2024 Status and Needs of Non-formal and Formal (K12) Environmental Educators Across Pennsylvania

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Table of Contents

Executive Summary and Key Recommendations (2024 Update)

Pennsylvania, home to diverse ecosystems and significant water basins, continues to play a pivotal role in maintaining the environmental health of the Chesapeake Bay Watershed. Educating citizens about the importance of their relationship with natural systems is critical to sustaining the health of Pennsylvania's waterways and terrestrial ecosystems. The role of formal and non-formal environmental educators in shaping environmentally literate citizens has never been more important. Educators foster an understanding of ecosystems that can transform environmentally passive residents into active stewards of the environment.

In 2024, the need for environmentally literate citizens continues to grow, with formal and non-formal educators at the forefront of preparing the next generation to address complex environmental challenges. The National Oceanic and Atmospheric Administration (NOAA) continues to support this effort through **Bay Watershed Education and Training (B-WET)** grants, which fund experiential learning for K-12 students and educators. These grants focus on expanding the implementation in K-12 schools of **Meaningful Watershed Educational Experiences (MWEEs)**, a framework designed to provide students with hands-on environmental learning opportunities (Sprague et al., 2018).

The MWEE framework includes four essential elements:

- **Issue Definition**: Students investigate an environmental issue or question.
- **Outdoor Field Activities**: Students participate in hands-on outdoor activities to collect data and observations.
- **Synthesis and Conclusions**: Students analyze their findings to draw conclusions.
- **Stewardship and Civic Action**: Students take action to address environmental issues at the personal or societal level.

Progress from 2019 to 2024: Since 2019, significant strides have been made in expanding environmental education in Pennsylvania. The 2019 Pennsylvania Statewide Environmental Education Survey (PA SEES) provided baseline data on educators' understanding of MWEE and other environmental education initiatives. In 2022, a revised version of the survey was conducted to assess the impacts of COVID-19 on environmental education. In 2024, the most recent survey reflects ongoing progress in educator training, MWEE implementation, and program alignment with new Pennsylvania Science, Technology, Engineering, and Environmental Literacy and Sustainability (STEELS) academic standards.

Key Findings

- **MWEE Professional Development Impact:** NOAA-funded B-WET grants have played a pivotal role in advancing the implementation and awareness of the Meaningful Watershed Educational Experience (MWEE) framework. By 2024, 56% of non-formal educators and 38% of formal educators reported staff participation in NOAA-supported MWEE training programs.
- **MWEE Awareness**: Awareness of the Meaningful Watershed Educational Experience (MWEE) framework has grown significantly among both formal and non-formal educators between 2019 and 2024. Non-formal educator awareness rose from 56% in 2019 to 81% in 2024. Similarly, formal educator awareness increased from 24% in 2019 to 56% in 2024. However, despite these gains, the increase in awareness among non-formal educators has leveled off in 2024.
- **Support for Full Integration of MWEE Elements Beyond Outdoor Field Experiences:** While outdoor field experiences are becoming more widely adopted, other essential

MWEE elements—such as issue definition, synthesis and conclusions, and action projects—are still lacking significant growth. This highlights the need for professional development models that go beyond simply raising awareness. Instead, they should focus on actively supporting the implementation of the full MWEE framework. Additionally, providing adequate resources is crucial to ensure complete integration of all MWEE elements, thus aligning with NOAA's broader goals.

- **Professional Development Needs**: In 2024, while the need for further training in watershed education remains important, it ranks lower than topics such as air quality, composting, and instructional technology. The primary focus of professional development has shifted toward curriculum alignment, particularly with state academic standards like Pennsylvania STEELS, and the effective use of outdoor learning spaces. Additionally, the demand for integrating cross-disciplinary approaches and social-emotional learning (SEL) through nature-based programs has notably increased, reflecting a broader trend toward holistic education.
- **Program Alignment with STEELS**: Non-formal organizations continue to face challenges aligning their programming with the new Pennsylvania STEELS academic standards, which will be fully implemented in 2025. By 2024, only 25% of non-formal organizations had aligned their programs with these standards.
- **Outdoor Learning Spaces**: The use of outdoor learning spaces has continued to grow since the pandemic. In 2024, 58% of formal educators and 66% of non-formal educators reported increased use of outdoor spaces for instructional purposes. Non-formal educators have increasingly integrated outdoor learning into broader interdisciplinary

teaching.

Key Recommendations

- **Foster Full MWEE Implementation:** To ensure full integration of all four MWEE elements, educators need targeted, classroom-ready resources and hands-on support. Professional development must go beyond raising awareness, offering detailed curricula and practical strategies for implementation. This approach will better support educators in delivering comprehensive, student-centered environmental education.
- **Expand Professional Development:** Professional development in 2024 should focus on facilitating the full adoption of MWEE elements, with an emphasis on STEELS standards, outdoor learning spaces, and cross-disciplinary integration. Educators, particularly in underserved regions, require practical, classroom-ready tools to implement MWEE's essential elements. These resources will help educators meet NOAA's goals for meaningful watershed education.
- **Support Program Alignment with STEELS:** Non-formal environmental organizations should be provided with resources and guidance to align their programs with the new STEELS standards. This alignment will enhance the credibility of these programs within the formal K-12 system and help strengthen environmental education's role in core academic instruction.
- **Enhance the Use of Outdoor Learning Spaces:** The expansion of outdoor learning environments should continue accompanied by resources that help educators integrate outdoor instruction across various subject areas. By leveraging outdoor spaces, educators can provide immersive, interdisciplinary experiences that foster both

academic growth and personal connections with the environment.

Materials and Methods:

Survey Development

The 2024 Pennsylvania Statewide Environmental Education Survey (PA SEES) was developed as part of the NOAA-funded Pennsylvania Environmental Literacy and MWEE Programming Capacity Building grant. The 2024 survey is the third in a series following the 2019 and 2022 surveys. The initial 2019 survey was created by the PA Watershed Education Task Force and a survey initiative committee, which included statewide representatives. Many of the original questions were adapted from national and regional environmental education surveys, including:

- University of Wisconsin Environmental Education surveys (Kerlin et al., 2015; Hougham et al., 2017; Hougham et al., 2019),
- NOAA's 2017 Environmental Literacy Survey (Center for Schools and Communities, 2015),
- Pennsylvania's 2015 Environmental Literacy Survey (PA Department of Education, 2015), and
- The Rhode Island Environmental Education Inventory (Gracia, 2018).

The 2024 survey retained core questions from previous years, focusing on MWEE awareness, implementation, and professional development needs, while incorporating new questions on **cross-disciplinary integration** and **social-emotional learning (SEL)** to reflect emerging educational trends. Similar to the 2022 survey, questions related to the impacts of

COVID-19 on environmental education were included, with a shift toward understanding long-term post-pandemic changes.

Survey Administration

As with previous surveys, the 2024 survey was administered through the Qualtrics platform, ensuring continuity in methodology across the three survey periods (2019, 2022, and 2024).

The survey targeted two main groups:

- Non-formal educators, such as those working at environmental education provider organizations (e.g., museums, state parks, nature centers), and
- Formal educators, such as K-12 teachers at public, private, and charter schools.

The survey remained open for an extended period in 2024 (March 1 to April 30), compared to the shorter period in 2019 and 2022 (March 1 to March 31), allowing for increased participation.

Survey Participants

The number of respondents varied across the three survey periods. Table 1 summarizes the number of formal and non-formal educators who participated in each survey.

Table 1

Number of Formal and Non-formal Educators Participating in the PA SEES Survey (2019, 2022, 2024)

Year	Formal Educators	Non-formal Educators	Administrators	Total Participants
2019	270	232	108	610
2022	132	95	24	251
2024	174	109	38	321

Geographic Coverage of Survey Participants

The 2024 PA SEES survey included participants from all of Pennsylvania's major river basins, ensuring that the results reflected the diversity of the state's ecological regions. **Table 2** below shows the breakdown of participants by river basin for the 2019, 2022, and 2024 surveys.

Table 2

Geographic Distribution of Survey Respondents by River Basin (2019, 2022, 2024)

PA River Basin	2019 Respondents	2022 Respondents	2024 Respondents
Delaware River Basin	182 (30%)	93 (37%)	106 (33%)
Susquehanna River Basin	214 (35%)	92 (37%)	140 (44%)
Ohio River Basin	159 (26%)	44 (18%)	62 (19%)
Great Lakes Basin	30 (5%)	10 (4%)	23 (7%)
Potomac River Basin	14 (2.4%)	6 (2.4%)	15 (5%)
Elk/Northeast Watershed	9 (1%)	6 (2%)	4 (1%)
Gunpowder Watershed	1 (0%)	0 (0%)	3 (1%)
TOTAL	610	251	321

The **Susquehanna River Basin** accounted for 44% of respondents in 2024, an increase from 35% in 2019. This is significant because the Susquehanna River Watershed spans nearly half of Pennsylvania's land area, making it the largest watershed in the commonwealth (see Figure 1 and Table 3). The increased representation from this region improves the survey's overall accuracy, ensuring that the diverse environmental education needs and perspectives of this ecologically critical area are better reflected in the results (Pennsylvania Association of Conservation Districts, n.d.).

While the Susquehanna covers the most land area, the **Delaware River Basin** is the most densely populated, containing 40.3% of Pennsylvania's population despite occupying only 14% of its land area. This highlights the different environmental and educational challenges faced by

these basins, with the Delaware's population density requiring unique strategies for environmental education and conservation

Figure 1

Pennsylvania's River Basins

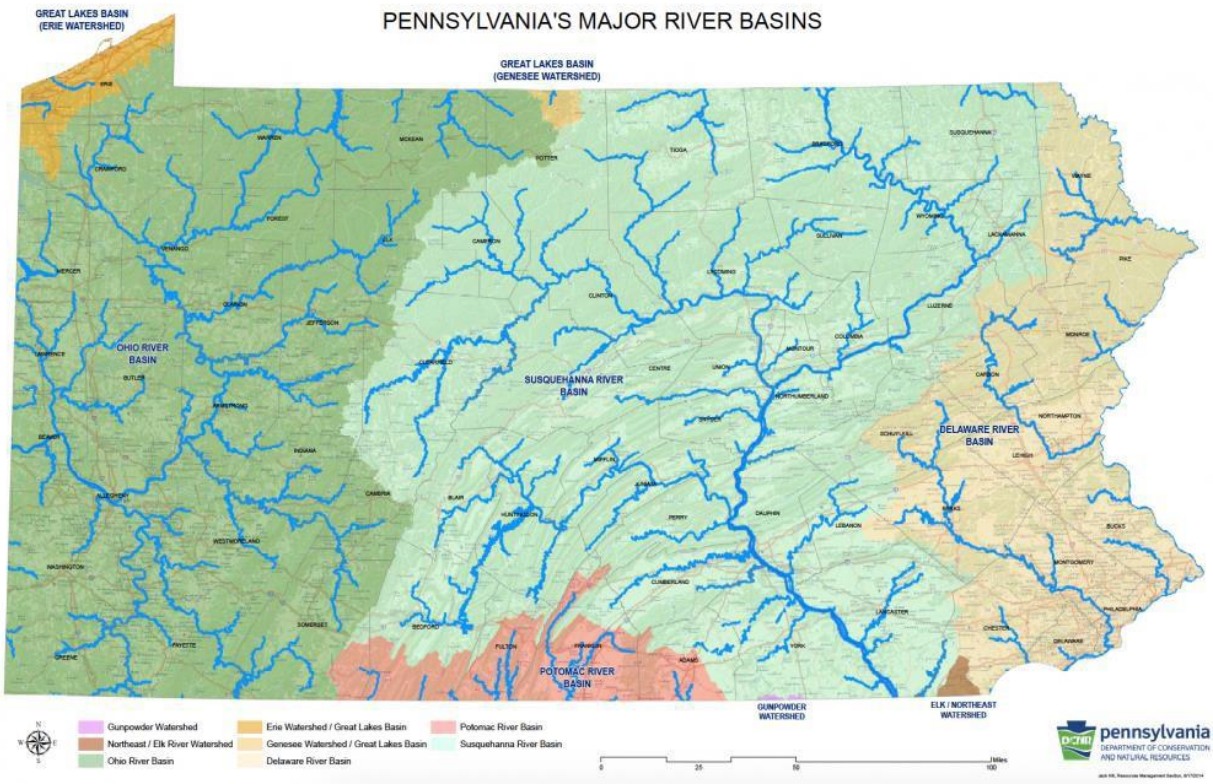


Table 3

Geographic Distribution of Pennsylvania's Land Area and Population by River Basin

Basin Name	% of Land Area	% of Population
Susquehanna	46.50%	25.70%
Ohio	34.50%	26.90%
Delaware	14%	40.30%
Potomac	3.50%	1.10%
Erie	1%	2.10%
Genesee	0.30%	0.02%
Elk & Northeast	0.15%	0.09%
Gunpowder	0.03%	0.01%

*Pennsylvania Department of Conservation and Natural Resources, 2010

Data Processing

Survey responses were anonymized and aggregated for analysis. Responses that were less than 25% complete were excluded from the final dataset. Only one response per non-formal organization was included in the analysis to avoid duplication. When more than one response was present from an organization, the most complete response was used. In contrast, multiple responses from formal educators within the same school were permitted.

Results:

Knowledge and Use of the MWEE Framework

Between 2019 and 2022, both non-formal and formal educators saw significant increases in their familiarity with the Meaningful Watershed Educational Experience (MWEE) framework (see Table 4). Non-formal educator awareness jumped from 56% to 85%, while formal educator awareness rose from 24% to 45%. This growth reflects the effectiveness of NOAA and the B-WET program in raising awareness during this period.

However, between 2022 and 2024, trends diverged. Non-formal educator awareness experienced a slight decline from 85% to 81%, suggesting that outreach efforts may have reached saturation. This decline signals the potential need for reinvigorated professional development (PD) strategies to sustain engagement. On the other hand, formal educator awareness continued to increase, growing from 45% to 56%. Though positive, this steady yet slower rate of increase indicates that more tailored PD efforts may be needed to further bridge the gap between non-formal and formal educators.

Despite overall gains, formal educators still lag behind their non-formal counterparts. This gap highlights the need for targeted outreach and PD efforts focused on formal educators,

ensuring they can fully integrate the MWEE framework into their programs.

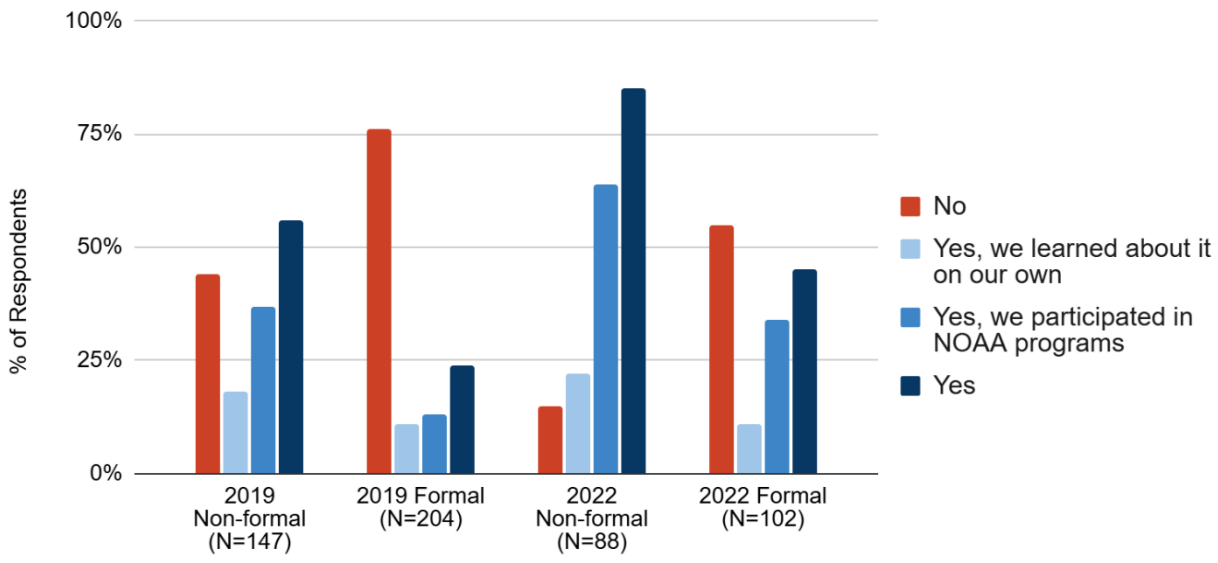
Table 4

MWEE Awareness for Non-formal and Formal Educators (2019, 2022 and 2024)

	Non-formal Educators			Formal Educators		
Awareness Response	2019 N=147	2022 N=88	2024 N=77	2019 N=204	2022 N=102	2024 N=128
No	44%	15%	19%	76%	55%	44%
Yes, we learned about it on our own	18%	22%	25%	11%	11%	18%
Yes, we have staff that have participated in NOAA-funded Bay Watershed Education and Training (B-WET) grant projects or MWEE training such as Chesapeake Bay Foundation workshops, PA MWEE Ambassador, or other training workshops	37%	64%	56%	13%	34%	38%
Yes (Combined)	56%	85%	81%	24%	45%	56%

Figure 2

MWEE Awareness for Non-formal and Formal Educators (2019, 2022 and 2024)



Comfort in Implementing MWEE Elements Among Non-formal Educators

Non-formal educators were surveyed on their comfort in applying the four MWEE elements—**issue definition**, **outdoor field experience**, **synthesis and conclusions**, and **action project**—using a 1 to 5 scale, where 1 indicates *not comfortable at all* and 5 signifies *very comfortable*.

Initial findings from 2019 to 2022 showcased a notable increase in comfort levels across all elements, reflecting the impact of effective professional development programs. However, data from 2024 revealed a plateau in these gains, with slight declines noted, suggesting that many educators may have reached a saturation point. This trend aligns with the overall stagnation in MWEE awareness and highlights the necessity for evolving PD strategies to sustain momentum.

Table 5 below details the comfort levels reported by non-formal educators, underscoring the need for ongoing, targeted support to fully integrate MWEE into educational practices.

Table 5

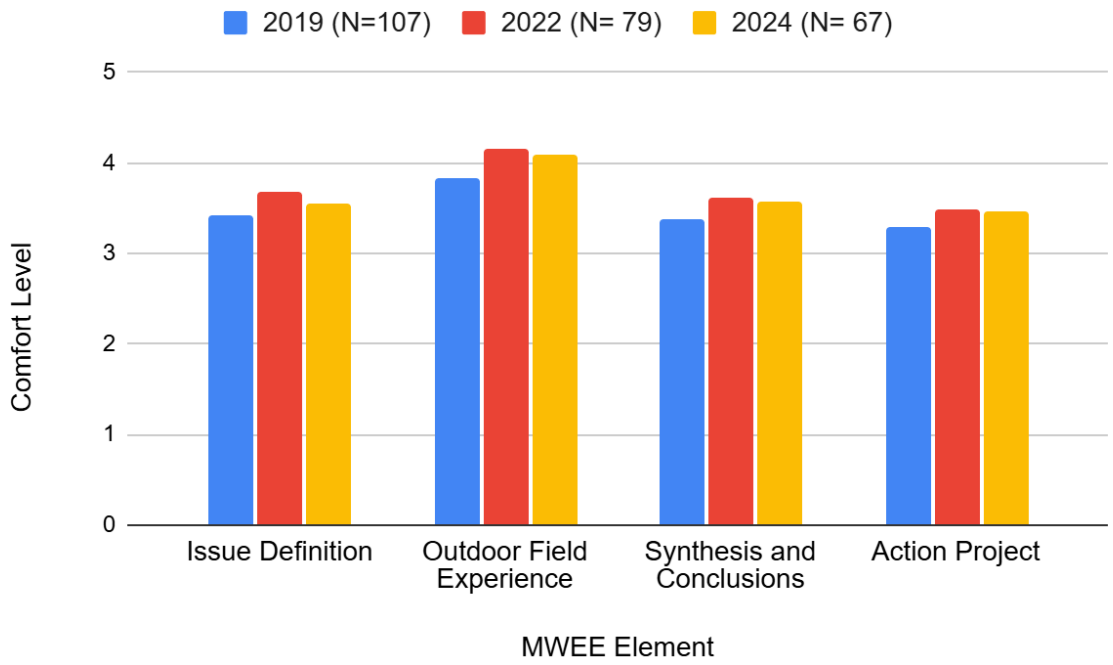
Non-formal Educators' Comfort Level Implementing Lessons Focused on the 4 Essential Elements of the MWEE (2019, 2022 and 2024)

	Non-formal Educators		
	2019 N=107	**2022 N= 79**	**2024 N= 67**
Issue Definition	3.42	3.69	3.56
Outdoor Field Experience	3.84	4.16	4.09
Synthesis and Conclusions	3.38	3.61	3.58
Action Project	3.3	3.49	3.47

*1- not comfortable at all, 2 - slightly comfortable, 3 – somewhat comfortable, 4- comfortable, 5 – very comfortable

Figure 3

Non-formal Educators' Comfort Level Implementing Lessons Focused on the 4 Essential Elements of the MWEE (2019, 2022 and 2024)



*1- not comfortable at all, 2 - slightly comfortable, 3 – somewhat comfortable, 4- comfortable, 5 – very comfortable

Implementation and Systemic Integration of MWEE Elements

While awareness of the MWEE framework improved among both non-formal and formal educators between 2019 and 2024, this did not fully translate into widespread implementation of all MWEE elements. As seen in the data, the core elements such as issue definition, synthesis and conclusions, and action projects showed only minimal growth in implementation during this period. For instance, issue definition saw incremental increases, with non-formal educator implementation rising from 23% in 2019 to 27% in 2024, while formal educator implementation increased from 27% to 31%. However, the synthesis and conclusions element remained largely stagnant, with non-formal educators at 18%-20% and formal educators showing only a slight increase from 21% to 22%. Similarly, the implementation of action projects showed little

progress, with non-formal educators remaining around 17%-18% and formal educators increasing slightly from 17% to 20%.

In contrast, outdoor field experiences showed notable growth across both groups. Non-formal educators demonstrated a rise from 39% in 2022 to 50% in 2024, while formal educators increased from 33% to 42% during the same period. These results suggest that outdoor field experiences are viewed as more feasible or desirable to implement compared to other MWEE elements, likely due to the hands-on, experiential nature of these activities.

Despite the progress in outdoor field experiences, the limited growth of other MWEE elements highlights the need for ongoing support. Educators may be aware of the MWEE framework and feel comfortable with its concepts, but additional resources and guidance are required to help them fully integrate all elements into their programs.

In alignment with NOAA's goal of systemic MWEE implementation—defined as ensuring that MWEEs are integrated at a full grade level or across an entire school district—non-formal organizations are playing a key role. In 2024, 66% of non-formal organizations reported that they worked with schools where MWEEs were part of a systemic environmental education program. However, less than half (48%) of non-formal organizations supported schools in developing MWEE curricula, a figure unchanged from 2022.

Although systemic engagement remains a priority, the data suggests some decline in this area. In 2024, 57% of non-formal organizations reported working with schools at a systemic level, down from 66% in 2022. This drop points to the need for continued collaboration and support to ensure that MWEE implementation reaches the systemic level across K-12 schools (see Table 6).

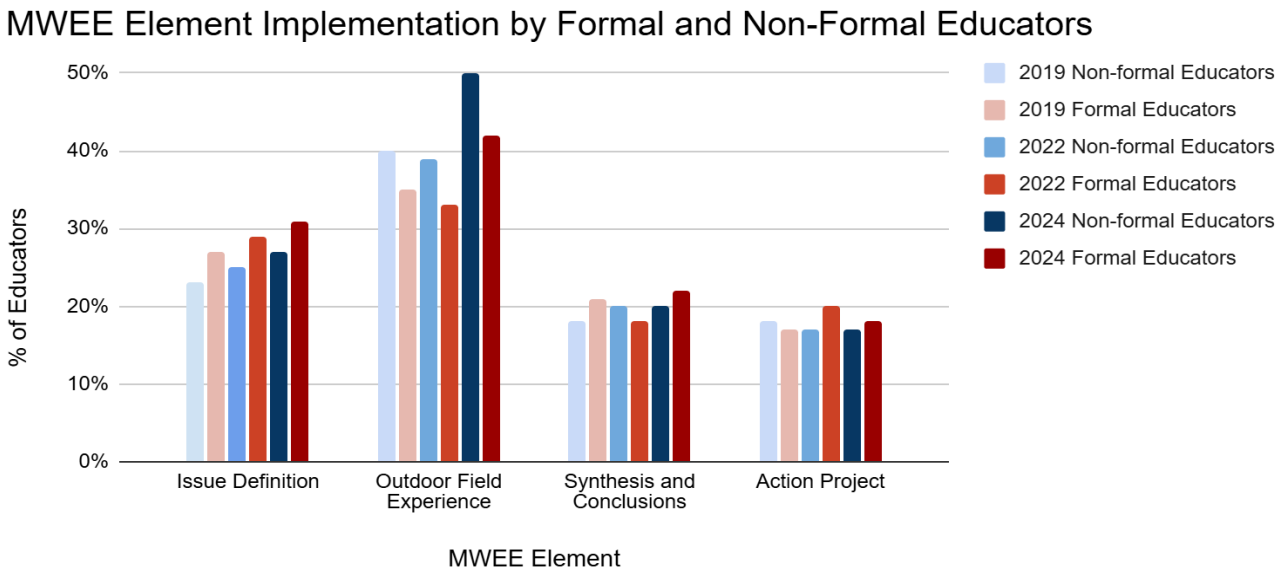
Table 6

Elements of the MWEE that Formal and Non-formal Educators Are Implementing (2019, 2022 and 2024)

	Non-formal Educators			Formal Educators		
	2019 N=142	2022 N=137	2024 N= 54	2019 N=145	2022 N= 85	2024 N= 147
Issue Definition	23%	25%	27%	27%	29%	31%
Outdoor Field Experience	40%	39%	50%	35%	33%	42%
Synthesis and Conclusions	18%	20%	20%	21%	18%	22%
Action Project	18%	17%	17%	17%	20%	18%

Figure 4

Elements of the MWEE that Formal and Non-formal Educators Are Implementing (2019, 2022 and 2024)



Staff Development and Training

To better understand the training needs of Pennsylvania educators, the survey asked respondents to identify areas where they required additional training, their preferred training formats, the organizations they looked to for training, and areas in which they felt competent enough to lead training. From 2019 to 2024, the overall staff development and training needs

remained relatively stable, but there were shifts in the priority of certain topics.

Areas of Training Needs

The survey provided educators with a list of 43 possible training topics, allowing them to select all that applied to themselves or their colleagues. The results demonstrate a continued need for professional development, though shifts in priority were observed over time. While many training needs remained consistent, several areas gained prominence, especially in 2024.

For **non-formal educators**, topics such as **air quality**, **academic standards alignment**, and **instructional technology in outdoor education** consistently ranked high across the years. Notably, **MWEE training**, which was a top priority in 2019, significantly dropped in rank by 2022 and 2024, indicating that the need for MWEE-specific training may have been addressed as educators became more experienced. In contrast, **air quality** and **geographic information systems (GIS)** rose in importance, reflecting shifts in environmental focus (see **Table 7**).

In 2019, **MWEE** was ranked 7th among non-formal educators, with 54% selecting it as a training need. However, by 2022, the ranking dropped to 29th, and in 2024, it remained low at 28th. This decline suggests that many educators may feel they have received adequate MWEE training or have shifted their focus to other areas. The growing emphasis on **air quality**, **GIS for educational programming**, and **instructional technology in outdoor education** highlights the evolving priorities in environmental education.

Table 7

Areas of EE Training Needed for Non-formal Educators (2019, 2022 and 2024)

	2019 (N=133)		2022 (N=81)		2024 (N=66)	
Rank	Subject	%	Subject	%	Subject	%
1	Academic Standards Alignment	60	Air Quality	65	Air Quality	74
2	Air Quality	58	Academic Standards Alignment	64	Academic Standards Alignment	73
3	Instructional Technology in Outdoor Ed.	56	Geographic Information Systems (GIS) for Ed. Programming	63	Instructional Technology in Outdoor Ed.	68
4	Using STEM as a Context for EE (E-STEM)	56	Geology and Fossils	63	Understanding School Initiatives	64
5	Understanding School Initiatives	56	Instructional Technology in Outdoor Ed.	62	Using STEM as a Context for EE (E-STEM)	59
6	Community Action and Service-learning	56	Astronomy	62	Geographic Information Systems (GIS) for Ed. Programming	59
7	MWEE	54	Using STEM as a Context for EE (E-STEM)	59	Geology and Fossils	59
8	Using Environmental Sensors in Programming	53	Community-based Learning	59	Composting & Vermicomposting	59
9	Geographic Information Systems (GIS) for Ed. Programming	51	Understanding School Initiatives	58	Community-based Learning	58
10	Community-based Learning	68	Essential Question, Performance Tasks, Learning Obj, Designing & Using in Programming	58	Climate/Citizen Science	58
	#43 Watershed Education – General	*22*	*#41 Watershed Education – General*	*25*	*#43 Watershed Education – General*	*26*
			#29 MWEE	*40*	*#28 MWEE*	*44*

Table 8

Areas of EE Training Needed for Formal (K12) Educators (2019, 2022 and 2024)

	2019 (N= 213)		2022 (N=114)		2024 (N=140)	
Rank	Subject	%	Subject	%	Subject	%
1	Air Quality	76	Air Quality	78	Air Quality	79
2	Drinking Water and Wastewater	71	Energy Efficiency	75	Curriculum Training in National and State Curricula	79
3	Instructional Technology in Outdoor Ed.	70	Curriculum Training in National and State Curricula	75	Composting and Vermicomposting	78
4	Sustainable Design and Green Technologies or Buildings	70	Current Environmental Issues	74	Geographic Information Systems (GIS) for Ed. Programming	77
5	MWEE	68	Community-based Learning	74	Instructional Technology in Outdoor Ed.	76
6	Geocaching & Orienteering	67	Drinking Water and Wastewater	73	Birds	75
7	Using STEM as a Context for EE (E-STEM)	65	Aquatic Ecology	73	Academic Standards Alignment	75
8	Energy Efficiency	65	Geographic Information Systems (GIS) for Ed. Programming	72	Sustainable Design & Green Technologies in Buildings	74
9	Using Environmental Sensors in Programming	64	Composting and Vermicomposting	72	Energy Efficiency	73
10	Curriculum Training in National & State Curricula	64	Academic Standard Alignment	72	Using Environmental Sensors in Programming	72
	#33 Watershed Education- General	*53*	*#11 MWEE*	*71*	*#26 MWEE*	*60*
			#31 Watershed Education-General	*59*	*#26 Watershed Education-General*	*60*

Preferred Professional Development Formats

The survey data from 2019 to 2024 reveals several trends in educator preferences for professional development formats. **In-person training led by outside providers** remains the most popular format among both formal and non-formal educators. Preferences for this format increased for formal educators, rising from 85% in 2019 to 91% in 2024. For non-formal educators, preferences for this format remained stable, with a slight decline from 82% in 2019

to 77% in 2024 (see **Table 3**).

Interest in **online formats**, particularly webinars and certificate programs, remained strong over the years. Non-formal educators showed a notable increase in their preference for webinars, from 39% in 2019 to 65% in 2024. Formal educators were more consistent in their preferences, with 60% selecting webinars in 2019 and 57% in 2024. **Online certificate programs** also saw modest growth, with formal educators' preferences increasing from 38% to 50%, while non-formal educators' preference remained steady at 43%.

In-person training led by internal staff saw a divergence in preferences between the two groups. Among formal educators, preference for this format declined sharply, from 55% in 2019 to 29% in 2024. However, non-formal educators' interest in this format grew, increasing from 22% in 2019 to 33% in 2024.

Lastly, **self-driven formats**—such as using books, magazines, and web-based research—saw a decline in preference among formal educators, dropping from 47% in 2019 to 31% in 2024. Similarly, non-formal educators' preferences for self-driven formats decreased slightly, from 34% to 29%.

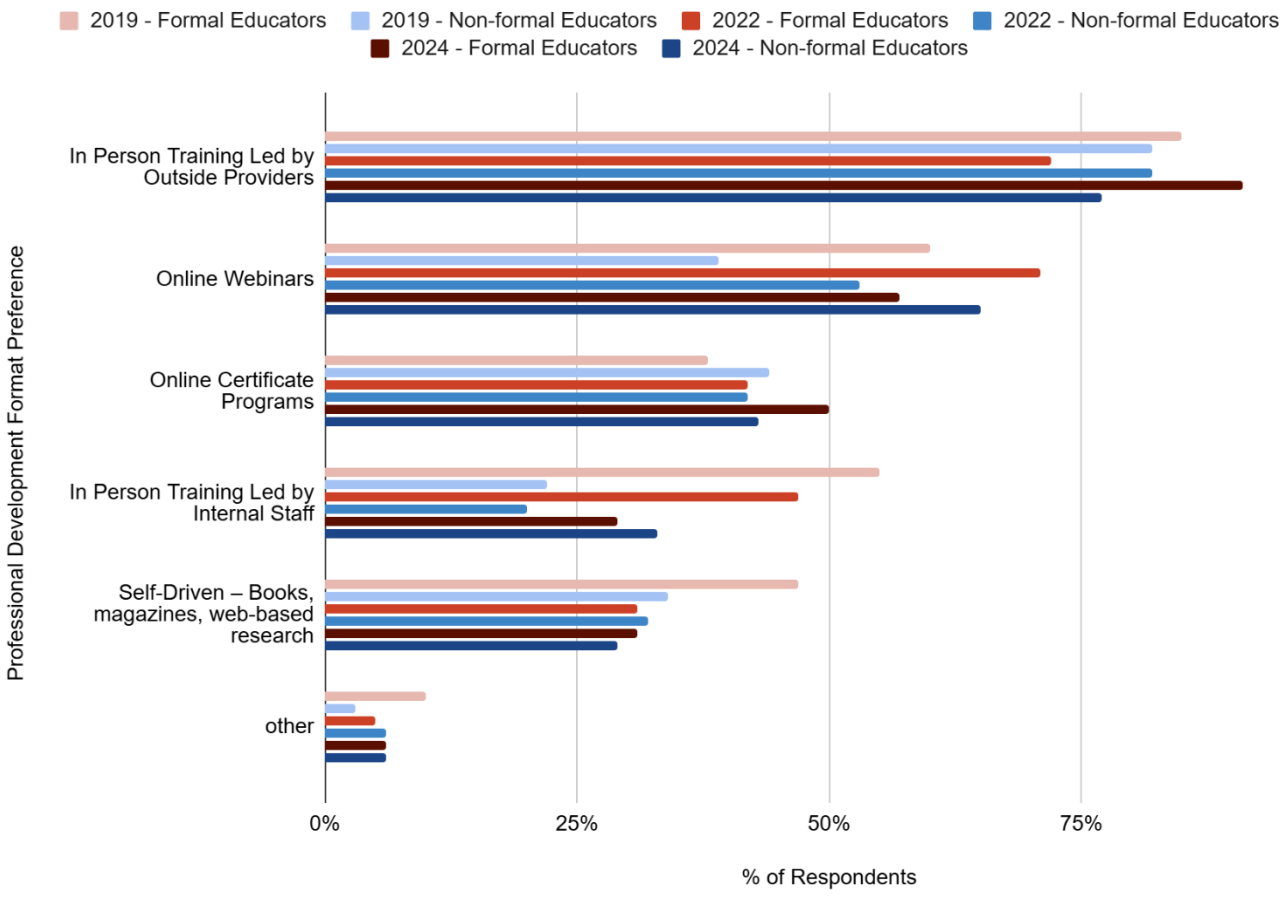
Table 9

Professional Development Format Preference (2019, 2022, 2024)

Format	Formal Educators			Non-formal Educators		
	2019 N=132	2022 N=78	2024 N=139	2019 N=214	2022 N=114	2024 N=69
In Person Training Led by Outside Providers	85%	72%	91%	82%	82%	77%
Online Webinars	60%	71%	57%	39%	53%	65%
Online Certificate Programs	38%	42%	50%	44%	42%	43%
In Person Training Led by Internal Staff	55%	47%	29%	22%	20%	33%
Self-Driven – Books, magazines, web-based research	47%	31%	31%	34%	32%	29%
other	10%	5%	6%	3%	6%	6%

Figure 5

Professional Development Format Preference (2019, 2022 and 2024)



Professional Development Providers

Building on the analysis of educators' preferences for professional development formats, this section explores the organizations that educators rely on for training and support. The data reveals several shifts in the types of providers used between 2019 and 2024.

State government agencies (such as the Pennsylvania Department of Education, Department of Conservation and Natural Resources, and Department of Environmental Protection) have remained the preferred PD provider for both formal and non-formal educators, highlighting the continued importance of state agencies as critical resources for both groups.

Federal government agencies (such as NOAA, NASA, and USGS) present a contrasting trend. Formal educators' reliance on federal agencies declined sharply, dropping from 46% in 2019 to 30% in 2024. In contrast, non-formal educators increased their reliance on federal agencies, rising from 42% in 2019 to 52% in 2024. This divergence suggests that while formal educators may be turning to other resources, non-formal educators are increasingly utilizing federal support.

Higher education institutions (community colleges, technical schools, and universities) have become a more prominent resource for both groups. Usage among formal educators remained consistent, rising slightly from 52% in 2019 to 57% in 2024. Non-formal educators showed a more significant increase in their reliance on higher education institutions, growing from 55% in 2019 to 67% in 2024, indicating a stronger trend toward academic partnerships for professional development.

Both **local non-formal environmental education (EE) organizations** and

national/regional non-governmental organizations (NGOs) (such as the Chesapeake Bay Foundation) experienced a decline in usage among formal educators. Usage of local EE organizations fell from 67% in 2019 to 48% in 2024, while national/regional NGO usage decreased from 62% to 42% during the same years. Among non-formal educators, usage of national NGOs and local EE organizations showed a slight increase between 2019 and 2024.

For-profit companies (such as publishers or tech firms like Google) continued to be a minor resource for both groups. Formal educators showed steady usage, with 17% in 2024, while non-formal educators saw a sharp decline, dropping from 17% in 2022 to just 3% in 2024. This suggests that formal educators may be more open to utilizing commercial resources, whereas non-formal educators have moved away from these options.

Overall, the trends suggest a sustained reliance on state agencies, a growing preference for higher education institutions, and a gradual shift away from local and national EE organizations among formal educators.

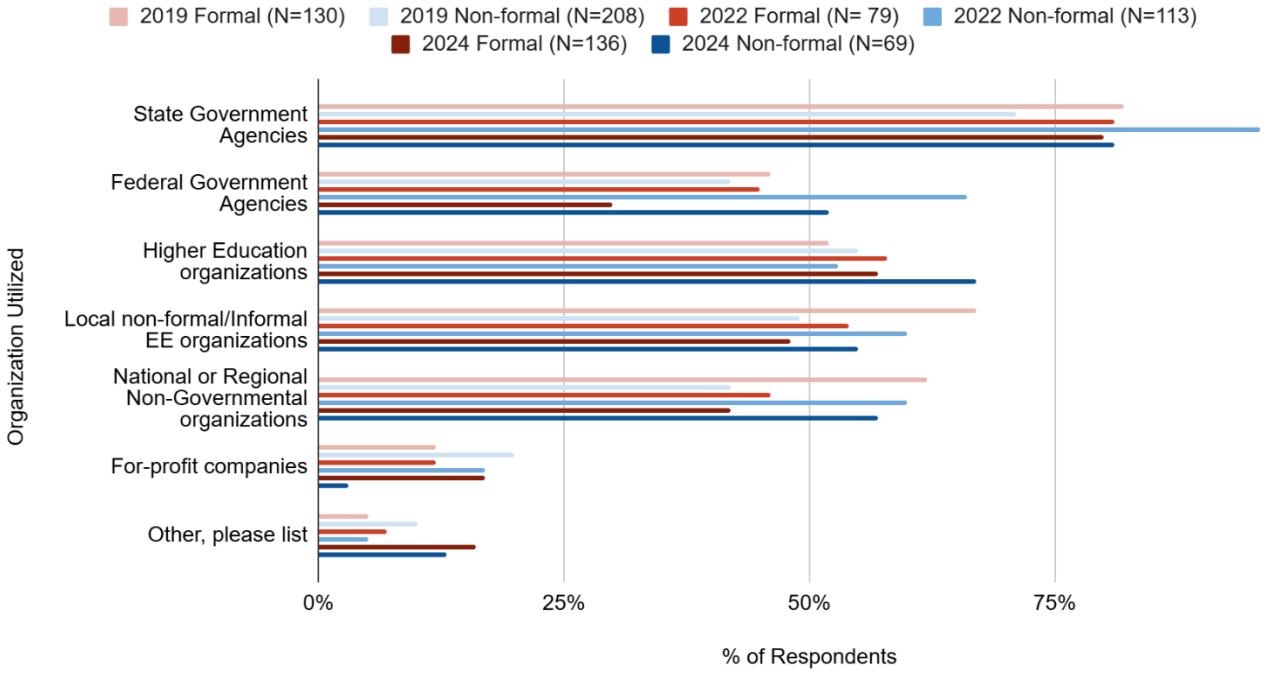
Table 10

Outside Professional Development Providers Used by Educators (2019, 2022 and 2024)

Organization Utilized	Formal			Non-formal		
	2019 N=130	2022 N= 79	2024 N=136	2019 N=208	2022 N=113	2024 N=69
1 - State Government Agencies (PDE, DCNR, DEP, Department of AG, PSU Extension, etc.)	82%	81%	80%	71%	96%	81%
2 - Federal Government Agencies (NOAA, NASA, USGS, etc.)	46%	45%	30%	42%	66%	52%
3 - Higher Education organizations (Community Colleges and Technical Schools, Colleges, Universities)	52%	58%	57%	55%	53%	67%
4 - Local non-formal/Informal EE organizations	67%	54%	48%	49%	60%	55%
5 - National or Regional Non-Governmental organizations (e.g., Chesapeake Bay Foundation)	62%	46%	42%	42%	60%	57%
6 - For-profit companies (Publishers, Google, etc.)	12%	12%	17%	20%	17%	3%
7 - Other, please list	5%	7%	16%	10%	5%	13%

Figure 6

Outside Professional Development Providers Used by Educators (2019, 2022 and 2024)



In addition to exploring professional development formats and providers, the study also examined the specific areas where educators felt confident leading training for others. Between 2019 and 2024, notable differences emerged between formal and non-formal educators regarding the subject areas they felt most prepared to lead.

Non-formal educators consistently expressed the most confidence in leading training on **watershed education, aquatic ecology** and **water quality assessments** in 2019, 2022, and 2024, with watershed education remaining the top choice in all years (see **Table 11**). However, the confidence to lead in curriculum-related areas, such as **national and state curricula** (e.g., Project WILD, Project WET), saw a decline by 2024, no longer appearing in the top-ranked subjects for non-formal educators.

Formal educators, by contrast, have consistently demonstrated confidence in leading training on pedagogical skills such as **classroom/group management** and **instructional methods**. These topics remained the highest-ranked in 2024 with 34% of formal educators indicating that they could lead PD on these topics. Additionally, topics such as **watershed education** and **inquiry-based teaching and learning** remained areas of confidence for formal educators in 2024 (see **Table 12**).

Interestingly, while **non-formal educators** are moving away from curriculum-based training, **formal educators** have shown some interest in environmental topics like **aquatic ecology** and **water quality assessments**, signaling an overlap in certain areas of strength between the two groups.

Table 11

Areas Where Non-formal (K12) Educators Could Lead EE Trainings (2019, 2022 and 2024)

	2019 (N=208)		2022 (N=81)		2024 (N=66)	
Rank	Subject	%	Subject	%	Subject	%
1	Watershed Education – General	70%	Watershed Education - General	55%	Watershed Education - General	50%
2	Water Quality Assessments	56%	Aquatic Ecology	47%	Aquatic Ecology	38%
3	Land Animals	54%	Birds	42%	Water Quality Assessments	35%
4	Aquatic Ecology	54%	Natural History	41%	Plants	35%
5	Curriculum Training in National and State Curricula (Project WILD, Project WET, Project Learning Tree, etc.)	53%	Water Sports, Kayaking, and Canoeing	38%	Leave No Trace Principals	33%
6	Leave No Trace Principles	53%	Land Use and Conservation	38%	Interpretive Skills	
7	Water Sports, Kayaking, and Canoeing	50%	Plants	37%	Birds	
8	Natural History	49%	Leave No Trace Principles Land Animals	37% 37%	Land Use and Conservation Program & Curricular Development	32%
9	Interpretive Skills	48%	Curriculum Training in National and State Curricula	35%	Natural History	30%
10	Litter and Recycling	48%	Citizen Science	35%	MWEE – Program Design & Implementation Classroom/Group Management Citizen Science	30%

Table 12

Areas Where Formal (K12) Educators Could Lead EE Trainings (2019, 2022 and 2024)

	2019 (N=130)		2022 (N=114)		2024 (N=140)	
Rank	Subject	%	Subject	%	Subject	%
1	Instructional Methods- General	49%	Classroom/Group Management	32%	Classroom/Group Management	34%
2	Classroom/Group Management	48%	Watershed Education - General	25%	Instructional Methods - General	34%
3	Inquiry-based Teaching and Learning	42%	Inquiry-based Teaching and Learning	25%	Inquiry-based Teaching and Learning	28%
4	Program and Curricula Development	39%	Instructional Methods- General	24%	Watershed Education - General	28%
5	Essential Questions, Performance Tasks, Learning Objectives – Designing and Using in Programming	34%	Litter and Recycling	20%	Aquatic Ecology	24%
6	Watershed Education – General	33%	Gardening, Agriculture, and Soils	20%	Program and Curricula Development	23%
7	Litter and Recycling	31%	Program and Curricula Development	18%	Water Quality Assessments	22%
8	Water Quality Assessments	29%	Water Sports, Kayaking, and Coaching	17%	Essential Questions, Performance Tasks, Learning Objectives – Designing and Using in Programming	
9	Current Environmental Issues	29%	Plants	17%	MWEE- Program Design & Implementation	21%
10	Gardening, Agriculture, and Soils	28%	Aquatic Ecology	17%	Litter & Recycling	

Non-formal Education Overview

Operating Budget

To better understand the size of the non-formal organizations represented in the survey, educators were asked to indicate the annual operating budget range for their environmental education (EE) organizations. The majority of respondents in 2019, 2022, and 2024 reported relatively small operating budgets, with most organizations falling in the **$0-$100,000** range (see **Table 13**).

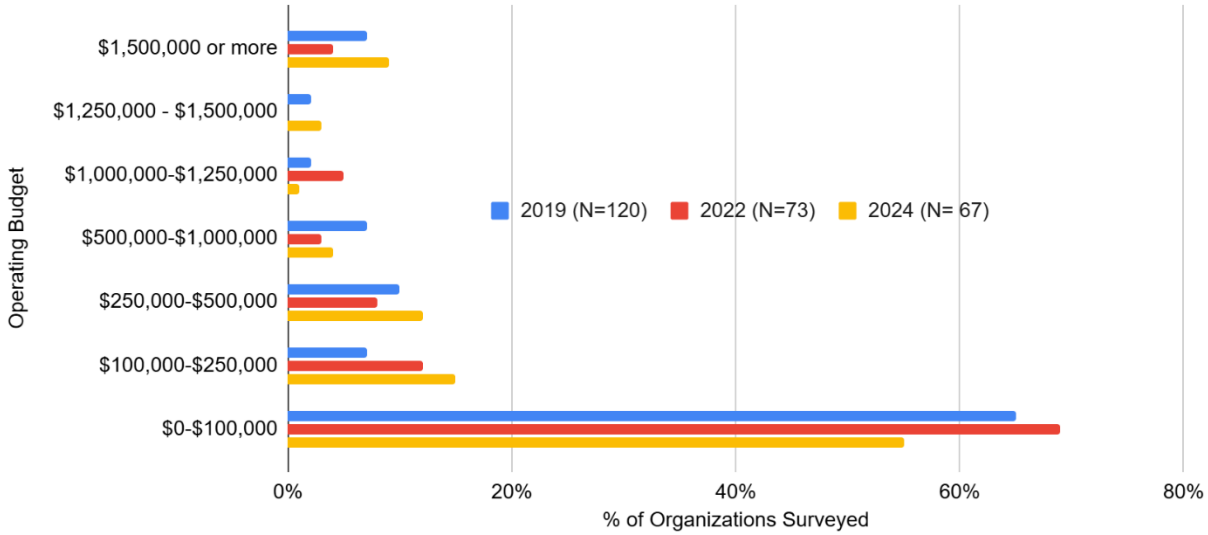
Table 13

Operating Budget for Non-formal Organizations (2019, 2022, and 2024)

Operating Budget	2019 (N=120)	2022 (N=73)	2024 (N= 67)
$1,500,000 or more	7%	4%	9%
$1,250,000 - $1,500,000	2%	0%	3%
$1,000,000-$1,250,000	2%	5%	1%
$500,000-$1,000,000	7%	3%	4%
$250,000-$500,000	10%	8%	12%
$100,000-$250,000	7%	12%	15%
$0-$100,000	65%	69%	55%

Figure 7

Operating Budget for Non-formal Organizations (2019, 2022, and 2024)



Participation Trends

Non-formal educators reported on program participation trends over the last five years, showing a clear rebound in 2024 to levels similar to or exceeding those of 2019. While participation dipped in 2022 due to the effects of the COVID-19 pandemic, by 2024, many

organizations reported stronger engagement.

In 2024, **31%** of educators noted that participation had **greatly increased**, a significant improvement compared to the **13%** who reported the same in 2022. Additionally, **36%** of educators reported that participation had **slightly increased** in 2024, surpassing the **31%** noted in 2019. The temporary dip in 2022, where **27%** of educators indicated a **slight decrease**, had fallen to just **8%** by 2024, signaling a robust recovery (see **Table 14**).

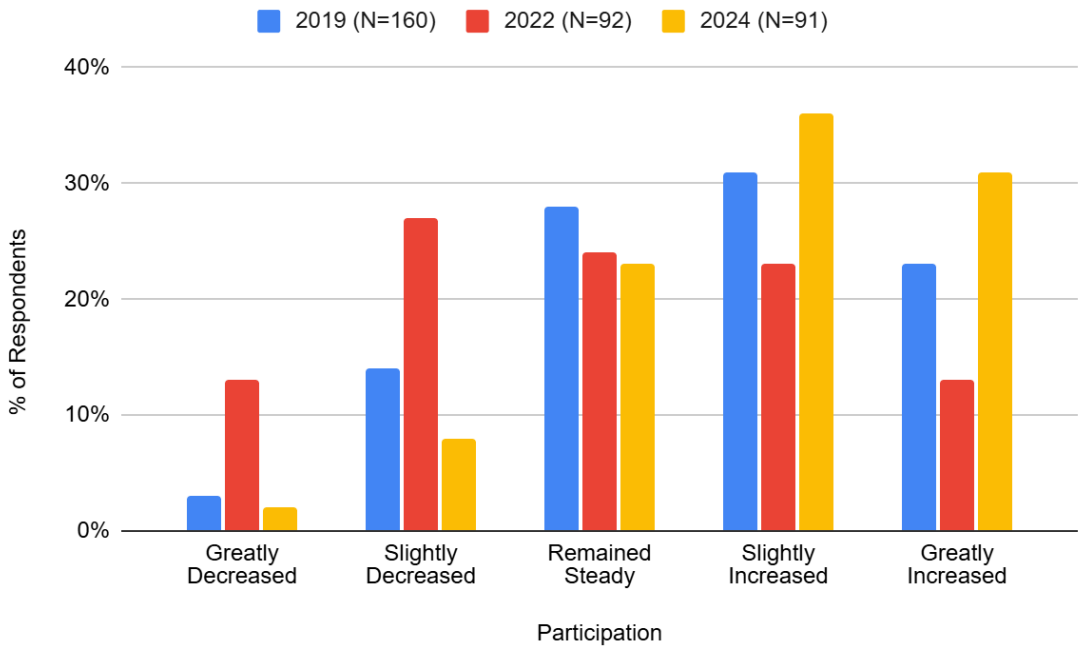
Table 14

Program Participation Trends (2019, 2022, and 2024)

Participation	2019 N=160	2022 N=92	2024 N=91
Greatly Decreased	3%	13%	2%
Slightly Decreased	14%	27%	8%
Remained Steady	28%	24%	23%
Slightly Increased	31%	23%	36%
Greatly Increased	23%	13%	31%

Figure 8

Program Participation Trends (2019, 2022 and 2024)



Alignment to PA STEELS Standards

Non-formal environmental education (EE) organizations report a growing commitment to aligning their programming with Pennsylvania's new Science, Technology, Engineering, Environmental Literacy, and Sustainability (STEELS) state academic standards, which will be fully implemented in 2025. By 2024, **69%** of non-formal EE organizations indicated that their programs were already aligned with the STEELS standards. This high level of alignment reflects a proactive approach to ensure that educational offerings are consistent with the evolving state academic expectations. In addition, **26%** of these organizations also aligned their programming with the Next Generation Science Standards (NGSS), further emphasizing their dedication to integrating national educational frameworks. However, **7%** of non-formal EE organizations reported that none of their programs were aligned to any standards, highlighting an area for potential growth.

When asked about their knowledge and use of the PA STEELS standards, non-formal educators demonstrated a significantly higher awareness compared to their formal education counterparts. In 2024, **28%** of non-formal educators rated their knowledge of the STEELS standards as high, with an additional **49%** rating it as moderate. This contrasts with formal educators, where only **13%** rated their knowledge as high and **54%** as moderate. While non-formal educators are leading in early adoption, a small percentage (7%) still reported low knowledge of the standards, underscoring the need for continued professional development as the 2025 implementation date approaches (see **Table 15**).

While the majority of non-formal organizations have demonstrated strong alignment and familiarity with PA STEELS, formal education still lags in awareness and implementation. As

the state moves toward full integration of the STEELS standards, it will be crucial to address these gaps through targeted training and resource allocation to ensure that all educators, both formal and non-formal, are equipped to meet the new academic benchmarks.

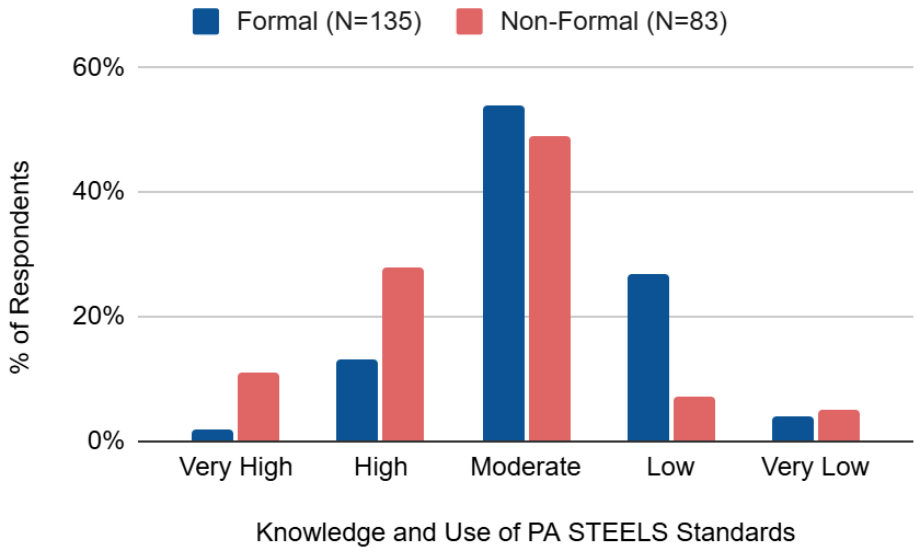
Table 15

Knowledge and Use of PA STEELS Standards Among Formal and Non-formal Educators (2024)

2024	Formal (N=135)	Non-formal (N=83)
Very High	2%	11%
High	13%	28%
Moderate	54%	49%
Low	27%	7%
Very Low	4%	5%

Figure 9

Knowledge and Use of PA STEELS Standards Among Formal and Non-formal Educators (2024)



Outdoor Education and the Use of Outdoor Learning Spaces

The COVID-19 pandemic prompted both formal and non-formal educators to rethink the instructional spaces they use, resulting in a significant shift toward outdoor learning environments. This section explores how the use of outdoor spaces has changed over the past

five years and identifies the key motivations behind these changes.

Changes in Use of Outdoor Spaces

Since returning to face-to-face instruction, there has been a marked increase in the use of outdoor learning spaces by both formal and non-formal educators. In **2024**, **55%** of non-formal educators reported that their use of outdoor spaces had either slightly or greatly increased, with **21%** stating it had greatly increased. Comparatively, **44%** of formal educators also reported increased outdoor space usage, with **34%** of formal educators indicating slight increases and **8%** reporting a significant rise (see **Table 16**).

While outdoor learning spaces were widely adopted across both groups, formal educators were more likely to maintain steady usage, with **40%** indicating no change in 2024. In contrast, non-formal educators were more inclined to report growth in their outdoor activities, with only **2%** indicating a slight decrease and none reporting a substantial decline.

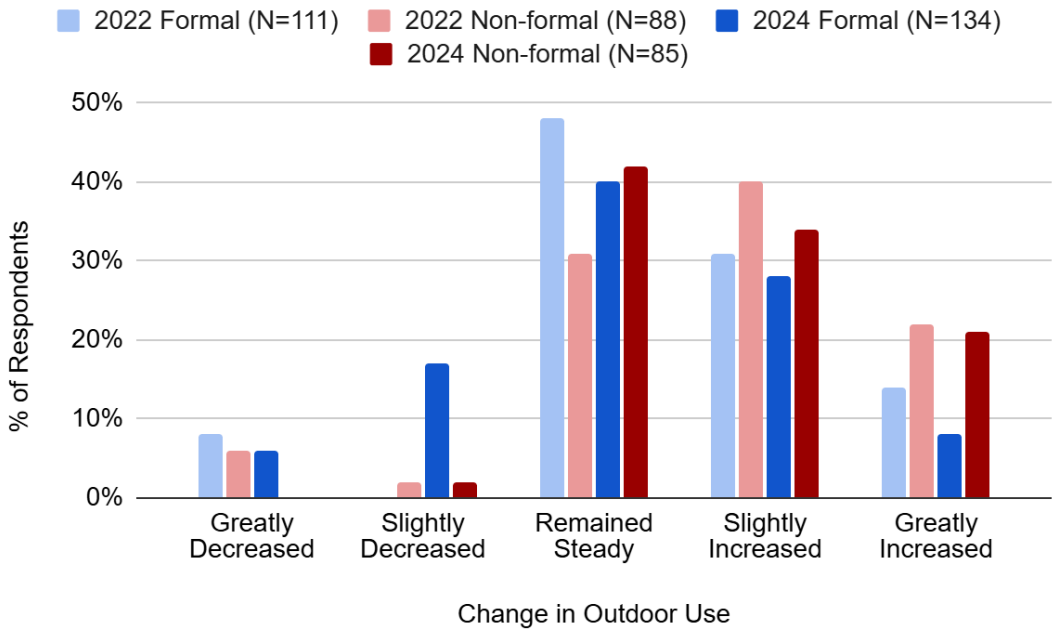
Table 16

Use of outdoors changed in past 3-5 years (2022 & 2024)

	Formal		Non-formal	
	2022 (N=111)	2024 (N=134)	2022 (N=88)	2024 (N=85)
Greatly Decreased	8%	6%	6%	0%
Slightly Decreased	0%	17%	2%	2%
Remained Steady	48%	40%	31%	42%
Slightly Increased	31%	28%	40%	34%
Greatly Increased	14%	8%	22%	21%

Figure 10

Use of outdoors changed in past 3-5 years (2022 & 2024)



Motivation for Increased Use of Outdoor Spaces

The motivations driving increased use of outdoor spaces varied across formal and non-formal educators. Among non-formal educators, the most common motivator was a desire to be outside, with 35% citing this as the reason for their expanded outdoor instruction in 2024. This was followed by the need for field experiences (30%) and health &safety concerns (17%).

For formal educators, the motivations were somewhat different. In 2024, 34% of formal educators also reported that a desire to be outside was a key motivator, but health and safety played a lesser role (15%). Social distancing, a primary concern during the pandemic, continued to influence decisions for both groups, although it declined as a motivating factor between 2022 and 2024.

Interestingly, non-formal educators showed more enthusiasm for outdoor fieldwork, with over 30% identifying the need for hands-on field experiences as a key reason for their shift

outdoors (see Table 17).

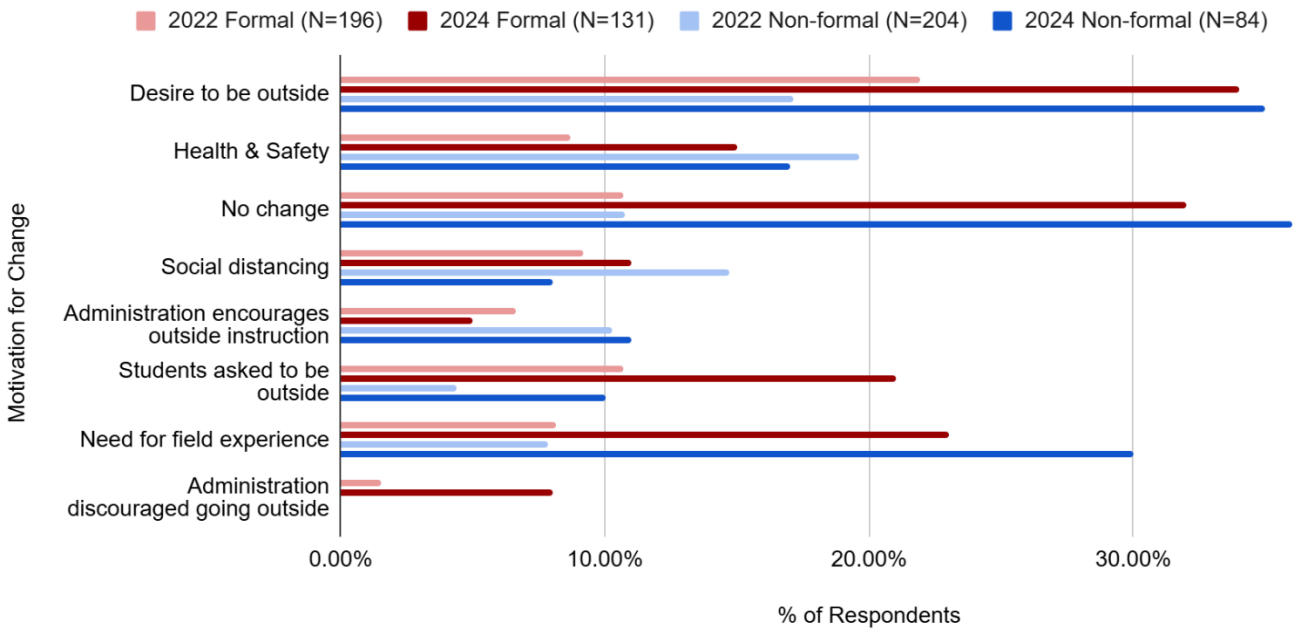
Table 17

Motivation for Change in Outdoor Learning Spaces (2022 & 2024)

	Formal		Non-formal	
	2022 (N=196)	2024 (N=131)	2022 N=204	2024 N=84
Desire to be outside	21.94%	34%	17.16%	35%
Health & Safety	8.67%	15%	19.61%	17%
No change	10.71%	32%	10.78%	36%
Social distancing	9.18%	11%	14.71%	8%
Administration encourages outside instruction	6.63%	5%	10.29%	11%
Students asked to be outside	10.71%	21%	4.41%	10%
Need for field experience	8.16%	23%	7.84%	30%
Administration discouraged going outside	1.53%	8%	0.00%	0%

Figure 11

Motivation for Change in Outdoor Learning Spaces (2022 & 2024)



Use of Outdoor Spaces for Activities

The ways in which outdoor spaces were utilized also varied between formal and non-formal educators. By **2024**, **79%** of non-formal educators reported using outdoor spaces for fieldwork activities such as scientific experiments and nature observations. This was a significant increase compared to **59%** of formal educators who used outdoor spaces for similar purposes. Other popular activities among non-formal educators included structured outdoor lessons (**74%**) and environmental stewardship projects (**68%**). For formal educators, outdoor spaces were more commonly used for traditional physical activities like physical education and sports (**68%** in 2024), with fewer focusing on structured lessons or environmental stewardship (see **Table 18**).

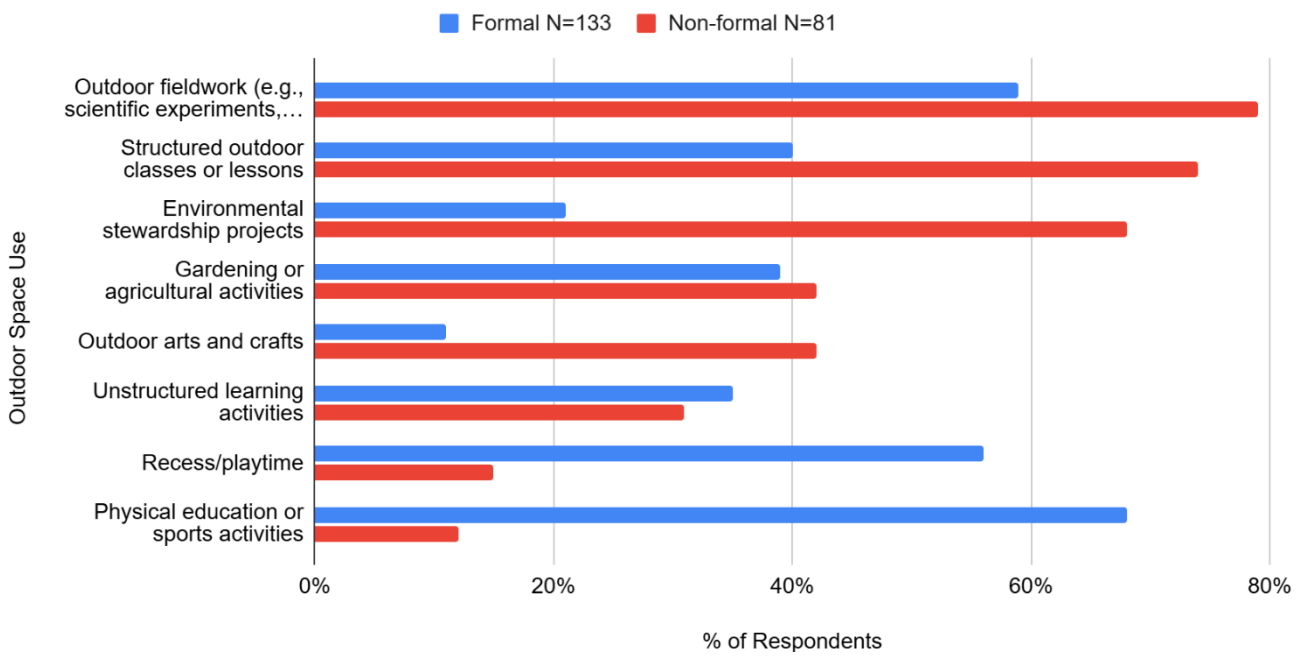
Table 18

Use of Outdoor Spaces 2024

Outdoor Space Use	Formal (N=133)	Non-formal (N=81)
Outdoor fieldwork (e.g., scientific experiments, nature observations)	59%	79%
Structured outdoor classes or lessons	40%	74%
Environmental stewardship projects	21%	68%
Gardening or agricultural activities	39%	42%
Outdoor arts and crafts	11%	42%
Unstructured learning activities	35%	31%
Recess/playtime	56%	15%
Physical education or sports activities	68%	12%

Figure 12

Use of Outdoor Spaces 2024



The increased use of outdoor spaces highlights a shift in educational practices following the pandemic. Both formal and non-formal educators recognized the value of outdoor learning, with a particular focus on health, safety, and hands-on experiences. Non-formal educators in particular have embraced outdoor spaces for structured learning activities, making them key drivers in the post-pandemic rethinking of educational environments.

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Appendix – 2024 PA Statewide Environmental Education Survey

Education Survey

Q1 2022 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 to allow them to follow up with questions or confirm the individual's existence within the organization or school being surveyed. By completing and submitting this survey, you consent to have your answers, not including personally 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. Question 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 or teacher leader) (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: COVID Impacts

Q14

COVID Impacts

After returning to face-to-face instruction, how did your use of the outdoor learning spaces change?

- ○ Greatly increased (1)
- ○ Slightly increased (2)
- ○ Remained the same (3)
- ○ Slightly decreased (4)
- ○ Greatly decreased (5)

Q63 If your use of outdoor learning spaces changed, what was your motivation for this change?

- ☐ No change (5)
- ☐ Health & safety (1)
- ☐ Desire to be outside (2)
- ☐ Need for field experience (4)
- ☐ Students asked to be outside (6)
- ☐ Administration encouraged outside instruction (7)
- ☐ Administration discouraged going outside (8)
- ☐ Social distancing (9)
- ☐ Mask breaks (10)
- ☐ Other (3) _____

Q65 How did your instruction related to Environmental Literacy and Sustainability change at your school/organization during COVID?

- ○ Greatly increased (1)
- ○ Slightly increased (2)
- ○ No change (3)
- ○ Slightly decreased (6)
- ○ Greatly decreased (7)
- ○ Other (4) _____

End of Block: COVID Impacts

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.

_____

_____

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.

_____

_____

_____

_____

_____

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)
- [ ] Stewardship and Civic Action: 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... = Stewardship and Civic Action: Students identify, explore, and implement solutions for action.

Q38G

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

○ About how many of your students participated in lessons focused on Stewardship and Civic Action? (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**

_____

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