5664.

End of Block: Admin