

Chesapeake Bay Program | Indicator Analysis and Methods Document
Environmental Literacy Planning | Updated June 2020

Indicator Title: Percentage of Local Education Agencies (LEAs) that are “Well Prepared” or “Somewhat Prepared” to implement environmental education program(s).

Relevant Outcome(s): Environmental Literacy Planning

Relevant Goal(s): Environmental Literacy

Location within Framework (i.e., Influencing Factor, Output or Performance):
Performance

A. Data Set and Source

(1) Describe the data set. What parameters are measured? What parameters are obtained by calculation? For what purpose(s) are the data used?

The Environmental Literacy Indicator Tool (ELIT) is a survey of public school districts that measured:

1. Degree of preparedness to provide Environmental Education
2. Extent to which MWEs are provided to students in elementary, middle, and high schools

The survey has Paperwork Reduction Act clearance through NOAA as the lead agency for this work (OMB Control Number: 0648-0753). The 2015 data represents the baseline data collected. 2017 and 2019 are the second and third years of data collection.

Analysis: Information from this tool was used to determine local education agency (LEA; also referred to as school district) capacity to provide systemic environmental education. The Chesapeake Bay Program (CBP) first screened data to include only LEAs that have 25% or more of their geographic area within the Chesapeake Bay Watershed; this used a GIS analysis based on school district polygons from NCEC/American Community Survey School District Data 2013, available at <https://deptofed.maps.arcgis.com/home/item.html?id=93dd62a783d2495e9e0b241a968a8f2f>. Responding LEAs answered a series of six items about elements of preparedness to provide environmental education across the district, which were scored to arrive at a total preparedness score for the district. Raw preparedness scores were coded into one of three preparedness categories (well prepared (9-12), somewhat prepared (4-8), and not prepared (0-3)); the number of LEAs in each category was calculated as a percentage of the total school districts within the watershed, including those that did not respond to the survey.

Survey Response Rate: The response rate to the 2019 survey of LEAs was 41% of school districts within the watershed portion of DE, DC, MD, PA, VA, and WV. In addition, the analysis carried forward a small number of LEA responses to the 2017 survey, for those districts that did not respond to the 2019 survey request; these districts represented an additional 14% of LEAs within the watershed portion of the states. These combined responses form this indicator (representing 55% of all LEAs within the watershed). Individual jurisdiction response rates can be viewed in the data file at <http://www.chesapeakeprogress.com/engaged-communities/environmental-literacy-planning>. All jurisdictions in the watershed participated in the 2019 survey except New York and Delaware.

For the purposes of the CBP data analysis only data from LEAs within the watershed were used and are included in the data file. The ELIT survey, however, does include all LEAs throughout all areas of the states, regardless of their inclusion in the Chesapeake Bay Watershed. For comparison purposes, the response rate to the 2019 survey of all LEAs was 28% regionwide, including both those within and outside of the watershed; data from an additional 12% of LEAs was carried-forward from 2017 responses that were not updated in 2019. The Chesapeake Bay Program contact can be contacted for additional information on the full survey.

- (2) List the source(s) of the data set, the custodian of the source data, and the relevant contact at the Chesapeake Bay Program.
- Source: Environmental Literacy Indicator Tool (ELIT) - survey of LEAs in all Chesapeake Bay Watershed jurisdictions except New York
 - Custodian: Katheryn Barnhart, barnhart.katheryn@epa.gov, 410-267-9856
 - Chesapeake Bay Program Contact (name, email address, phone number): Shannon Sprague, shannon.sprague@NOAA.GOV, (410) 267-5664
- (3) Please provide a link to the location of the data set. Are metadata, data-dictionaries and embedded definitions included? N/A

B. Temporal Considerations

- (4) Data collection date(s): May-November 2019
- (5) Planned update frequency (e.g., annual, biannual, etc.):
- Source Data: Biennial
 - Indicator: Biennial
- (6) Date (month and year) next data set is expected to be available for reporting: January 2022

C. Spatial Considerations

- (7) What is the ideal level of spatial aggregation (e.g., watershed-wide, river basin, state, county, hydrologic unit code)? *School district*
- (8) Is there geographic (GIS) data associated with this data set? If so, indicate its format (e.g., point, line polygon). *None at this time.*
- (9) Are there geographic areas that are missing data? If so, list the areas.
There is no data from New York and relatively small amounts of data from Pennsylvania and West Virginia (data from 35%, and 50%, respectively, of LEAs within the Chesapeake Bay watershed in each state). Because of this lack of data (NY), or lack of sufficient data (WV and PA), it is difficult to make statewide generalizations about these jurisdictions.
- (10) Please submit any appropriate examples of how this information has been mapped or otherwise portrayed geographically in the past. *N/A*

D. Communicating the Data

- (11) What is the goal, target, threshold or expected outcome for this indicator? How was it established?
The Environmental Planning Literacy outcome in the 2014 Chesapeake Bay Watershed Agreement does not specify a target.
- (12) What is the current status in relation to the goal, target, threshold or expected outcome?
The 2019 ELIT showed that the majority of responding LEAs in the watershed are somewhat prepared to implement high quality environmental education, but preparedness varies between the states. Nearly all of the Well-Prepared districts were in Maryland, with a few others coming from Virginia and Pennsylvania. West Virginia had the highest rate of responding districts that were unprepared. Low response rates in Pennsylvania, and, to a lesser extent, West Virginia limit generalizability of state patterns.
- Moreover, the data from across three years of surveying LEAs indicate a steady increase, of about 3-4% each period, of the proportion of well-prepared districts aggregated across responding districts in the watershed. Further, when looking only at data from districts for which there is both 2017 and 2019 reports, 23% of LEAs moved to a higher category of preparedness.*
- (13) Has a new goal, target, threshold or expected outcome been established since the last reporting period? Why? *No.*

(14) Has the methodology of data collection or analysis changed since the last reporting period? How? Why?

There have been no changes since 2017 beyond the inclusion of 2017 data for those school districts that responded in 2017 but not in 2019.

(15) What is the long-term data trend (since the start of data collection)?

There appears to be slight, steady increase in the proportion of responding districts who score as well prepared to implement environmental education.

(16) What change(s) does the most recent data show compared to the last reporting period? To what do you attribute the change? Is this actual cause or educated speculation?

Substantial changes (greater than five percentage points) are highlighted in **bold**.

- Watershed-wide: There was indication of continued positive shifts in LEAs' levels of preparedness for EE between 2017 and 2019, primarily an increase in the proportion of LEAs that scored as well prepared.
- Delaware: no new data in 2019.
- DC: No change.
- MD: **Increase in proportion of well-prepared LEAs by 22 percentage points.**
- PA: Not enough data to generalize statewide. **12% of LEAs reporting in 2019 were well-prepared, compared with no well-prepared LEAs in 2017. There was also a decrease in the proportion of unprepared LEAs (by 16 percentage points).** However, analysis of paired 2017 and 2019 data did not show a change in the number of well-prepared districts, which suggests the differences may be mainly due to new districts responding to the 2019 survey.
- VA: **Increase in proportion of well-prepared LEAs (from 21% to 26%), with a similar decrease in the proportion of somewhat prepared LEAs (from 64% to 58%).**
- WV: No data for 2017 for comparison.

(17) What is the key story told by this indicator?

This indicator shows the extent to which public school districts within the watershed are prepared to put a comprehensive and systemic approach to environmental literacy in place as called for in the Environmental Literacy Planning Outcome of the Environmental Literacy Goal of the 2014 Chesapeake Bay Watershed Agreement.

State departments of education and local education agencies play an important role in establishing expectations and guidelines, and providing support for the development and implementation of environmental education programs within their schools. In the development of plans and the delivery of programs, local education agencies can also benefit from partnerships with environmental education organizations, natural resource

agencies, universities, businesses, and other organizations that have a wealth of applicable products and services as well as a cadre of scientific and professional experts that can complement the classroom teacher's strengths and heighten the impact of environmental instruction both in the classroom and in the field.

E. Adaptive Management

(18) What factors influence progress toward the goal, target, threshold or expected outcome?

- **State-level Advocacy for Environmental Literacy:** There is a need for high level support for environmental literacy that flows from administrations or legislatures and is communicated to school systems so there can be a shared vision among stakeholders and state leadership. Organized support from stakeholders for such positions is also important in advancing any state policy initiatives.
- **Local Education Agency Support for Environmental Literacy:** Education in most of the states in the Chesapeake Bay watershed are controlled by local education agencies (600+ in the region), each with their own leadership and management structure. Except for state laws and regulations, education priorities are largely determined at the local level and may not mirror state priorities. Meaningful Watershed Educational Experiences (MWEEs) and sustainable school practices are often left out of established accountability mechanisms between state and local education agencies.
- **Education Reform:** This is a time of tremendous change in education for many of the watershed jurisdictions. While national education reform efforts including STEM, Common Core, and Next Generation Science Standards lend themselves to using the environment as an integrating context for learning, the extensive efforts to support and implement the necessary shifts in teaching and learning required by these reforms pose on-going challenges to systemic approaches to environmental education.
- **Funding to Support Environmental Literacy Projects:** A major limiting factor is funding, including support for sustainable school initiatives, student projects, teacher professional development, and transportation.
- **Decision Making Authority:** Many facets of school sustainability (environmental performance, health and wellness, etc.) rest with disparate departments and individuals within a school division or individual school. These different groups are often not coordinated within a jurisdiction.

(19) What are the current gaps in existing management efforts?

- Better engagement of State DOE leaders and dedicated staff support at State DOEs

- School district environmental literacy plans and their active participation in ELIT survey
- Curriculum alignment/integration embedding MWEs and environmental literacy content
- Additional funding to support projects
- Established state environmental literacy plans and state level coordination among partners
- Teacher and administrator professional development

(20) What are the current overlaps in existing management efforts? None.

(21) According to the management strategy written for the outcome associated with this indicator, how will we (a) assess our performance in making progress toward the goal, target, threshold or expected outcome, and (b) ensure the adaptive management of our work?

The Chesapeake Bay Program will maintain the Environmental Literacy Indicator Tool and collate and report data. The survey will be administered every two years through the state departments of education. In FY 2014 and 2017, funding from National Oceanic and Atmospheric Administration (NOAA)'s Bay Program augmented by NOAA B-WET funding was available to provide technical assistance to states to develop strategies to collect voluntary data from local education agencies to feed into the new Bay Program environmental literacy metrics and to support the work of a professional evaluator to review the data and establish meaningful baselines. In FY 2019, EPA included this work in a new contract awarded to assist with performance metrics for stewardship activities.

The Leadership Team of the Education Workgroup, which includes federal representatives from the NOAA and U.S. Environmental Protection Agency (EPA), along with at least two representatives per state (generally from the state departments of education and lead natural resource agencies), convenes bi-monthly to discuss priorities and progress towards meeting the Environmental Literacy Goals and Outcomes. The full Education Workgroup, which includes broader representation from federal agencies, state agencies, nonprofits, local education agencies, and others, meets twice a year. In addition, the group holds an Environmental Literacy Leadership Summit every two years around specific issues or priorities. Moving forward, these Summits will serve as good opportunities to re-assess where the group is in achieving the outcomes of the agreement and adjusting strategies as appropriate.

F. Analysis and Interpretation

Please provide appropriate references and location(s) of documentation if hard to find.

(22) What method is used to transform raw data into the information presented in this indicator? Please cite methods and/or modeling programs.

The ELIT includes a set of questions intended to help assess the current capacity of school districts/LEAs to implement a comprehensive and systemic approach to environmental education. This included six questions to determine if the LEA had the following things in place specific to environmental education: an established program leader, regular communication among staff about EE, a support system for high quality professional development, a program that integrated EE into appropriate curricular areas, a plan to provide MWEEs for students, and/or community partnerships. For each question LEAs were awarded points depending on whether they reported they had the item fully in place (2 points), partially in place (1 point), or not in place (0 points). Break points were then set to determine if LEAs were well prepared (scores of 9-12), somewhat prepared (scores of 4-8), or not prepared (scores of 0-3) to deliver high quality environmental education.

(23) Is the method used to transform raw data into the information presented in this indicator accepted as scientifically sound? If not, what are its limitations?

The method for scoring and grouping responses into preparedness levels has been vetted with the Education Workgroup for face validity when established at the outset of ELIT surveying. After slight adjustments to the system between 2015 and 2017, the same system is used continuously, allowing stable comparisons from year to year.

Due to low response rates from some jurisdictions, we are limited to talking about the indicator levels only for those LEAs that responded to the survey; we are not able to generalize from the data to make regionwide conclusions. Based on workgroup feedback, the Education Workgroup, in consultation with the Status and Trends workgroup, decided to present the results in relation to all LEAs within the watershed (including the proportion of non-respondents) to show progress towards the outcome, rather than limiting the conversation only to respondents. This was done by calculating the percentage of LEAs in each category (well prepared, somewhat prepared, and not prepared) out of the school districts that fall within the watershed, including those school districts that did not respond to the survey. The proportion of nonreporting LEAs are also included in the chart and data file.

There was not a non-response survey done to be able to determine how to extrapolate the data to non-respondents. However, non-response analysis of 2019 respondents indicated that there were several factors related to who responded. LEAs were more likely to respond if they were in the Chesapeake Bay watershed than outside of it. When we look just at LEAs within the watershed, state was a major determinant of who responded to the survey. In Maryland and DC, responses were received from every district in the population (i.e., data are a census, not a sample); as a result, results are an accurate picture of the conditions within those jurisdictions. Virginia's dataset is also very thorough for the state, with 60% of districts reporting updated data in 2019 (and an additional 24% having usable 2017 data). For this jurisdiction, it is reasonably safe to consider data reported in 2019 to be a thorough representation of conditions and

generalizations are warranted. Data from West Virginia and Pennsylvania, however, include a relatively limited (50% or lower), self-selected sample of districts in the state; those data do not support generalizations of conditions across those states. See the answer to question 9 of this document for additional data gaps. Delaware's data relied entirely on data from the prior reporting period.

There was also a relationship between district enrollment and response rate; LEAs that responded to the 2019 ELIT tended to have significantly larger student enrollment. The average enrollment of responding LEAs was almost 4 times higher than the average enrollment of non-responding LEAs. This may indicate that district size and capacity is a factor in responding; however, district size is also related to state, as some states (e.g., Maryland) have large county-level school districts, while other states (e.g., Pennsylvania) have smaller municipality-level school districts.

(24) How well does the indicator represent the environmental condition being assessed?

The indicator represents LEAs that chose to respond to these specific ELIT questions. Therefore, this indicator does not represent all LEAs in the watershed or within the watershed jurisdictions. The indicator does not include charter and private schools.

(25) Are there established reference points, thresholds, ranges or values for this indicator that unambiguously reflect the desired state of the environment? **No.**

(26) How far can the data be extrapolated? Have appropriate statistical methods been used to generalize or portray data beyond the time or spatial locations where measurements were made (e.g., statistical survey inference, no generalization is possible)?

See the answer to question 23 of this document, as well as the response rates for individual jurisdictions, located in the data file housed at <http://www.chesapeakeprogress.com/engaged-communities/student>.

G. Quality

Please provide appropriate references and location(s) of documentation if hard to find.

(27) Were the data collected and processed according to a U.S. Environmental Protection Agency-approved Quality Assurance Project Plan? If so, please provide a link to the QAPP and indicate when the plan was last reviewed and approved. **If not, please complete questions 28-31. No**

(28) *If applicable:* Are the sampling, analytical and data processing procedures accepted as scientifically and technically valid? **Yes.**

(29) *If applicable:* What documentation describes the sampling and analytical procedures used?

A report of the 2019 survey procedures and results is available at:

https://www.chesapeakebay.net/who/group/education_workgroup.

(30) *If applicable:* To what extent are procedures for quality assurance and quality control of the data documented and accessible?

A report of the 2019 survey procedures and results is available at:

https://www.chesapeakebay.net/who/group/education_workgroup.

Support for completion of the ELIT survey is provided by state education representatives from the Education Workgroup for districts within their jurisdiction, and staff from the CBP is available to answer questions. In addition, districts are provided access to their previously completed ELIT surveys to aid new staff in answering the questions by considering how their district responding to the items (including open-ended explanations) in previous years. This was intended to reduce burden on districts and to provide some year-to-year reliability.

(31) Are descriptions of the study design clear, complete and sufficient to enable the study to be reproduced? Yes.

(32) Were the sampling, analytical and data processing procedures performed consistently throughout the data record?

No. There was a slight change made to the questions asked to calculate this indicator between 2015 and 2017, based on feedback after the pilot test of the survey tool. The aggregate data reported for 2015 were re-scored in 2017 using the updated procedure. There have been no additional changes since 2017.

(33) If data sets from two or more sources have been merged, are the sampling designs, methods and results comparable? If not, what are the limitations?

Yes. The 2019 reported data include a small subset of data that were gathered in the 2017 survey period. The exact same survey tool was used, and data from 2017 was only carried forward if a district did NOT respond to the 2019 survey. This is based on an awareness of the value of a more comprehensive dataset, the difficulty of obtaining responses from districts regularly, as well as an assumption that preparedness at a district level may have stayed reasonably stable for two years. Data would not be carried forward further than two years. When year-to-year comparisons were made, the more constrained dataset of only paired 2017-2019 responses were considered to interpret results.

(34) Are levels of uncertainty available for the indicator and/or the underlying data set? If so, do the uncertainty and variability impact the conclusions drawn from the data or the utility of the indicator?

See the answer to question 9 of this document for information about data gaps.

(35) For chemical data reporting: How are data below the MDL reported (i.e., reported as 0, censored, or as < MDL)? If parameter substitutions are made (e.g., using orthophosphate instead of total phosphorus), how are data normalized? How does this impact the indicator? N/A

(36) Are there noteworthy limitations or gaps in the data record? See the answer to questions 9 and 23 of this document.

H. Additional Information (*Optional*)

(37) Please provide any further information you believe is necessary to aid in communication and prevent any potential misrepresentation of this indicator.

It should be noted that the 2107 ELIT survey included wording changes to some items, and one of the 2015 items was removed. As a result of the change in number of items, the procedure for scoring the responses into the three categories (well-prepared, somewhat prepared, and not prepared) also changed slightly. However, a report done by the data collector showed that when 2015 data were re-analyzed (removing responses to the eliminated item and applying 2017 scoring), the patterns generally held. See the report for more details, available at https://www.chesapeakebay.net/who/group/education_workgroup.

In April 2017, the 2015 data set was updated from its original, which used a binary analysis of location within the Chesapeake watershed (in or out), and as a result many school districts that simply intersected with the watershed boundary were included in that analysis. Working together, the Education workgroup leadership, GIS analyst, and Indicators Coordinator determined that a rule should be used that includes school districts with 25% or more area within the watershed as the basis for this indicator. This approach more accurately reflects the reach of the Education workgroup of the Chesapeake Bay Program. This change in approach resulted in a slightly higher percentage of well-prepared LEAs (23% of those who responded, as opposed to 21% in the first version of the 2015 data analysis). The change in approach also resulted in other small changes in categories and response/nonresponse rates across the jurisdictions. West Virginia has only one response included in the indicator for the Chesapeake Bay watershed, but the other of the 2 responses received for the survey is included in the calculations on the Jurisdiction tab, reflecting LEAs who responded to the survey throughout the various states.