# 2022 Status and Needs of Non-Formal and Formal (K12) Environmental Educators Across Pennsylvania

## Authors:

Michella P. Salvitti, M.S.[1], Nanette Marcum-Dietrich, Ph.D.[1], Steve Kerlin, Ph.D.[2], Timothy Smith, M.S. [2], Elizabeth Fulton[1]

[1]Millersville University of Pennsylvania, 51 Lyte Road, Millersville, Millersville, PA 17551
[2]Stroud Water Research Center, 970 Spencer Road, Avondale, PA 19311

## Contributors:

TamaraPeffer[3] and Mary van de Kerkhof, Ph.D.[4]

[3]PA Department of Education, 333 Market Street, Harrisburg, PA 17126
[4]Two Roads Consulting CORP, 6 E. Aldine Dr., Hockessin, DE 19707

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## Author's Note:

Nanette Marcum-Dietrich     https://orcid.org/0000-0001-7535-3984
Steve Kerlin     https://orcid.org/0000-0002-7334-175X

Correspondence concerning this report should be addressed to Nanette Marcum-Dietrich, Ph.D., Millersville University, 51 Lyte Road, Millersville, PA 17551, USA. Email: nanette.marcum-dietrich@millersville.edu

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## Executive Summary and Key Recommendations:

Pennsylvania is home to several water basins and diverse ecosystems, and the health of those ecosystems is the keystone to the environmental health of the northeast region. An environmental responsibility such as this stresses the importance of cultivating environmentally literate citizens. The young students in elementary schools, the curious minds that visit a state park, and the lifelong learners in our community are the environmental advocates and stewards for maintaining and improving the health of Pennsylvania's waterways and terrestrial ecosystems. The difference between a resident who is environmentally passive and one who is environmentally literate is often their educated understanding of their relationship with natural systems. Environmentally literate citizens are shaped by today's formal and non-formal educators. Educators' role in Environmental Education (EE) is critical as they share their local ecosystem knowledge with students. The 2019 United States census data reports that there were 50 million employed college graduates; 37% had a bachelor's degree in science or engineering, of which only 15% were employed in a STEM occupation. Of that 15% that were employed in a STEM field, only 16% had a career related to environmental science (U.S. Census Bureau, 2019). The changes start with EE education and curriculum development by providing more funding and professional development opportunities for the EE teacher and providers.

The National Oceanic and Atmospheric Administration (NOAA) actively supports K12 EE through Bay Watershed Education and Training (B-WET) grants. B-WET grants fund locally relevant, authentic experiential learning for K12 students and educators through Meaningful Watershed Educational Experiences (MWEEs) for students (Chesapeake Bay Foundation, 2004). 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. *Action Project,* where students participate in an age-appropriate project during which they take action to address environmental issues at the personal or societal level.  (This element's name was recently updated to *Stewardship and Civic Action.)*

The MWEE framework was developed in 2011 by the Chesapeake Bay Program to support MWEE integration in schools. Classroom activities that utilize the MWEE framework have the potential to enhance EE teaching and learning in Pennsylvania and improve the future stewardship of PA's watershed through increased education and awareness. The land, water, and atmosphere are separate systems that are all intricately related, and one system's health depends on the other's health. In the case of the Chesapeake Bay Watershed, Pennsylvania's water quality affects the Chesapeake Bay water quality, and the land use in Pennsylvania impacts the health of the Chesapeake Bay. The Bay could see positive changes if citizens across the Commonwealth were made more aware of their impact on water resources.

The key to creating a more robust, impactful EE in Pennsylvania is understanding how prepared our educators are to teach EE and implement MWEEs. In the 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 (PA SEES) (Millersville University of Pennsylvania, 2020). In 2022, the 2019 PA SEES was revised; minor changes were made to the original questions, and a section regarding the impacts of COVID-19 was added. The updated survey was distributed in March of 2022, supported by the NOAA B-WET PA Expanding Environmental Literacy and MWEE Implementation Capacity Across Pennsylvania grant #NA22NMF4570318. The 2022 PA SEES survey aims to build upon the data collected in the 2019 survey and evaluates the impacts of COVID-19 on EE. This most recent survey, 2022 PA SEES, sought to provide an update on the overall status of EE in the Commonwealth by surveying both non-formal and formal (K12) educators to learn more about their: knowledge of MWEE framework, staff development, and training needs, participation trends, program alignment to standards, the operating budgets for non-formal EE organizations, the present capacity of formal (K12) educators to incorporate EE, non-formal and formal (K12) partnerships, COVID impacts on EE. Below are the significant findings from the 2022 SEES survey.

1) **MWEE Awareness** - Increasing awareness of the MWEE framework is a central goal of the NOAA B-WET PA Expanding Environmental Literacy and MWEE Implementation Capacity Across Pennsylvania grant. **A major finding from the 2022 survey is the significant positive increase in MWEE awareness among both formal and non-formal educators compared to 2019.** MWEE awareness increased by 29.45% (from 55.78% to 85.23%) for non-formal educators and 20.86% (from 24.51% to 45.37%) for formal educators.

2) **MWEE Implementation** - While the above data suggests that educators are aware of the MWEE framework and non-formal educators are comfortable implementing each of the four essential elements, this comfort did not translate into increased MWEE implementation. Approximately 70% of educators in 2019 and 2022 reported that they did not implement the MWEE's four essential elements in the previous year.

3) **Professional Development and Training in EE** - The need for additional training is great. Educators were able to select from a list of 42 training topics that they needed additional training; all 42 topics were chosen by more than 50% of respondents. Educators report state agencies as their primary training providers when asked who they rely on for professional development training.

4) **Non-formal EE Organizations need to align their programming to the new NGSS-aligned PA State Science Standards.** In 2022, Pennsylvania adopted new science standards that are aligned with the Next Generation Science Standards (NGSS). Only 19% (17/88) of non-formal organizations report that their programming is currently aligned with the new standards.

5) **COVID Impact** - The pandemic encouraged educators to rethink instructional spaces and the traditional learning environments used. Both non-formal and formal educators reported a notable increase in the use of outdoor learning spaces after returning to face-to-face instruction, but their motivation for this change varied, with health and safety (19.61%) being most important for non-formal educators and a desire to be outside (21.94%) being the most prevalent motivator for formal educators.

## Materials and Methods:

The 2022 PA Statewide Environmental Education Survey (2022 PA SEES) was an initiative of the NOAA-funded Pennsylvania Environmental Literacy and MWEE Programming Capacity Building grant. In 2019, 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 the University of Wisconsin Environmental Education surveys (Kerlin et al. 2015, Houghan et al. 2017, & Houghan et al. 2019), the NOAA's 2017 Environmental Literacy survey (Center for Schools and Communities, 2015), PA's 2015 Environmental Literacy survey (PA Department of Education, 2015), and a recent Environmental Education Inventory of Current Practices in Rhode Island survey report (Gracia, 2018). The 2022 survey included three questions related to the impact of COVID-19. The 2019 survey was distributed in the spring of 2019, and the 2022 survey was distributed in March of 2022. Both surveys were distributed via Qualtrics, a web-based survey software.

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 museums, PA state parks, nature centers), and formal (K12) educators (e.g., teachers at public, private, parochial, and charter schools). The design of the questions investigated the status of environmental education, MWEE awareness and implementation, COVID-19 impacts on education, and professional development needs for non-formal and formal (K12) educators across the Commonwealth. Non-formal educators also answered questions about the organization's economics (operating budget) and organizational skill areas. Responses were limited to one survey response per non-formal environmental education provider organization. When 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 teacher responses at the same school. Survey responses less than 25% completed were deleted and not included in the report.

The 2022 survey was active from March 1st, 2022, to March 31st, 2022. The survey was made available to members of the task force via online links, and members of the task force distributed it to EE organizations and educators across the Commonwealth. The 2022 PA SEES had moderate participation across the Commonwealth, with 251 unique participants completing the survey (see Table 1). This is a decline from the 2019 survey, which had 580 unique participants. Of these, 95 were non-formal educators (with 67% from small EE organizations with annual operating budgets below $100,000), 132 were formal (K12) educators (70.33% secondary, 26.38% elementary, 3.29% pre-K), and 24 were school administrators (for whom no data was collected).

Table 1. Survey Respondents in 2019 and 2022

|  | Non-Formal Educators | Formal Educators | Administrators | Total |
|---|---|---|---|---|
| 2019 | 232 | 270 | 108 | 610 |
| 2022 | 95 | 132 | 24 | 251 |

The geographic coverage of respondents were well dispersed throughout the state and, therefore, representative of the state. The largest group of respondents fell within the three largest River Basins: Delaware River Basin 37.20% (93/250), Susquehanna River Basin 36.80% (92/250), and Ohio River Basin 17.60% (44/250). Other watersheds represent a small portion of the state geography and had fewer respondents. The smallest River Basin by area is the Gunpowder Watershed which had no representation (see Table 2).

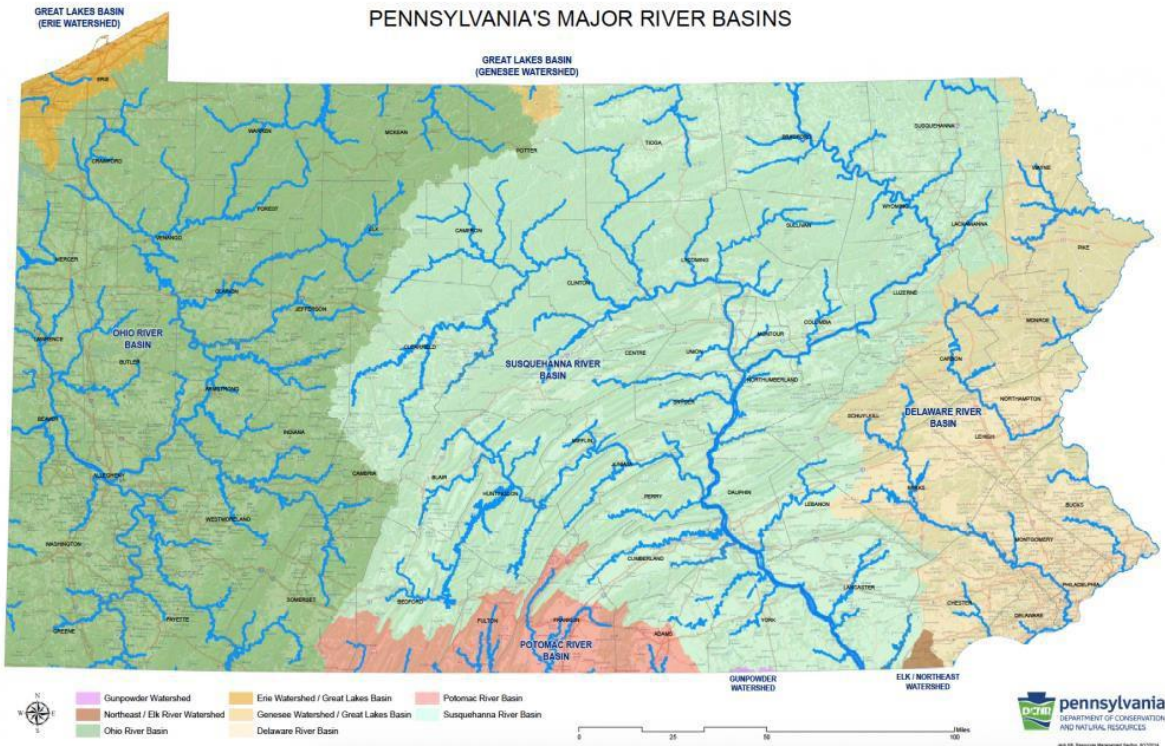Figure 1. Pennsylvania's Major River Basins

Table 2. Survey Participants From Each PA River Basin

| PA River Basin | Percentage | # of Respondents |
|---|---|---|
| Gunpowder Watershed | 0.0 | 0 |
| Elk/Northeast Watershed | 2.0 | 5 |
| Potomac River Basin | 2.4 | 6 |
| Great Lakes Basin | 4.0 | 10 |
| Ohio River Basin | 17.6 | 44 |
| Susquehanna River Basin | 36.8 | 92 |
| Delaware River Basin | 37.2 | 93 |
| Total | 100.0 | 250 |

*one respondent did not reply to this question.

Several questions included in the survey were administered to both non-formal and formal (K12) educators. For ease of comparison, the results are reported in the same section when a question was asked of both non-formal and formal (K12) educators. Due to differences in duties and capacity of non-formal educators (versus formal [K12] educators), specific questions were only asked of non-formal educators to determine particular needs related to their organization, and formal educators were administered other specific questions related to their classroom duties.

## Key Findings:

### Knowledge and Use of the MWEE Framework

When asked in 2019 and 2022 - *Is your organization familiar with the Meaningful Watershed Educational Experience (MWEE) framework/Instructional Model?* The 2022 data shows a **significant positive increase in MWEE awareness among both formal and non-formal educators**. Comparing 2022 data to 2019, MWEE awareness increased by 29.45% for non-formal educators and 20.86% for formal educators. In 2022, 85.23% of non-formal and 45.37% of formal educators reported knowledge of the MWEE. For non-formal educators, 63.64% indicated that someone from their organization participated in a B-WET-funded MWEE workshop. These results suggest that NOAA and the B-WET program are succeeding in teaching educators about MWEEs, with more significant progress evident with non-formal educators. Still, there remains a significant need for greater outreach to formal educators, who are nearly four times more likely to be unfamiliar with MWEEs (14.77% of non-formal educators are unfamiliar with MWEEs compared to 54.63% of formal (K12) educators.) Of the educators who were knowledgeable of MWEEs, 63.64% (56/88) of non-formal and 34.26% (35/102) of formal (K12) educators indicated that they participated in a NOAA-funded/B-WET program or event (see Table 3). NOAA and the B-WET program are succeeding in teaching educators about MWEEs, but training has focused more on non-formal environmental education providers.

Table 3. 2019 and 2022 MWEE Awareness for Non-formal and Formal Educators

|  | Non-formal Educators | | Formal Educators | |
|---|---|---|---|---|
|  | 2019 N=147 | 2022 N=88 | 2019 N=204 | 2022 N=102 |
| **No** | 44.22% | 14.77% | 75.49% | 54.63% |
| **Yes,** we learned about it on our own | 18.37% | 21.59% | 11.27% | 11.11% |
| **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 | 37.41% | 63.64% | 13.24% | 34.26% |
| **Yes** (Combined) | 55.78% | 85.23% | 24.51% | 45.37% |

The MWEE framework has four essential elements (issue definition, outdoor field experience, synthesis and conclusions, and action project.) To learn more about non-formal educators' knowledge of the MWEE's four essential elements, non-formal educators were asked to rate their comfort level in implementing each of the essential elements in programming with schools on a scale of 1-5 with 1 being not comfortable at all and 5 being very comfortable. Non-formal educators' comfort in implementing lessons focused on the four essential elements of the MWEE increased for each element. In 2019, non-formal educators' mean comfort level ranged from 3.3 to 3.84, and in 2022 their mean comfort level ranged from 3.49 to 4.16 (see Table 4). In both 2019 and 2022, non-formal educators' comfort was greatest for outdoor field experiences.

Table 4. Non-formal Educators' Comfort Level Implementing Lessons Focused on the 4 Essential Elements of the MWEE

|  | Non-formal Educators | |
|---|---|---|
|  | 2019 N=107 | 2022 N= 79 |
| Issue Definition | 3.42 | 3.69 |
| Outdoor Field Experience | 3.84 | 4.16 |
| Synthesis and Conclusions | 3.38 | 3.61 |
| Action Project | 3.3 | 3.49 |

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

While the above data suggests that educators are aware of the MWEE framework and non-formal educators are comfortable implementing each of the four essential elements, this comfort did not translate into MWEE implementation. Between 65- 70% of educators in 2019 and 2022 reported that they did not implement the MWEE's four essential elements in the previous year (see Figure 2).

Figure 2. Number of MWEE Programs/ Lessons Implemented Last Year that Included MWEE elements
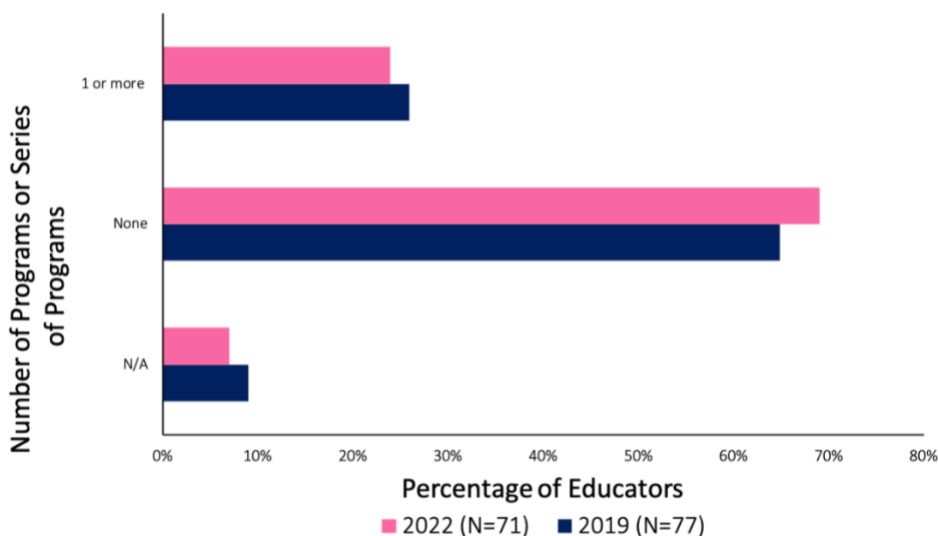


To identify which of the four essential elements are most prevalent in educational programming, educators were asked to identify which of the four essential elements they implemented in the past year. The data for 2022 was similar to the data reported in 2019. For both formal and non-formal educators, Outdoor Field Experience was the essential element they implemented most often followed by Issue Definition (see Table 5).

Table 5. Elements of the MWEE that Formal and Non-formal Educators Implemented Last Year

|  | Non-Formal Educators | | Formal Educators | |
|---|---|---|---|---|
|  | 2019 N=142 | 2022 N=137 | 2019 N=145 | 2022 N= 85 |
| Issue Definition | 23.24% | 24.82% | 26.90% | 29.41% |
| Outdoor Field Experience | 40.14% | 38.69% | 35.17% | 32.94% |
| Synthesis and Conclusions | 18.31% | 19.71% | 21.38% | 17.65% |
| Action Project | 18.30% | 16.79% | 16.55% | 20.00% |

## Staff Development and Training

To understand the staff development and training needs of educators in Pennsylvania, the survey asked educators to identify areas where they need additional training, their preferred mode of training, the organization(s) they look to for training, and areas where they feel able to lead training. **Overall, educators' staff development and training needs were relatively unchanged from 2019-2022**.

## Areas of Training Needs

To identify areas where additional training is needed, the survey presented educators with a list of 43 possible training topics. Educators were directed to select all the topics that they or their colleagues would benefit from additional training. On the survey, educators were able to select all topics that apply to them or their colleagues. The results show that **the need for training is great**, as all 42 topics were chosen by more than 50% of respondents (See Tables 6 &7). Air quality, using environmental sensors and GIS were mentioned as areas of greatest need by both non-formal and formal educators. The data shows that the training needs of non-formal educators remained relatively unchanged from 2019 to 2022, with eight of the top ten topics staying the same. There was more variability in results for formal educators, with five of the top ten identified topics changing from 2019 to 2022.

Table 6. Areas of EE Training Needed for Non-Formal Educators

| Rank | Non-Formal Educators 2019 | | Non-Formal Educators 2022 | |
|---|---|---|---|---|
| | Subject | Percent | Subject | Percent |
| 1 | Air Quality | 96.15 | Air Quality | 94.23 |
| 2 | Understanding School Initiatives and Speaking School Languages | 91.25 | Using Environmental Sensors in Programming | 91.49 |
| 3 | Academic Standards Alignment | 86.67 | Learning and Development Theory | 91.3 |
| 4 | Using Environmental Sensors in Programming | 86.25 | Understanding School Initiatives and Speaking School Language | 90.00 |
| 5 | Astronomy | 84.42 | Geographic Information Systems (GIS) for Education Programming | 89.09 |
| 6 | Energy Efficiency | 83.53 | Astronomy Instructional Technology in Outdoor Education | 87.04 |
| 7 | Instructional Technology in Outdoor Education | 80.00 | Sustainable Design and Green Technologies or Buildings | 86.96 |
| 8 | Geographic Information Systems (GIS) for Education Programming | 79.76 | Essential Questions, Performance Tasks, Learning Objectives - Designing and Using in Programming | 86.54 |
| 9 | Geology and Fossils | 79.75 | Academic Standards Alignment | 86.21 |
| 10 | Essential Questions, Performance Tasks, Learning Objectives – Designing and Using in Programming | 79.01 | Community-based learning | 85.45 |

Table 7. Areas of EE Training Needed for Formal (K12) Educators

| | Formal Educators 2019 | | Formal Educators 2022 | |
|---|---|---|---|---|
| Rank | Subject | Percent | Subject | Percent |
| 1 | Air Quality | 94.94 | Geographic Information Systems (GIS) for Education Programming | 93.98 |
| 2 | Geocaching and Orienteering | 92.67 | Air Quality | 92.55 |
| 3 | Using Environmental Sensors in Programming | 92.31 | Curriculum Training in National and State Curricula | 91.01 |
| 4 | Geographic Information Systems (GIS) for Education Programming | 90.00 | Team Building or Ropes Course | 90.67 |
| 5 | Sustainable Design and Green Technologies or Buildings | 88.82 | Using Environmental Sensors in Programming | 90.00 |
| 6 | Team building or Ropes Course | 87.88 | Astronomy | 89.02 |
| 7 | Astronomy | 87.25 | Other Compositing and Vermicomposting | 88.89 |
| 8 | Instructional Technology in Outdoor Education | 86.23 | National History | 88.31 |
| 9 | Geology and Fossils | 85.71 | Stormwater Management | 88.24 |
| 10 | Other | 85.71 | Community-based learning | 87.78 |

## Mode of Training

When asked about their preferred format for professional development, **educators continue to prefer in-person training led by people outside their organization above other formats.** A notable change from 2019 to 2022 in Professional Development format preference was a 5% increase for formal educators and a 6% increase for non-formal educators in their preference for webinars which may be attributed to the popularity of virtual resources during the pandemic (see Figure 3).

Figure 3. Professional Development Format Preference
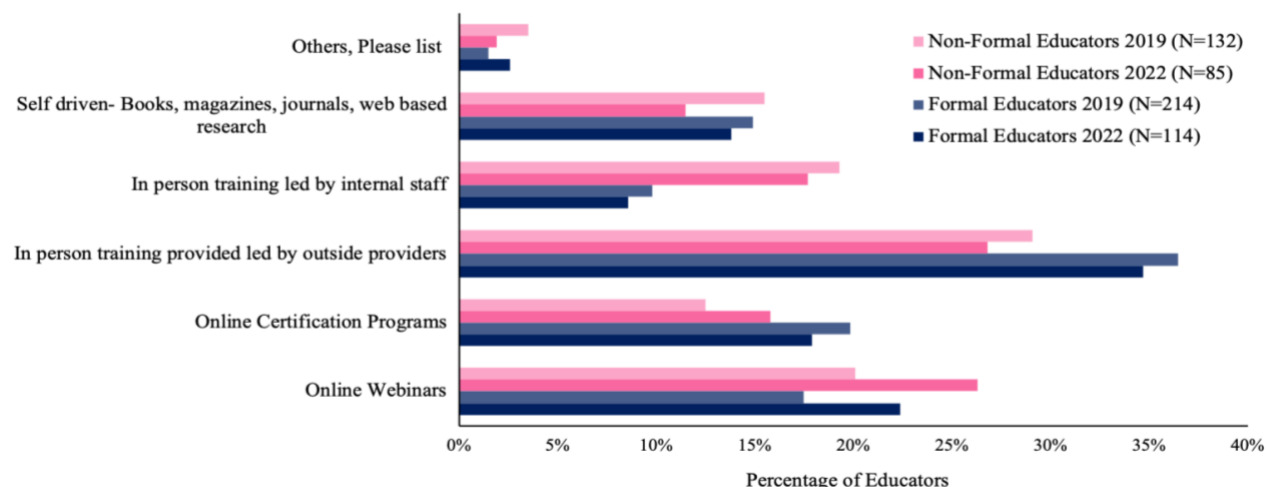


In order to understand which outside providers are used by educators in Pennsylvania, the survey asked respondents to identify all organizations they utilize for professional development from a list of six choices. State agencies was the outside provider most often mentioned by educators as a professional development provider they used in both 2019 and 2022. In 2019, 82.30% (107/130) of non-formal and 70.67% (147/208) of formal educators utilized state government agencies for professional development. This reliance on state government agencies increased in 2022 to 96.20% (76/79) for non-formal educators and 81.42% (92/113) for formal educators.

Table 8. Outside Professional Development Providers Used by Educators

| Organization Utilized | Non-formal | | Formal | |
|---|---|---|---|---|
| | 2019 N=130 | 2022 N= 79 | 2019 N= 208 | 2022 N= 113 |
| 1 - State Government Agencies (PDE, DCNR, DEP, Department of AG, PSU Extension, etc.) | 82.30% | 96.20% | 70.67% | 81.42% |
| 2 - Federal Government Agencies (NOAA, NASA, USGS, etc.) | 46.15% | 65.82% | 41.83% | 45.13% |
| 3 - Higher Education organizations (Community Colleges and Technical Schools, Colleges, Universities) | 52.31% | 53.16% | 55.29% | 57.52% |
| 4 - Local non-formal/Informal EE organizations | 66.92% | 59.49% | 49.04% | 53.98% |
| 5 - National or Regional Non-Governmental organizations (e.g., Chesapeake Bay Foundation) | 61.54% | 59.49% | 41.83% | 46.02% |
| 6 - For-profit companies (Publishers, Google, etc.) | 11.54% | 16.46% | 19.71% | 11.50% |
| 7 - Other, please list | 5.38% | 5.06% | 9.62% | 7.08% |

When asked what to select all areas where educators felt confident in leading professional development and training for others, in both 2019 and 2022, formal educators felt most confident leading training related to instructional methods and classroom management, while non-formal educators felt most prepared to offer training on water-related subjects (see Tables 9 & 10). Specifically, non-formal educators felt confident leading professional development and training in general watershed education and water quality assessments (see Table 9). Formal educators felt confident leading professional development and training in classroom management, instructional methods, and inquiry-based teaching (see Table 10). Notable, curriculum training in national and state curriculum dropped out of the top 10 subject areas that non-formal educators felt comfortable leading. This is a subject area that has been identified by formal educators as topic that they would like access to training sessions (see Table 6).

Table 9. Areas Where Non-formal (K12) Educators Could Lead EE Trainings

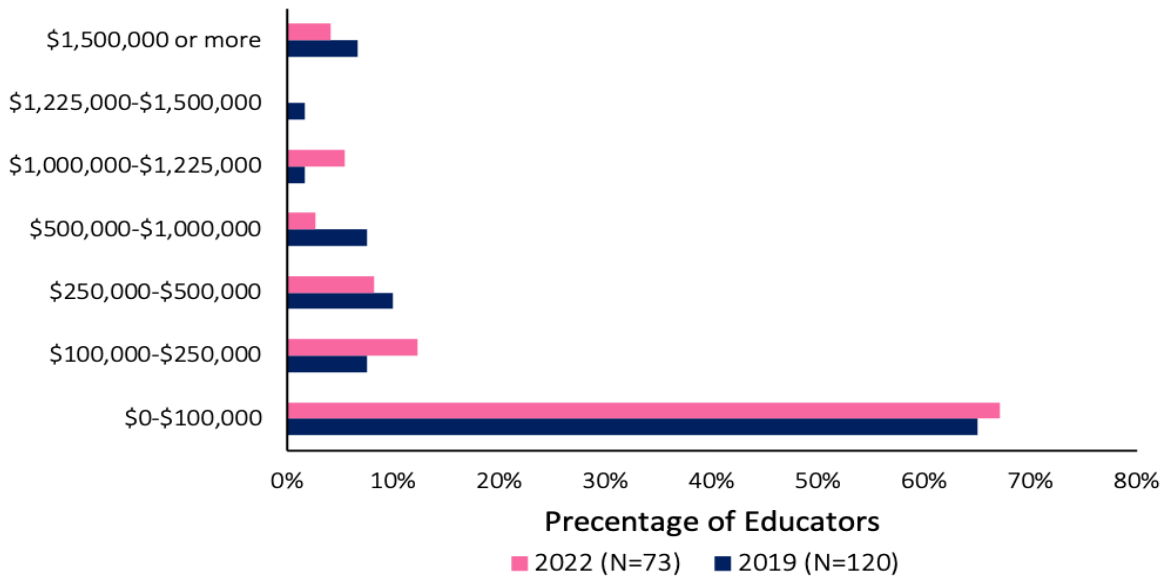| Rank | Non-Formal Educators 2019 | | Non-Formal Educators 2022 | |
|---|---|---|---|---|
| | Subject | Percent | Subject | Percent |
| 1 | Watershed Education – General | 70.21 | Watershed Education - General | 67.74 |
| 2 | Water Quality Assessments | 55.56 | Water Quality Assessments | 64.58 |
| 3 | Land Animals | 54.32 | Water Sports, Kayaking, and Canoeing | 53.7 |
| 4 | Aquatic Ecology | 53.85 | Natural History | 51.72 |
| 5 | Curriculum Training in National and State Curricula (Project WILD, Project WET, Project Learning Tree, etc.) | 52.69 | Birds | 51.67 |
| 6 | Leave No Trace Principles | 52.56 | Aquatic Ecology | 51.52 |
| 7 | Water Sports, Kayaking, and Canoeing | 50.00 | Land Animals | 50.00 |
| 8 | Natural History | 48.75 | Land Use and Conservation Leave No Trace Principles | 47.37 |
| 9 | Interpretive Skills | 48.10 | Curriculum Training in National and State Curricula | 44.40 |
| 10 | Litter and Recycling | 47.83 | Interpretive Skills | 43.20 |

Table 10. Areas Where Formal (K12) Educators Could Lead EE Trainings

| Rank | Formal Educators 2019 | | Formal Educators 2022 | |
|---|---|---|---|---|
| | Subject | Percent | Subject | Percent |
| 1 | Instructional Methods- General | 48.76 | Classroom/Group Management | 41.98 |
| 2 | Classroom/Group Management | 47.59 | Instructional Methods - General | 35.62 |
| 3 | Inquiry-based Teaching and Learning | 42.11 | Inquiry-based Teaching and Learning | 31.46 |
| 4 | Program and Curricula Development | 39.23 | Watershed Education - General | 30.77 |
| 5 | Essential Questions, Performance Tasks, Learning Objectives – Designing and Using in Programming | 33.8 | Litter and Recycling | 25.88 |
| 6 | Watershed Education – General | 33.13 | Program and Curricula Development | 25.33 |
| 7 | Litter and Recycling | 30.63 | Gardening, Agriculture, and Soils | 23.91 |
| 8 | Water Quality Assessments | 28.83 | Water Sports, Kayaking, and Coaching | 22.78 |
| 9 | Current Environmental Issues | 28.73 | Plants | 20.69 |
| 10 | Gardening, Agriculture, and Soils | 27.68 | Leave No Trace Principles | 20.51 |

## Non-formal Education Specific Information

### Operating Budget

To identify the size of the non-formal organizations taking the survey, we asked the non-formal educators to indicate their yearly operating budget range for their EE organization. The majority of non-formal organizations who participated in both the 2019 and 2022 surveys represent small EE organizations with annual operating budgets of less than $100,001 (see Figure 4).

Figure 4. Operating budget for 2019 and 2022



Participation Trends

When non-formal educators were asked in 2022 to describe the participation trends in their programs for the last five years, on a Likert scale ranging from greatly decreased to greatly increased, there was a notable shift in the data with a rise in educators reporting that program participation has slightly decreased and a decline in educators reporting that participation has slightly increased over the previous five years. When non-formal educators were asked what factors they believe account for this change in participation, the impacts of COVID 19 were mentioned most often.

Figure 5. Program Participation Trends for the Last 5 Years
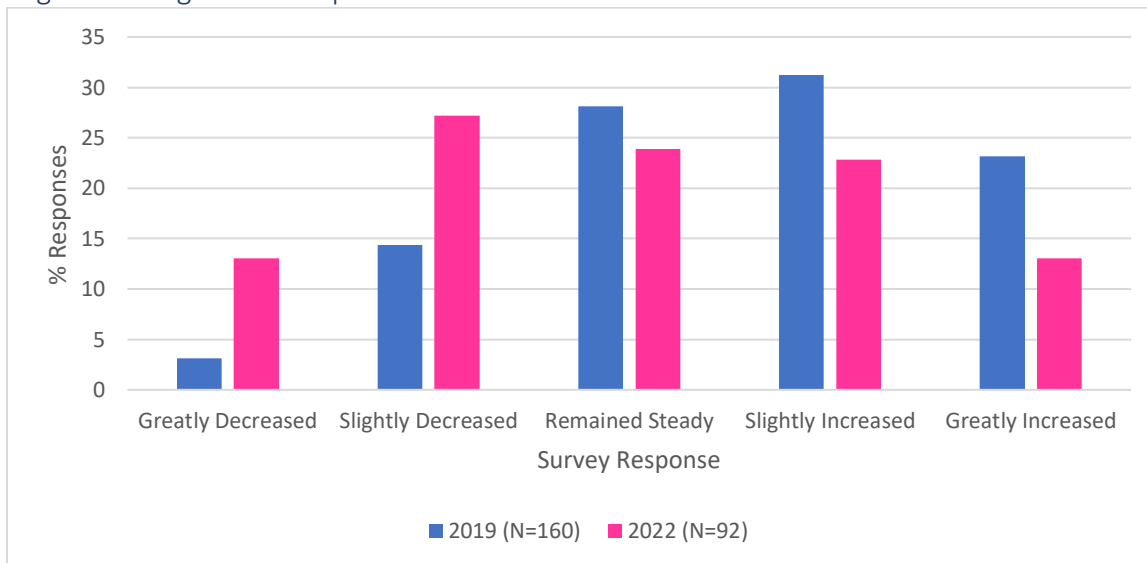
## Alignment to Standards

Non-formal organizations report a commitment to aligning their programming with state academic standards. 76% (67/88) of non-formal organizations report that their programs are aligned with the PA Academic Standards in Environment and Ecology as they were adopted in 2009. In 2022, Pennsylvania adopted new science standards that are aligned with the Next Generation Science Standards (NGSS). When asked if their programming is aligned with NGSS, only 19% (17/88) of non-formal organizations report that their programming was aligned with these new standards.

## Support for Systemic MWEE Integration in K12 Schools

NOAA B-WET's program encourages the systemic implementation of MWEEs in K12 schools. Systemic is defined as a full grade level or all students in a district). In alignment with NOAA's goal, 66% (60/91) non-formal organizations report that schools participate in their programs as part of a systemic EE program, but less than half 48% (43/90) non-formal organizations report that they assist the school in MWEE curriculum development.

## COVID Impacts

Both formal and non-formal educators had to adapt their teaching methods due to COVID. The following questions were used to gauge the use of outdoor learning spaces and if COVID impacted Environmental Literacy and Sustainability instruction. There was a notable increase in the use of outdoor learning spaces when instruction returned to face-to-face. Formal educators were primarily motivated by health and safety, while the change for non-formal educators was the desire to be outside. Regarding Environmental Literacy and Sustainability instruction, there was no impact during COVID.

The pandemic encouraged educators to rethink instructional spaces and the traditional learning environments used. Both formal and non-formal educators reported a notable increase in the use of outdoor learning spaces after returning to face-to-face instruction. Non-formal educators saw the greatest shift toward the use of outdoor learning spaces, with 61.36% (54/88) reporting that their use of outdoor learning spaces greatly or slightly increased. In comparison, 44.14% (54/111) of formal educators also reported that their use of outdoor learning spaces greatly or slightly increased.

Figure 6. Educators' use of Outdoor Learning Spaces After Returning to Face-to-Face Instruction



% of Respondents
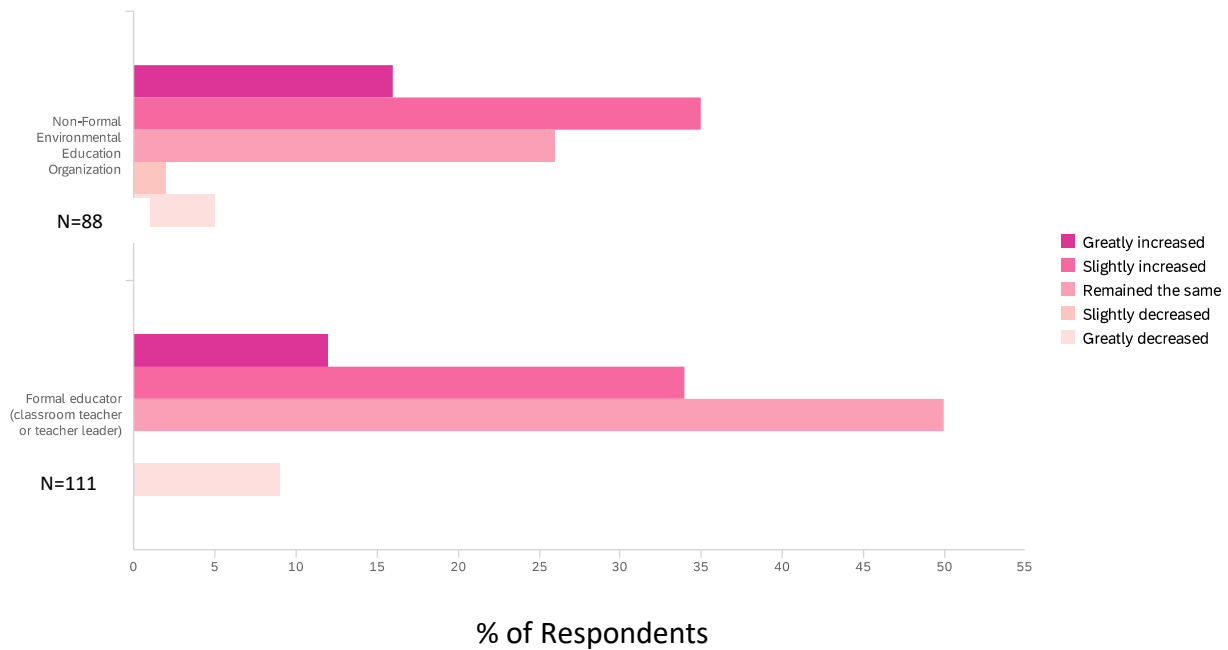
If they reported that their use of the outdoor spaces changed following the return to face-to-face instruction, educators were asked to identify their motivation for this change. The results showed great variability in motivations, with health and safety at 19.61% (40/204) and a desire to be outdoors at 17.16% (35/204) being the most important for non-formal educators and a desire to be outside being the most prevalent motivator for formal educators at 21.94% (43/196) (see Table 11).

Table 11. Motivation for Change in Outdoor Learning Spaces

|  | Non-Formal Educator N=204 | Formal Educator N=196 |
|---|---|---|
| Desire to be outside | 17.16% | 21.94% |
| Health & Safety | 19.61% | 8.67% |
| Mask breaks | 8.33% | 13.27% |
| No change | 10.78% | 10.71% |
| Social distancing | 14.71% | 9.18% |
| Administration encourages outside instruction | 10.29% | 6.63% |
| Students asked to be outside | 4.41% | 10.71% |
| Need for field experience | 7.84% | 8.16% |
| Other | 6.86% | 2.55% |
| Administration discouraged going outside | 0.00% | 1.53% |

Non-formal and Formal educators were asked if their instruction in Environmental Literacy and Sustainability changed at their school/organization during COVID. Approximately half (53.85%)

of non-formal educators reported that there was no change in their instruction in Environmental Literacy and Sustainability. Formal educators showed a similar trend, with 60.71% indicating that there was also no change in Environmental Literacy and Sustainability instruction during COVID (see Figure 7).

Figure 7. Change in Instruction Related Environmental Literacy and Sustainability During COVID
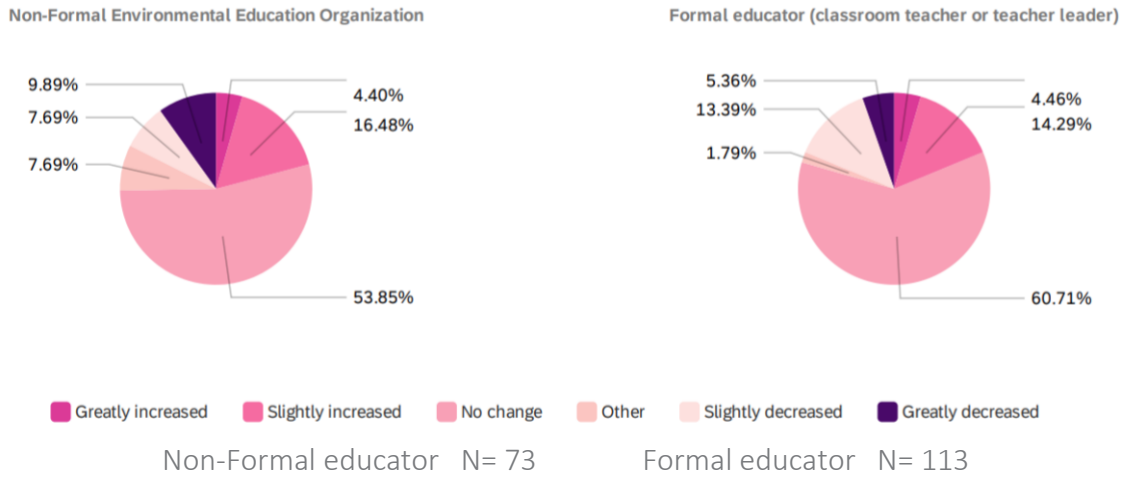
## References

Bureau, U. S. C. (2022, September 8). *American Community Survey (ACS)*. Census.gov. Retrieved October 4, 2022, from http://www.census.gov/programs-surveys/acs/

Center for Schools and Communities. (2015). *Pennsylvania ELIT Survey: Summary of results.* Retrieved from www.pdesas.org/davbauman/2015/12/4/639252/file.aspx

Chesapeake Bay Program. (n.d.). Retrieved October 4, 2022, from https://www.chesapeakebay.net/what/publications/meaningful-watershed-educational-experience1%E2%80%AF%E2%80%AF%E2%80%AF%E2%80%AF%E2%80%AF%E2%80%AF%E2%80%AF%E2%80%AF%E2%80%AF

Gracia, S. (2018). *Environmental Education: Inventory of Current Practices* [Rhode Island]. Retrieved from http://rieea.org/the-ee-inventory-of-current-practices- survey/

Hougham, J., Kerlin, S., Liddicoat, K., Ellis, K., & Crampe, E. (2017). Status and Needs of Environmental Education Related Organizations in Wisconsin: Results from the 2015 statewide survey. UW-Cooperative Extension, Wisconsin Center for Environmental Education, Wisconsin Association for Environmental Education, and the Wisconsin Environmental Education Consortium. Madison, WI. Available online at http://fyi.uwex.edu/environmentaleducation/files/2017/06/Status-and- Needs-of-Environmental-Education-Related-Organizations-in-Wisconsin-2.0.pdf

Hougham, J., Morgan, T., Olsen, S., & Herde, I. (2019). *Status And Needs Of Environmental Education Organizations In Wisconsin* (pp. 1–35). Madison, WI: University of Wisconsin – Madison, Division of Extension. Retrieved from http://www.waee.org/state-wide-ee-survey

Kerlin, S., Kacoroski, J., & Liddicoat, K. (2015). Status and Needs of Environmental Education Related Organizations in Wisconsin: Results of the 2014 statewide survey. *UW-Cooperative Extension, Wisconsin Center for Environmental Education, Wisconsin Association for Environmental Education, and the Wisconsin Environmental Education Consortium.* Available online at http://www.uwsp.edu/cnr-ap/wcee/Pages/publications.aspx and http://www.waee.dreamhosters.com/state-wide-ee-survey.

*Meaningful watershed educational experience*. Chesapeake Bay Program. (n.d.). Retrieved October 4, 2022, from https://www.chesapeakebay.net/what/publications/meaningful_watershed_educational_experience1%E2%80%AF%E2%80%AF%E2%80%AF%E2%80%AF%E2%80%AF%E2%80%AF%E2%80%AF%E2%80%AF%E2%80%AF%E2%80%AF

Millersville University of Pennsylvania. (2020). 2019 Status and Needs of Non-Formal and Formal (K-12) Environmental Educators Across Pennsylvania. Millersville, PA: Smith, T., Kerlin, S., & Marcum-Dietrich, N. Retrieved Oct 1, 2022, from https://repository.library.noaa.gov/view/noaa/24252

Millersville University of Pennsylvania. (2022). *2022 Status and Needs of Non-Formal and Formal (K-12) Environmental Educators Across Pennsylvania.* Millersville, PA: Salvitti, M., Marcum-Dietrich, N., Kerlin, S., & Smith, T.

PA Department of Education. (2015). *Pennsylvania Environmental Literacy Plan*. Sprague, S., Green, A., Drennan, T., Schabow, K., O'Neall, E., & Pizzala, A. (2019). An Educator's Guide to the Meaningful Watershed Educational Experience (MWEE), 1–35. Retrieved from https://www.cbf.org/document-library/education/teachers-guide-to-meaningful-watershed-education-experience.pdf

U.S. Census Bureau, 2019 American Community Survey, 1-year estimates www.census.gov/programs-surveys/acs/

## Appendix – 2022 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) _____

---

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)

---

Q15A

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

---

Q15B

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

---

Q15C

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

---

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) _____

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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) | ○ | ○ |

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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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_____

_____

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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)

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

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*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)
_____

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*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) _____

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*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) _____

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*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) _____

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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)

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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*