Maryland Green Schools: Progress toward Statewide Goals

School Year 2021–22

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BACKGROUND

Study Purpose & Methods

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About Maryland Green Schools

The Maryland Green Schools (MDGS) program is a sustainable schools award program and is the signature program of the Maryland Association for Environmental and Outdoor Education (MAEOE). The program began in 1999 and has expanded throughout 23 of Maryland's 24 school districts. The MDGS program provides infrastructure, support, and a rigorous review process to any school in Maryland, offering the opportunity to be awarded status as a sustainable school, and carrying the recognition and title of a Maryland Green School.

The MDGS program has been essential to Maryland's ability to connect with goals of the Chesapeake Bay Watershed Agreement, as well as helping schools achieve the state educational standards and requirements for environmental literacy (COMAR 13A.04.17 – Environmental Literacy Instructional Programs for Grades Prekindergarten – 12).

The MDGS Goal

The "Maryland Green Schools Act of 2019" was passed by the state legislature, providing funding to expand efforts to support schools toward sustainability. This included **a goal of supporting 50% of all schools in Maryland to be awarded the status of Maryland Green Schools by 2026.**

Through the support of this funding, MAEOE intends that their work will lead to: (i) increased support for the development of Green Schools, (ii) provided professional development to more teachers, and (iii) increased students' environmental literacy.

At this stage, evaluation is examining evidence of impact in the first two goals. First, it examines the extent of expansion of MDGS awards statewide, including any changes seen from 2021 and whether the program saw progress in efforts to geographically expand its reach in eastern and western counties. Second, it explores evidence of the reach and impact of professional development from the past three years on teachers and schools, particularly whether these offerings led to successful MDGS applications.

Year 2 Evaluation: Maryland Green Schools

Evaluation Questions

In year two, evaluation continued to examine MDGS' progress toward expansion of awarded schools, adding an examination of reach of professional development (PD).

1. **What is current progress toward the goal?**

- Rate of new awards? Maintenance of Green School status?
- To what extent do schools let awards lapse?
- How are schools distributed over the award levels / lifecycle of the program?

2. **Among public schools, how is MDGS doing at improving strategic targets?**

- Increases in far western and eastern counties?
- What are patterns of awarding by other key school characteristics – location, size, Title 1?

3. **How often do schools that participate in MAEOE PD achieve awards/re-awards?**

4. **What is the collective impact of MDGS?**

- Student reach
- Environmental metrics from 2022

Evaluation Data Sources

Because the program intends to reach across the state, it is critical to understand how the population of Maryland Green Schools compares to the full population of schools in the state of Maryland. It is important to know not just aggregate numbers for states, but to be able to match the two datasets to understand **which types of schools are not currently served by the MDGS program**, in order to improve outreach, support, and strategy.

This analysis drew upon several data sources:

- MDGS records of all schools currently or previously awarded and their most recent MDGS award level
- School-level data on all public schools in Maryland, via National Center of Educational Statistics (NCES) 2020 dataset (the most recent available)
- School-level data on all Maryland private schools, via NCES' Private School Survey
- Environmental metrics reported in applications for 2022 MD Green Schools.
- MAEOE records of PD participation

Data Analysis

Comparing internal MDGS data with national databases of school statistics required an extensive data cleaning and merging process to provide a thorough, and up-to-date analysis of status. Because all entities collect data and metrics in slightly different ways, data were systematically cleaned, reviewed, and double-checked to enable accurate data merging. From this combined data set, the analysis examines the full set of currently awarded MDGS schools (whether awarded in 2022 or a prior year) against the population of all schools in Maryland.

To refine data to align with the types of schools appropriate to apply to MDGS, datasets were filtered to eliminate entries that: 1) are solely pre-K (or daycare) facilities; 2) have fewer than 15 enrolled students; or 3) are alternative or virtual programs without a physical building/grounds.

Because MDGS awards are on a 4-year cycle, change in metrics will be incremental. In any one year, only schools in an application year (roughly 25%) have the potential to shift status; the other 75% are likely stable from the prior year.

Context for Evaluation: COVID-19 Adjustments

Program Adjustments Due to COVID-19

Because the COVID-19 pandemic hit all schools extremely hard, the MDGS program made accommodations to support and provide flexibility to schools for the past two years – the 2020-21 and the 2021-22 school years. The rationale for the adjustments were to support schools in their progress toward sustainability goals, without penalizing schools for limitations resulting from the wide-ranging challenges of the pandemic.

There were slight modifications made to the application to allow for flexibility and limitations on activities during years with remote learning and social distancing. But most importantly, the **MDGS program instituted a flexible award extension policy for 2021 _and_ 2022**. While all schools can _request_ a one-year extension to their re-award timeline in any year, for the past two years, **all schools were automatically granted an additional "grace period"** if they had applications due but did not submit.

This extended grace period will no longer continue next year; all schools in this grace period will need to re-apply or will move to "lapsed' status.

Impact of Program Adjustments

Because of the extended grace period, the MDGS program will not see an impact on drop of overall award rates in this year's reporting (as it did not last year). This means, **the impact of COVID-19 on rates of awarded Green Schools won't be fully measurable until the end of the 2023 school year**, when the program will see if schools who needed the grace period are able to reestablish their sustainable school practices and submit their re-award applications at the end of 2022-23.

This timing will allow the MDGS program to provide targeted support to those schools who are in their "grace period," as they are known to be potentially at risk for having their award status lapse, and being forced to restart the full application and award cycle in a future year.

Moreover, although last year MAEOE received fewer applications than in a non-COVID year, the number of applicants (including re-award applicants) this year seemed to be back on the upswing, which is a promising sign that schools are rebounding and prioritizing sustainability.

RESULTS

Progress Towards 50% Goal

Number of Certified Maryland Green Schools

In 2022, there are 679 Green Schools. This is an increase of 16 schools since last year's report.

These 679 awarded schools include all of those that are in good standing with MDGS's current guidelines. This includes schools who are up-to-date and awarded within the standard 4-year reapplication cycle, as well as 145 schools that are in an extension.

There are another 167 schools that were awarded at some point in the past, but their status has since lapsed. If these schools wanted to pursue an award, they would need to re-start the process.

MDGS requires reapplication every four years. As noted in the Background section, due to COVID, MDGS gave automatic extra grace periods to any school that needed it during the past two years. The extension category reflects this flexibility. **17 schools entered their extension period in 2022.**

Although a small increase, it suggests that most schools in their grace periods have not pursued reapplication. **These 145 schools are likely in need of careful targeting and potentially support during 2022-23** to avoid losing their award status next year.

There are 679 Maryland Green Schools

This includes awarded, renewed, sustainable, and those in their extension period.
Another 167 schools were previously awarded Green Schools, but have allowed their status to lapse.

Awarded	Extension	Lapsed
534	145	167

Status within the MGDS Certification Lifecycle

The current Maryland Green Schools are spread across the lifecycle of awards, including 21% of schools in the Sustainable phase – an increase of 5 percentage points since 2021.

In 2022, the distribution of where schools are in the lifecycle of their MDGS awards shifted slightly, with slightly fewer schools in their Initial Award phase, and slightly more schools in the Sustainable phase. Each category shifted by about 5 percentage points since 2021.

Overall, the data suggest that the program **did best at supporting currently awarded schools to continue their journey as a MD Green School.** More schools graduated to "Re-award 1 level" this year than new schools were newly added to "Initial Award" status.

There was similarly an increase in Sustainable awardees this year, which marked the initiation of requiring formerly grandfathered Sustainable Schools to engage in a reapplication process. Because this is the first year of this process, all Sustainable awardees are at the Bronze level. But no schools were moved out of their status, due to the ongoing COVID grace period.

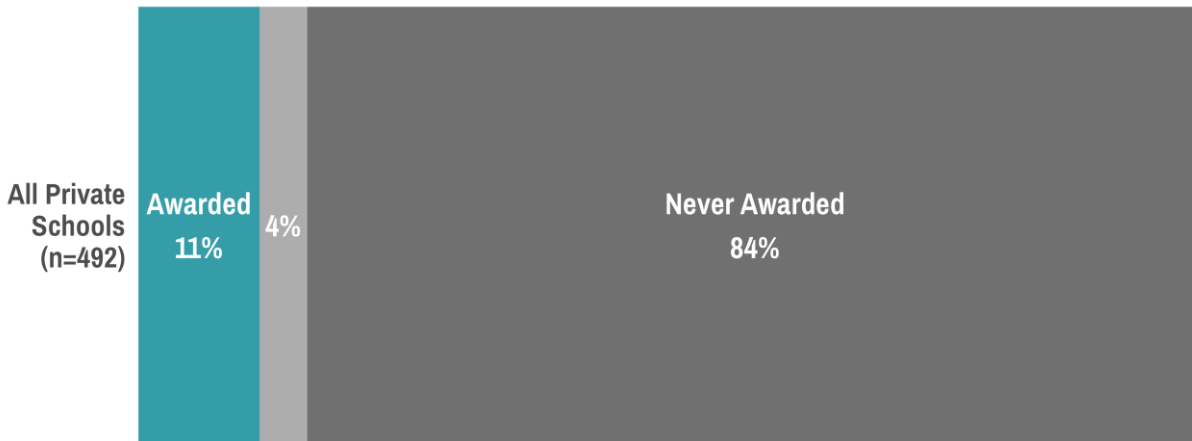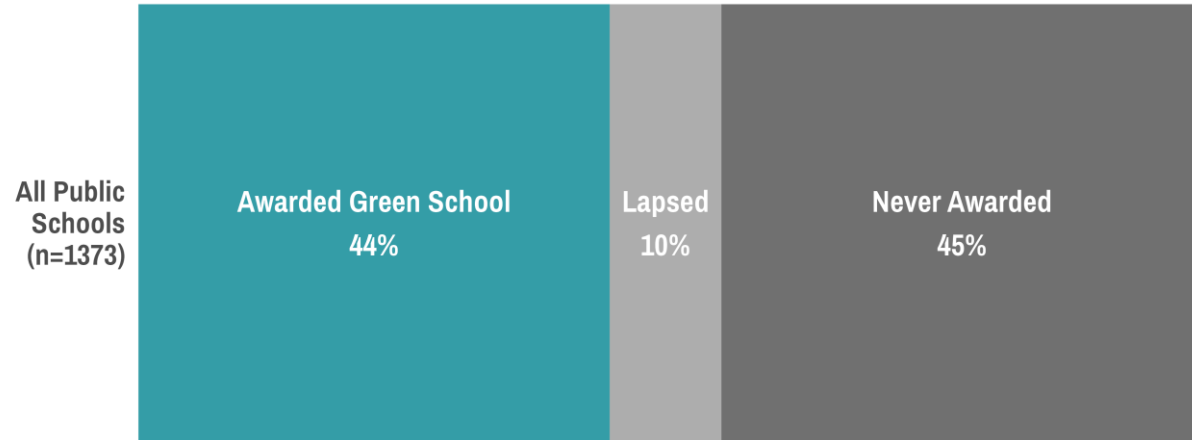**Where Schools are in the Green School Award Lifecycle**

The distribution of all current Green Schools (n=679), and what phase of the process most recently achieved, from initial award through reaching sustainable status

Initial Award 25% (170 schools)	Reawarded 1 34% (230 schools)	Reawarded 2 20% (136 schools)	Sustainable 21% (143 schools)

Progress Statewide: Public & Private Combined

As of 2022, around 36% of all schools in the state – public and private – are awarded as Maryland Green Schools.

The goal of the MDGS program is to reach 50% of all schools awarded as Green Schools by 2026. The 36% achieved in 2022 is a three percentage-point increase from the award levels in 2021 (33%).

36% Green Schools is computed against all schools in Maryland reported in the most recent publicly available datasets of schools (NCES, 2020 public and private school data). In cases where a school is registered as a Green School but not in the public dataset (typically an issue with private school data), an entry was added for that school, to ensure each Green School is also counted among all Maryland Schools.

Schools recorded as closed were excluded from all calculations and analyses. Throughout this report, data filtered out schools that: 1) are solely pre-K (or daycare) facilities; 2) have fewer than 15 enrolled students; or 3) are alternative or virtual programs without a physical building/grounds. **This filtering allowed a percentage that reflects those school entities that are legitimate candidates for MDGS awards.**

Over one-third of all schools in Maryland are Green Schools

This includes awarded, sustainable, and those in their extension period.
This total includes both public and private schools.

36% Green School	64% Not a Green School

Progress Statewide: Public versus Private

Maryland Green Schools have stronger reach in public schools.

Comparing the proportion of current Green Schools within each type of school (public and private)

| All Public Schools (n=1373) | Awarded Green School 44% | Lapsed 10% | Never Awarded 45% |

| All Private Schools (n=492) | Awarded 11% | 4% | Never Awarded 84% |

The MDGS program has had dramatically greater success among public schools than among private schools, with 44% of all public schools already awarded as Green Schools.

MDGS has been much more successful at gaining traction within public schools. Of nearly 1,400 public schools in Maryland, 44% are already Green Schools, which is only six percentage points below the overall target of 50%. Another 10% of public schools previously had Green School awards, which have lapsed over the years.

While there are far fewer private schools in the state, the rate of penetration into this group remains much lower (only 11% are awarded). This substantial disparity raises questions about whether public and private schools have different needs, interests, or priorities when it comes to considering MDGS applications.

Because the primary emphasis of the MDGS program is public schools, the next section of this report focuses on exploring the data from public schools in detail.

RESULTS

Progress in Public Schools

Public: MDGS Distribution Across Grade Levels

Of the 600+ public schools that are currently Green Schools, around 60% are at the elementary school level, which is on par with the distribution of all public schools.

The distribution of MD Green Schools by grade-level are extremely similar to the distribution of all schools by grade-level across the state; there are far more individual schools at the elementary level than at the upper grade levels. Around 58% of all public schools in the state of Maryland are elementary schools, which indicates the MDGS program does not have a substantial skewing at serving different grade levels.

There is also robust representation of middle and high schools in the population of Green Schools.

These data have remained steady from 2021 analyses.

On the next page, we explore the award rates within each grade band in more detail to further illustrate this conclusion.

Distribution of Public Green Schools by Grade Level

The proportion of all public schools that are awarded that are from each grade band.
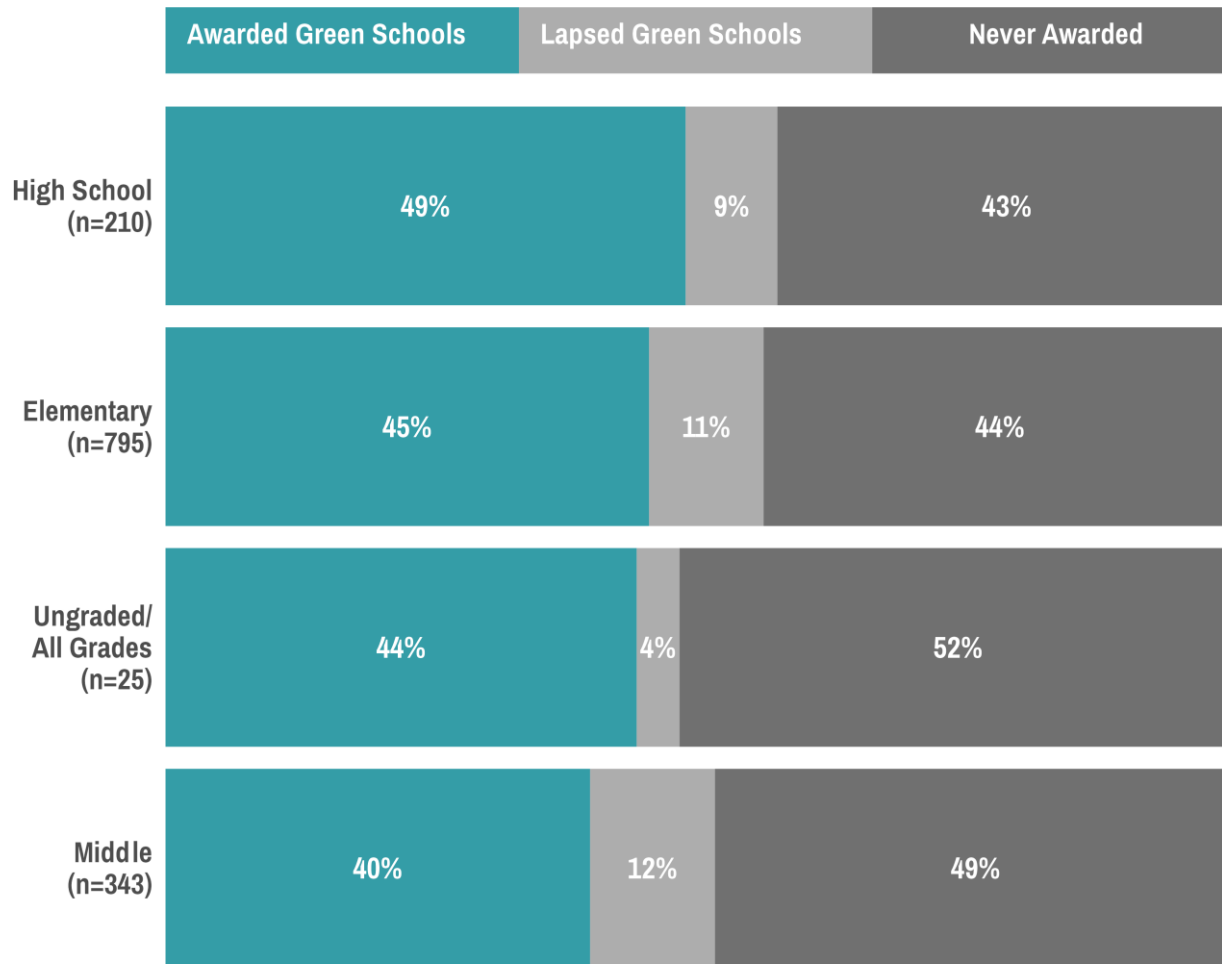Note: 'Middle School' includes schools that are ES/MS and MS/HS for this graphic.

All Schools (n=1373)
Elementary 58% | Middle 25% | High School 15%

Green Schools (n=608)
59% | 22% | 17%
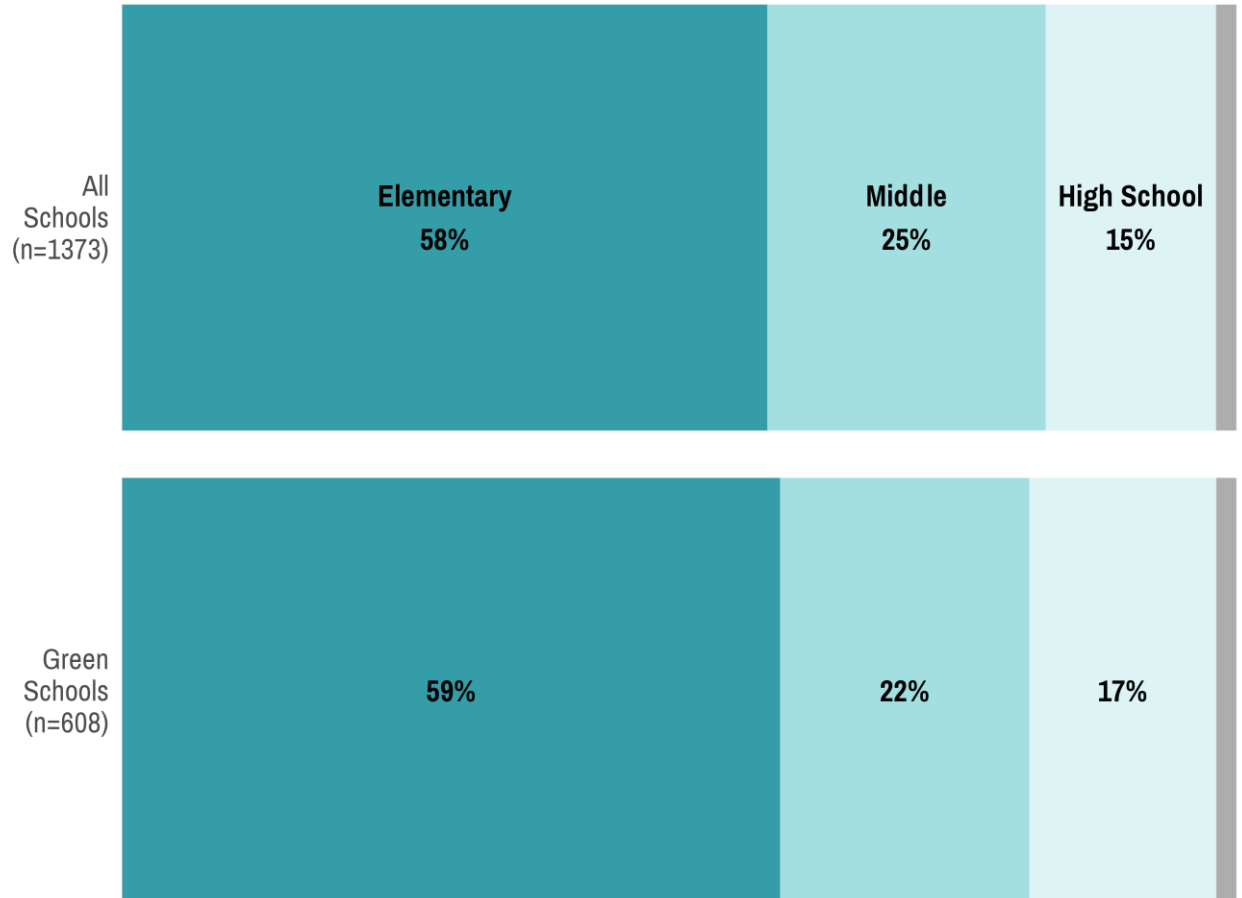
Gray is schools serving All Grades (ES, MS, and HS) or Ungraded (e.g., special ed, technical, etc.), as coded

Public: MDGS Reach within Grade Levels

MD Green Schools have reached over 40% of schools in each grade band.

Comparing the proportion of schools that are Green Schools, by each grade level of public schools

	Awarded Green Schools	Lapsed Green Schools	Never Awarded
High School (n=210)	49%	9%	43%
Elementary (n=795)	45%	11%	44%
Ungraded/ All Grades (n=25)	44%	4%	52%
Middle (n=343)	40%	12%	49%

Note: 'Middle School' contains overlapping grade bands of MS/HS and ES/MS

Looking at the rate of reach of MDGS within each grade level, relative to the population of schools in Maryland, it confirms that the program is relatively balanced in its reach by grade level.

Within each individual grade band, we see that between 40% and 49% of schools are Maryland Green Schools. The rate is slightly higher for elementary and high schools, but only slightly.

The more careful process of data filtering that was added to the 2022 analyses removed entries in the state databases for alternative school programs, often labeled as "ungraded," which lack a physical building and are not typically suited to a MDGS application. As a result of this filtering, we found the MDGS has achieved proportional penetration into the relatively few non-traditional "ungraded" or K-12 schools that *are* appropriate for the program. While it's a small segment toward the statewide goal, **it indicates that MDGS is working to reach equitably across types of school programs**.

In this analysis, middle school includes schools that span slightly beyond 6-8th grades (e.g., K-8 and 6-12). There are few schools in these groups, so we combined them for the purpose of understanding the overall patterns.

MDGS Progress by County: Public Schools

County	Awarded	Lapsed	Never Awarded
Calvert County (n=23)	**100%**	0%	0%
Queen Anne's County (n=14)	**100%**	0%	0%
Talbot County (n=8)	**75%**	0%	25%
Prince George's County (n=200)	**68%**	0%	32%
Howard County (n=76)	**62%**	18%	20%
Garrett County (n=12)	**58%**	25%	17%
St. Mary's County (n=26)	**54%**	35%	12%
Cecil County (n=28)	**50%**	7%	43%
Wicomico County (n=26)	**50%**	0%	50%
Anne Arundel County (n=119)	**46%**	15%	39%
Worcester County (n=13)	**46%**	15%	38%
Montgomery County (n=205)	**44%**	7%	48%
Carroll County (n=39)	**44%**	36%	21%
Charles County (n=38)	**42%**	11%	47%
Harford County (n=54)	**41%**	28%	31%
Baltimore County (n=168)	**39%**	12%	49%
Allegany County (n=22)	**36%**	0%	64%
Caroline County (n=9)	**22%**	0%	78%
Baltimore City (n=162)	**22%**	8%	70%
Kent County (n=5)	**20%**	0%	80%
Washington County (n=42)	**19%**	10%	71%
Frederick County (n=66)	**11%**	12%	77%
Dorchester County (n=11)	**0%**	9%	91%
Somerset County (n=7)	**0%**	14%	86%

Rates of Green School achievement continue to vary widely by county. Queen Anne's County and Calvert County have maintained success with 100% of public schools awarded.

In 2022, there are nine counties in which MDGS has already achieved the benchmark of 50% Green Schools among the public schools in the county. **This increased from 2021, when only 8 counties had met this benchmark.** In 2022, Cecil County reached this benchmark for the first time.

There are seven counties where fewer than one-third of schools are Green Schools. **This decreased from 2021, with 1 county moving above the one-third benchmark** (Worcester). This includes two counties, where the program continues not to have any current Green Schools (Dorchester and Somerset Counties).

Eight schools are in the middle of this range, with between 36% and 46% of public schools awarded by the MDGS program.

The next page shows changes in award rates by county, and the following page shows a heat map to explore award percentages geographically.

MDGS Progress by County: Improvements in 2022

County	Change in 2022	2022 Awarded	2021 Awarded
Calvert County (n=23)	--	100%	100%
Queen Anne's County (n=14)	--	100%	100%
Talbot County (n=8)	--	75%	75%
Prince George's County (n=200)	↑ 4%	68%	64%
Howard County (n=76)	↑ 2%	62%	60%
Garrett County (n=12)	--	58%	58%
St. Mary's County (n=26)	↑ 4%	54%	50%
Cecil County (n=28)	↑ 2%	50%	48%
Wicomico County (n=26)	--	50%	50%
Anne Arundel County (n=119)	--	46%	46%
Worcester County (n=13)	↑ 17%	46%	29%
Montgomery County (n=205)	↑ 1%	44%	43%
Carroll County (n=39)	↑ 5%	44%	39%
Charles County (n=38)	↑ 3%	42%	39%
Harford County (n=54)	↑ 2%	41%	39%
Baltimore County (n=168)	↑ 2%	39%	37%
Allegany County (n=22)	--	36%	36%
Caroline County (n=9)	↑ 2%	22%	20%
Baltimore City (n=162)	↑ 2%	22%	20%
Kent County (n=5)	--	20%	20%
Washington County (n=42)	↑ 1%	19%	18%
Frederick County (n=66)	↑ 2%	11%	9%
Dorchester County (n=11)	--	0%	0%
Somerset County (n=7)	--	0%	0%

14 of the 24 Maryland counties increased the number of public schools with active MDGS awards. Worcester County had the greatest gain – with an increase of 17 percentage points from 2021.

Evidence from 2022 suggests the program is making process in the eastern counties already.

Most dramatically, Worcester County (the southeastern-most county in Maryland) increased the number of awarded schools from 29% in 2021 to 46% of all schools in 2022 – nearly reaching the 50% target. Worcester is a small county, but this level of progress is a very positive step toward achieving the goal statewide.

Another notable change was in Cecil County (the northeastern-most county), where there was only an increase of 2%, but that growth reached the 50% benchmark. There were not dramatic or notable changes in the western-most counties.

It is worth noting that, because of the continued COVID-era extensions, no counties decreased their percentages this year. That could change next year, when the grace periods expire.

MDGS Progress by County: Public Schools

Proportion of public schools, by county, that are MD Green Schools

This heat map depicts which counties have the highest percentage of their public schools awarded (bright green), and which counties have the lowest percentage of public school awarded (bright blue).

The region with the lowest engagement in the MDGS program appears to in the Eastern Shore area, as well as some counties in western Maryland.

Cecil County newly achieved 50% of public schools awarded MDGS status in 2022.
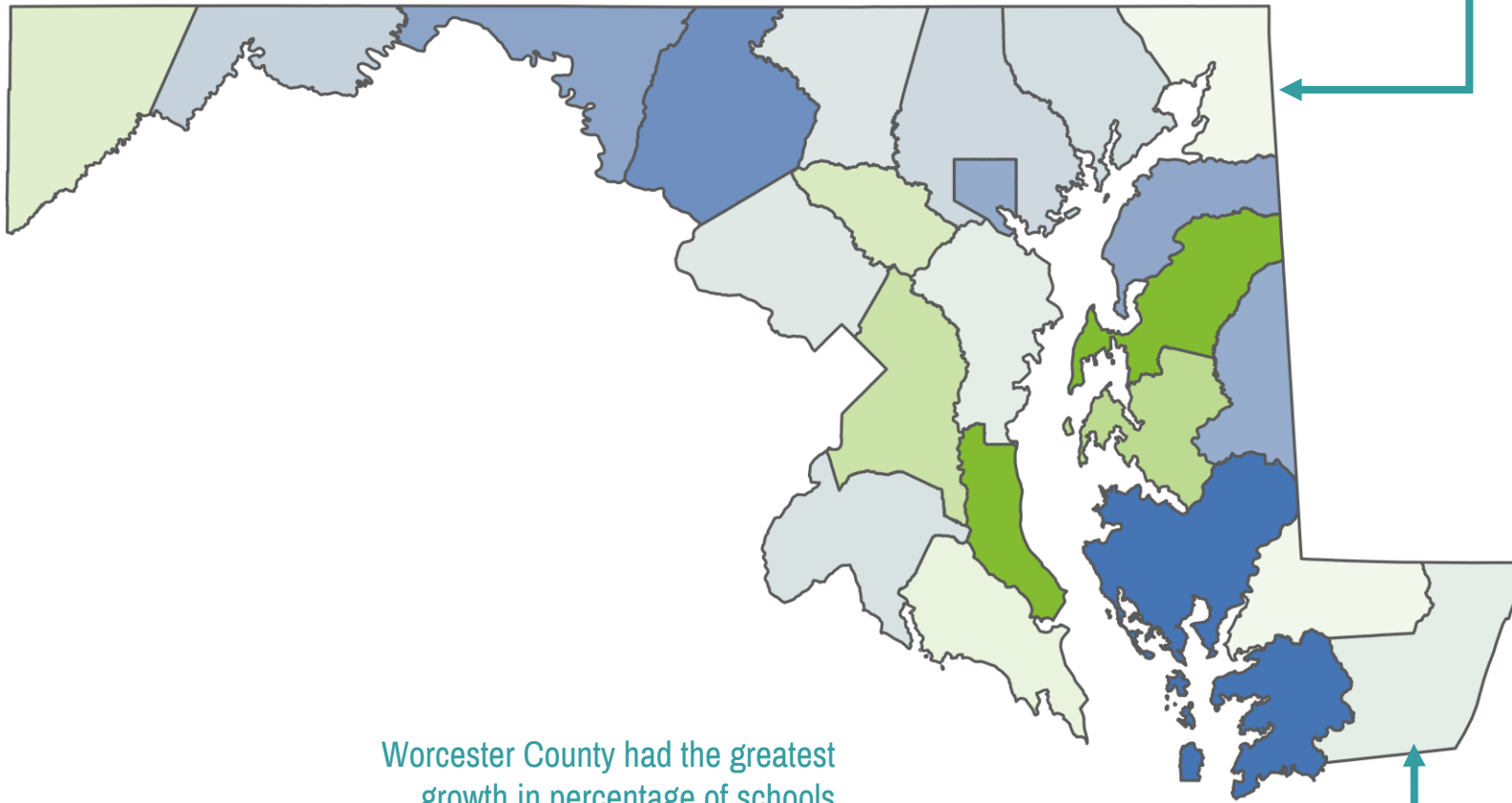
Worcester County had the greatest growth in percentage of schools awarded as MDGS from 2021 to 2022.

% Awarded GS
100%
75%
50%
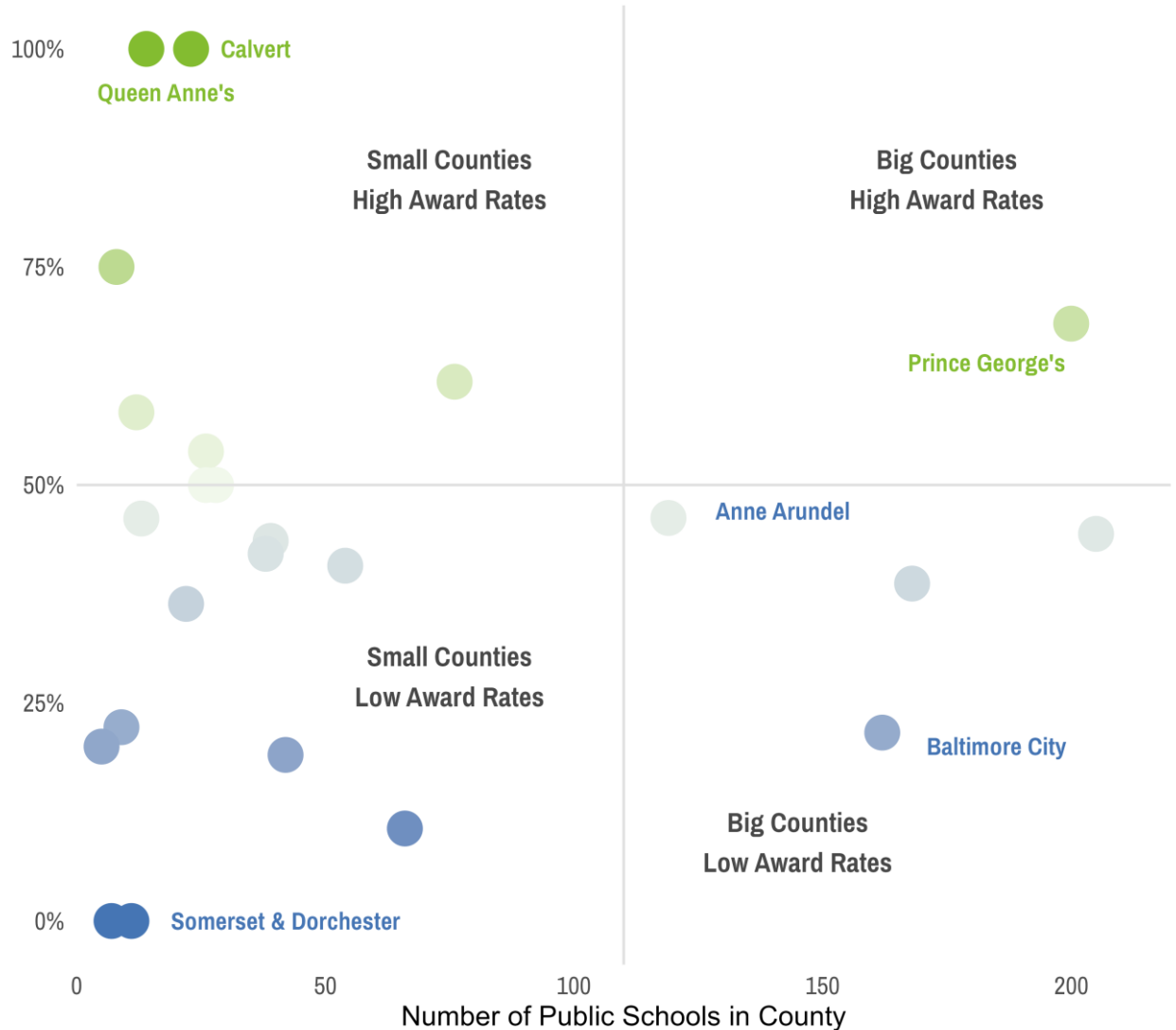25%
0%

Public: Size of County and Award Rates

MDGS Award Rates are evenly distributed across the smaller counties in Maryland (those with fewer than 100 public schools). In the five largest counties of Maryland, award rates average around 50%.

Maryland's 24 counties vary widely in terms of the number of individual public schools contained within the county – from a low of just 5 schools in Kent County to a high of 205 schools in Montgomery County. Given this variation, this scatter plot explores whether there are any relationships in the rates of MDGS awards based on this wide variation of county size.

In the smaller counties, award rates fall along a fairly normal distribution – including the highest rates (Queen Anne's and Calvert Counties) and the lowest rates (Somerset & Dorchester Counties). Among the large counties, MDGS has had greatest success in Prince George's County, where 68% of the 200 schools are Green Schools. Success has been lower in Baltimore City, with only 22% of the 162 schools achieving MDGS awards.

Scatter Plot: Percentage of Green Schools by Size of County

Scatter plot to explore any patterns between the size of a county (in terms of number of public schools) and the percentage of those schools that have achieved Green School status

Public: MDGS Reach in Urban/Rural Locations

MD Green Schools have greatest reach in rural and suburban areas.

Comparing the proportion of public schools that are currently awarded, by each locale type.

Awarded Green Schools	Lapsed Green Schools	Never Awarded

Rural (n=220)
- Awarded Green Schools: 50%
- Lapsed Green Schools: 14%
- Never Awarded: 36%

Suburb (n=802)
- Awarded Green Schools: 48%
- Lapsed Green Schools: 10%
- Never Awarded: 42%

Town (n=54)
- Awarded Green Schools: 35%
- Lapsed Green Schools: 11%
- Never Awarded: 54%

Urban (n=292)
- Awarded Green Schools: 31%
- Lapsed Green Schools: 9%
- Never Awarded: 60%

The MDGS program continues to have greater success recruiting and awarding individual schools that are in rural and suburban locations. All percentages increased from 2021 to 2022, but the overall distribution pattern is consistent.

When we compare the extent of the MDGS program's reach to schools based on the Census' classification of the school's location category (as rural, urban, suburban, or a town), it is clear that the program has had greatest success in schools that are in rural and suburban areas. In both of these locale types, around half of public schools are Green Schools (meeting the overall goal of the program).

This highlights the differences at the individual school level, when compared with aggregate county- or district-level patterns. Schools classified as rural exist across nearly all Maryland counties.

In contrast, MDGS has the lowest reach into all schools in urban areas (31% of all urban public schools). These results may suggest that more targeted outreach to schools in urban areas could help increase the number of green schools overall.

Public: MDGS Reach by School Size

Among public schools, the MDGS program has had greater success in larger schools. The average enrollment at a Green School is just under 700 students, while the average enrollment at non-awarded schools is ~600 students.
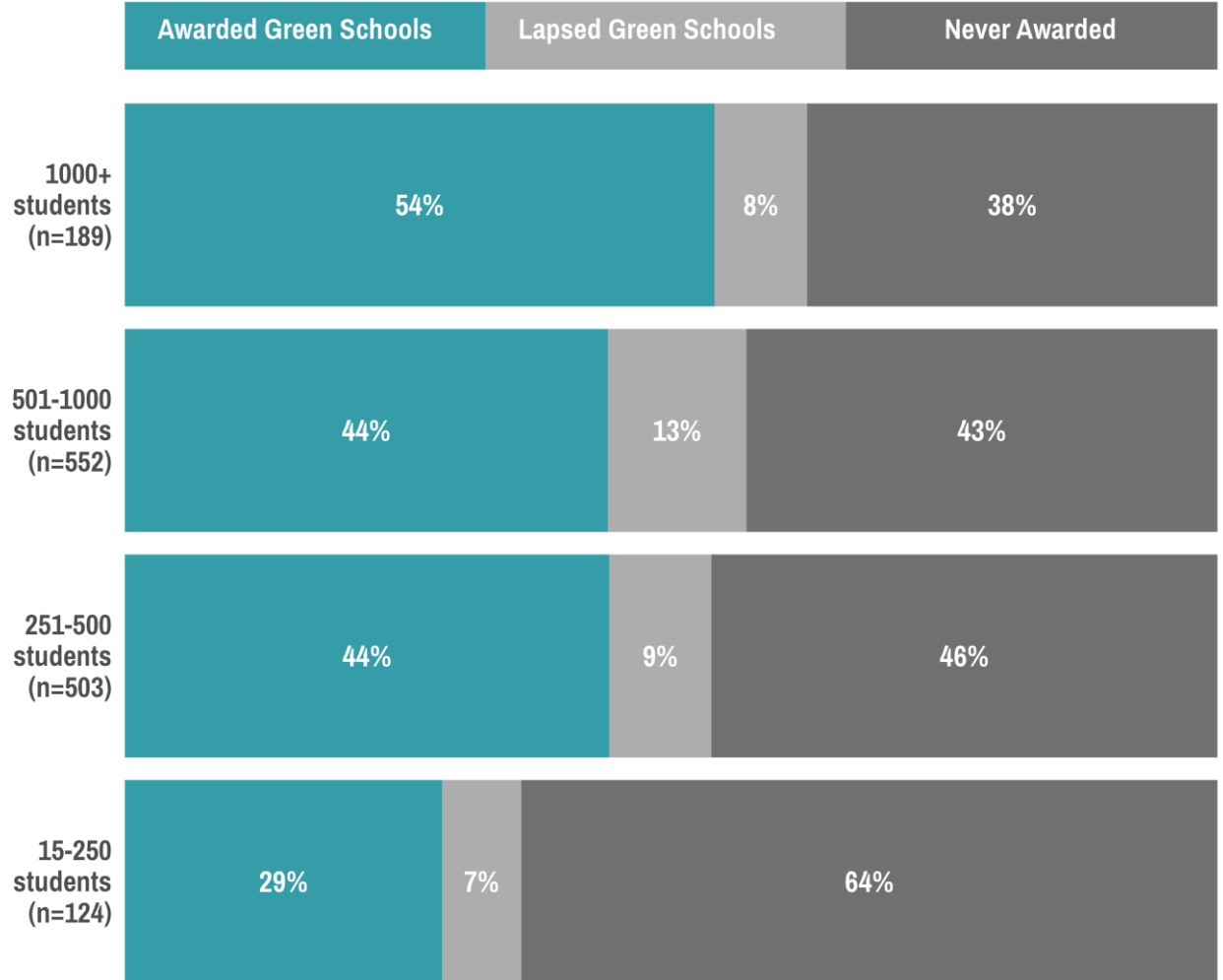
Looking at the reach of the MDGS program by groupings based on school size, we see a progressive increase in percentage of reach as schools get larger. MDGS has already reached 44% or more of all schools with over 250 students enrolled. Among the largest schools in Maryland (1,000+ students), MDGS status has already been awarded to more than half of those schools.

The percentage of awarded schools in each category increased from 2021 to 2022, although the overall pattern of distribution stayed consistent.

In contrast, the MDGS program has had less reach into the very small public schools – those with fewer than 250 students. It is still possible that small schools have different motivations or concerns about becoming Green Schools, compared to the largest schools.

MD Green Schools have have had greatest reach into larger schools.

Comparing the proportion of public schools that are currently awarded, by the size of the school (as defined by student enrollment numbers).

	Awarded Green Schools	Lapsed Green Schools	Never Awarded
1000+ students (n=189)	54%	8%	38%
501-1000 students (n=552)	44%	13%	43%
251-500 students (n=503)	44%	9%	46%
15-250 students (n=124)	29%	7%	64%

Public: MDGS Reach in Title I Schools

The MDGS program continued to have much greater success recruiting and awarding schools that are not Title I schools, a designation used to identify schools with high rates of students from low-income families.

As was seen in 2021, schools that are designated as Title I eligible are less likely to be Maryland Green Schools. While the number of Title I schools has increased, the percentage that have been awarded as a Green School is effectively unchanged since last year.

In contrast, the program has exceeded the 50% benchmark among public schools that are not designated as Title I eligible; this percentage actually grew by 4 percentage points since 2021.

This could relate to the lower reach in urban schools; but mostly suggests that schools with students facing economic and/or academic struggles have been less likely to engage in the MDGS application process. It may be useful to try to learn from Title I schools that *are* Green Schools if and how the MDGS award is educationally supportive of their students and curricular goals to better engage future schools in this category.

MD Green Schools have less reach into Title I schools.

Comparing the proportion of schools that are currently awarded, by whether they are designated as Title I.

	Awarded Green Schools	Lapsed Green Schools	Never Awarded
Title I (n=720)	36%	9%	55%
Not Title I (n=653)	53%	13%	34%

Public: MDGS Reach based on FARM Eligibility

The MDGS program also continues to have stronger reach in schools where the majority of students are not eligible for free and reduced meal programs (an indicator of socio-economic status of families). However, the greatest growth appeared to be in schools where over 75% of students are FARM-eligible.

These data are extremely similar to the data on the prior page (of Title I status) as both are indicators of socioeconomic conditions for the school's community. Again, the MDGS program continues to have strongest presence in the schools in which the lowest proportion of students are eligible for free and reduced meal (FARM) programs. MDGS has exceeded its 50% benchmark among schools were fewer than half of students are eligible for these programs.

However, while the percentage of reach was stable in most categories, the percentage of awarded schools where over 75% of students are FARM-eligible increased by 4 percentage points from the 2021 data. There were shifts in the overall number of schools in each category, so we will continue to monitor these data.

MD Green Schools have less reach in schools with high FARM eligibility.

Comparing the proportion of schools that are currently awarded, by the percentage of students who are eligible for free and reduced meals (FARM).

	Awarded Green Schools	Lapsed Green Schools	Never Awarded
Schools w/ 75-100% eligible (n=234)	35%	7%	58%
Schools w/ 50-75% eligible (n=416)	34%	7%	59%
Schools w/ 25-50% eligible (n=405)	51%	10%	39%
Schools w/ 0-25% eligible (n=313)	55%	18%	27%
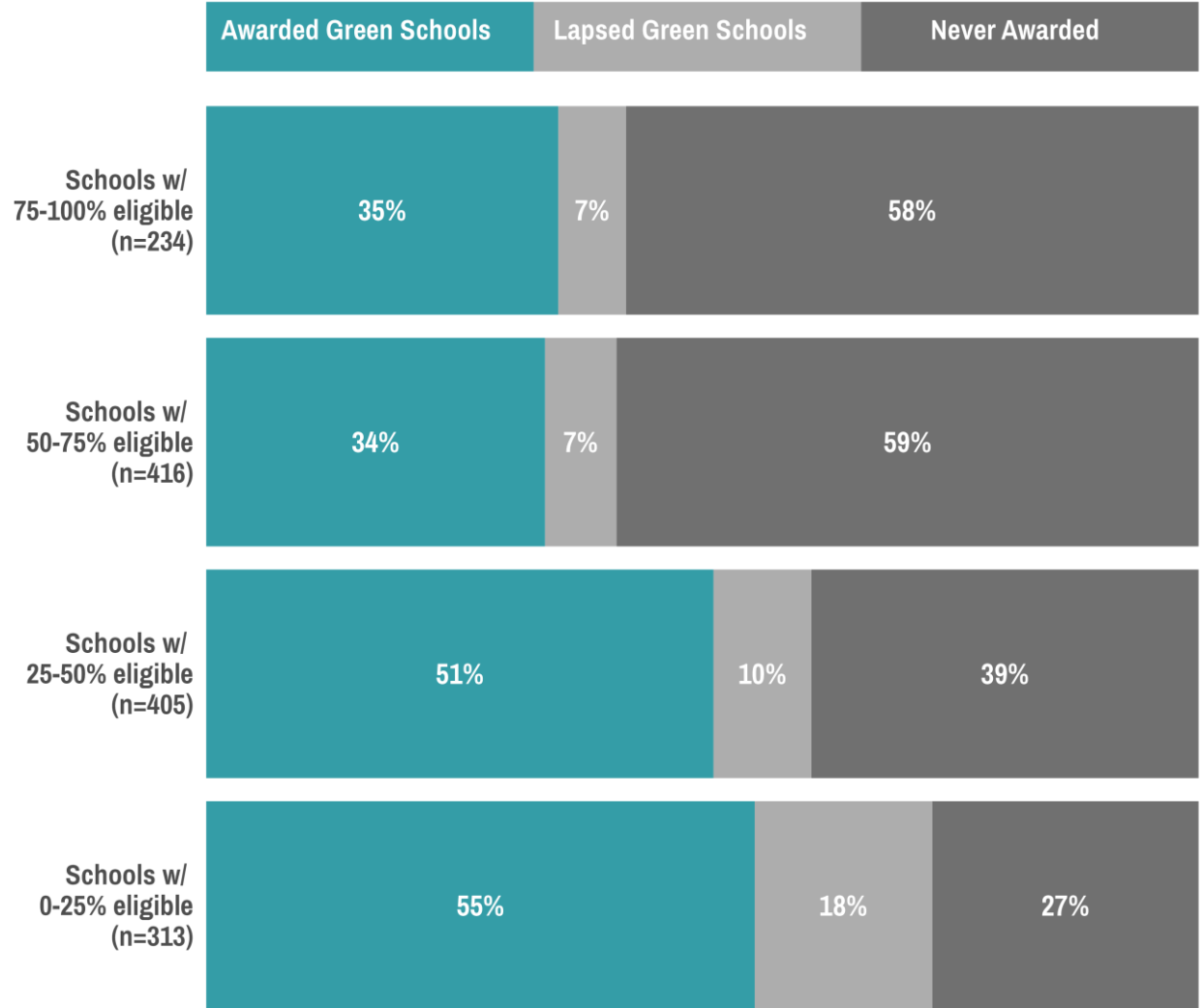
RESULTS

Reach of MAEOE Professional
Development Activities

All Programs Offered and Tracked: 2019-2022

List of Individual Trainings Tracked by MAEOE & Total Attendees

In this table, attendees refers to the individual people listed in MAEOE's professional development tracking data.

Name of Professional Development Offering	Total Individual Attendees
PLT E-Units (various topics; could attend more than one session)	351
Diversity Equity Inclusion Justice Accessibility Symposium (Registrations; could attend multiple sessions; have access to the recording)	266
Nature-Wise: Reading, Writing, Playing and Probing in the Outdoor Classroom (Registrations; have access to recording)	195
Lunch and Share (16 Sessions - Could attend any; more info here)	162
Forest Literacy Six-Workshop Series (could attend any # out of 6)	131
Using the Outdoors as a Classroom - Taking Learning Outside	88
Youth Voice, Youth Action (Earth Force) - Cohort 2	76
LGBTQ Community Conversation: Creating Safe & Welcoming Spaces Outdoors (Registrations; have access to recording)	72
Using the Outdoors as a Classroom - Evaluating the School Grounds	70
Using the Outdoors as a Classroom - Integrating MWEEs	64
Using the Outdoors as a Classroom - Best Practices	56
Youth Voice, Youth Action (Earth Force) - Cohort 1	56
Using the Outdoors as a Classroom - Planning and Implementation	54
Summer Watershed Academy	51
Using Tree Farms as Training and Field Experience Sites	43
2021 MAEOE Summer Institute	33
2022 MAEOE Summer Institute	27
Globe	27
Forest Literacy (June 11 & 12) Outdoor Workshops	26
Green Schools are Awesome	9
Total	**1,857**

In total, data indicated that there were a total of 1,857 people attending the professional development trainings provided by MAEOE across a wide range of topics to support sustainability practices and environmental literacy in education.

Data are drawn from MAEOE's tracking records of individuals attending trainings during school years 2019-20, 2020-21, and 2021-22.

The trainings covered a wide range of topics, with the most thoroughly used trainings being the Project Learning Tree e-units and the symposium on diversity, equity, inclusion, justice, and accessibility. The workshop on teaching and learning in outdoor classrooms, as well as the Forest Literacy workshop were also very well attended.

In the remainder of this section of the report, we will dig into more detail about who these attendees were, particularly focusing on the school-based attendees and whether there was any relationship between attending one or more of these sessions and achieving MDGS awards in the past three years.

Attendance by School Affiliates and Other Contacts

Overall, the professional development primarily served individuals who listed affiliations with individual schools or, in fewer cases, with the county-wide school district. Within these individuals, 238 unique Maryland schools were represented.

Most of the attendees of trainings were individuals who listed the name of an individual K-12 school as their affiliation, representing the core end-user for achieving MDGS awards. Some of these individuals (a much smaller portion) did not name an affiliation with one school, but listed an entire district. They are included in this count.

Other attendees came from a wide range of organizations, likely those who support schools in the MDGS process. This is not systematically tracked, but the organizational names listed suggest it includes partners from informal and community education organizations (including field classroom sites); representatives of state, federal, and local government; colleges and universities; and foundations. Many of these may be Green Centers tapped to help prospective MDGS candidates.

70% of attendees of MAEOE professional development listed direct affiliation with either a Maryland K-12 school or a Maryland public school district.

Aggregate counts of the number of individual registrants based on the type of organization they listed as their affiliation; types were assigned based on the name entered by the attendee. If an individual attended multiple trainings, they would be included multiple times in this count.

Attendee's Organizational Affiliation	Number of Individual Attendees
School or School District	**1,293**
Other Entity / None Provided*	564
Total	1,857

Note: Other entities include various supporting organizations, including informal/community organizations centered on sustainability education; representatives from state, local, and federal government agencies; individuals from institutions of higher education; and foundation representatives. "None Provided" are individuals who did not enter an affiliation. These other categories are not tracked systematically, so they cannot be broken out in detail reliably.

Number of Attendees by County

Counts of Individual School-Based Attendees, Organized by County

This table shows counts of just those attendees who were affiliated with a named K-12 school in Maryland.

County	Attendees from Private Schools	Attendees from Public Schools	School Type Unknown	Total
Prince George's	17	346	1	364
Baltimore	24	246	15	285
Anne Arundel	127	37	0	164
Montgomery	25	99	4	128
Baltimore City	14	72	0	86
Charles	0	44	0	44
Washington	0	35	0	35
Allegany	0	25	0	25
Caroline	0	23	0	23
Wicomico	0	20	0	20
Howard	1	17	0	18
Harford	0	11	4	15
Frederick	2	10	0	12
St. Mary's	0	11	0	11
Carroll	0	8	0	8
Calvert	0	3	0	3
Queen Anne's	0	3	0	3
Talbot	0	3	0	3
Cecil	0	1	0	1
Garrett	0	1	0	1
Worcester	0	1	0	1

Overall, the largest number of professional development attendees in MAEOE's records were from schools in the larger counties in the state – Prince George's, Baltimore, Anne Arundel, and Montgomery.

Overall, there were far more attendees from public schools than private schools, which aligns with the patterns of schools generally and MDGS schools. **Anne Arundel County, however, stands out from all of the others for having a much stronger participation by affiliates of private schools,** with nearly four times more attendees from private schools than public schools.

Only Somerset, Dorchester, and Kent Counties had no school-level affiliates attend in this time.

These numbers count every individual session attendee; anyone who attended multiple sessions on the tracking list are counted for each attendance in these data. In addition, an individual school may have had multiple people attend sessions over the period, so it does not reflect the number of individual schools that were part of professional development. We explore those data on the next page.

Number of Schools Engaged, by County

Counts of Individual Schools that Attended Professional Development, by County

This table shows counts of individual schools that were represented at session(s) by one or more staff.

County	Number of Individual Schools Represented	Percentage of All Schools in the County
Caroline (n=11)	5	45%
Allegany (n=28)	8	29%
Charles (n=50)	13	26%
Prince George's (n=260)	50	19%
Talbot (n=12)	2	17%
Wicomico (n=34)	5	15%
Baltimore (n=245)	35	14%
Baltimore City (n=216)	28	13%
Washington (n=57)	7	12%
Queen Anne's (n=17)	2	12%
Anne Arundel (n=161)	18	11%
Calvert (n=27)	3	11%
St. Mary's (n=49)	5	10%
Frederick (n=80)	8	10%
Harford (n=70)	7	10%
Montgomery (n=307)	28	9%
Carroll (n=48)	4	8%
Howard (n=97)	7	7%
Garrett (n=15)	1	7%
Worcester (n=16)	1	6%
Cecil (n=36)	1	3%

While larger counties had more individuals at trainings, MAEOE seemed to better reach a higher percentage of individual schools within the smaller eastern and western counties.

Given the goal of encouraging a greater number of *schools* to apply to be MD Green Schools, a better measure of the professional development reach was looking at how many individual schools were represented in the trainings. This measure also helps reveal what proportion of the county's schools (public and private) were reached by trainings.

In this way, it becomes clear that the program was successful at including a relatively large proportion of the schools within smaller counties in training opportunities. Most notably, 45% of the schools listed in Caroline county – public and private – took part in a training during this period.

On the next page, we share a heat map of the percentage of schools in the state that were at MAEOE training sessions to explore, geographically, where there was stronger and weaker representation.

Reach of Professional Development, by County

Proportion of all schools, by county, that attended between 2019-2022

This heat map depicts which counties with the highest percentage of all individual schools (public and private) that had at least one affiliated person attend a training by MAEOE (bright green), and which counties had the lowest proportion of all schools attend (white). Gray indicates no schools from that county attended

Professional development efforts seemed to reach a high proportion of schools in Caroline, Allegany, and Charles Counties.

% Attending MAEOE
Professional Development

40.0%

30.0%

20.0%

10.0%
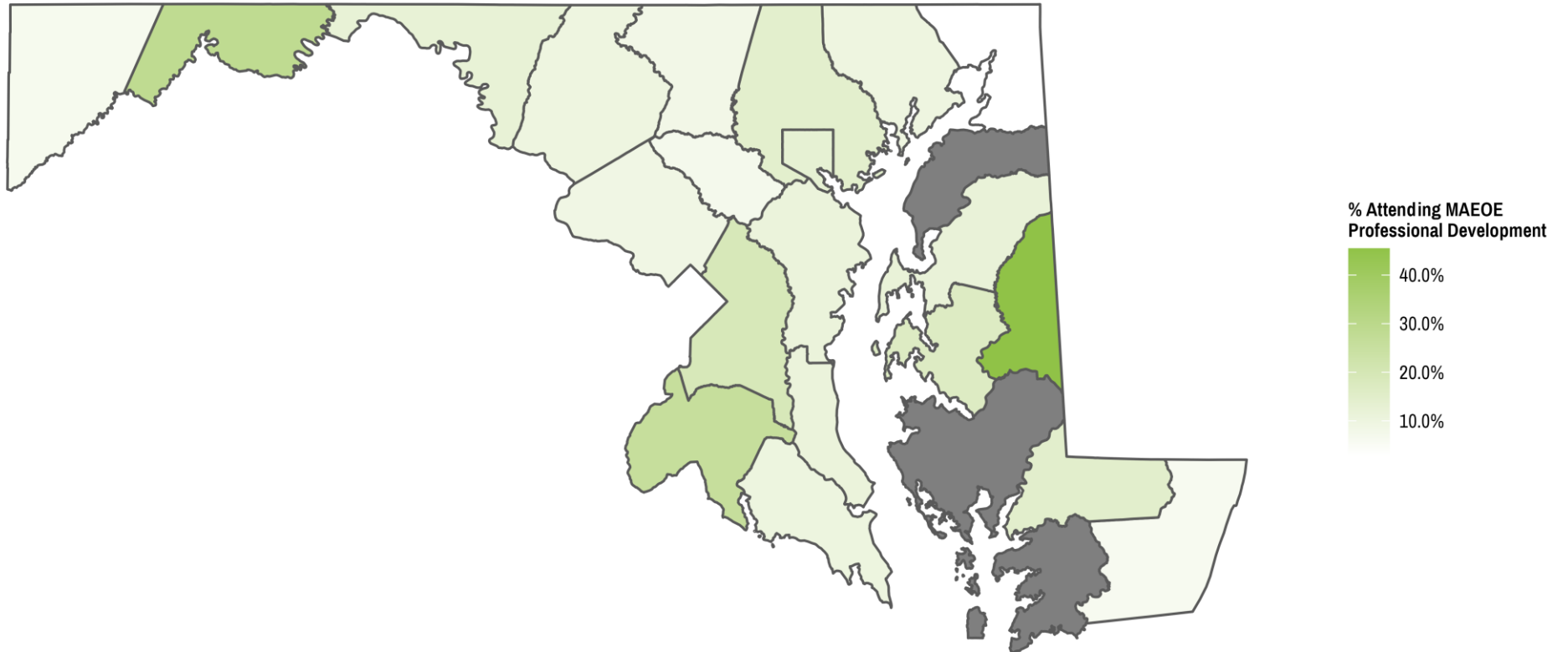
Supporting Achievement of MDGS Awards

Around half of the schools where staff attended MAEOE professional development during this period successfully applied and were awarded or re-awarded MDGS status in the past three school years.
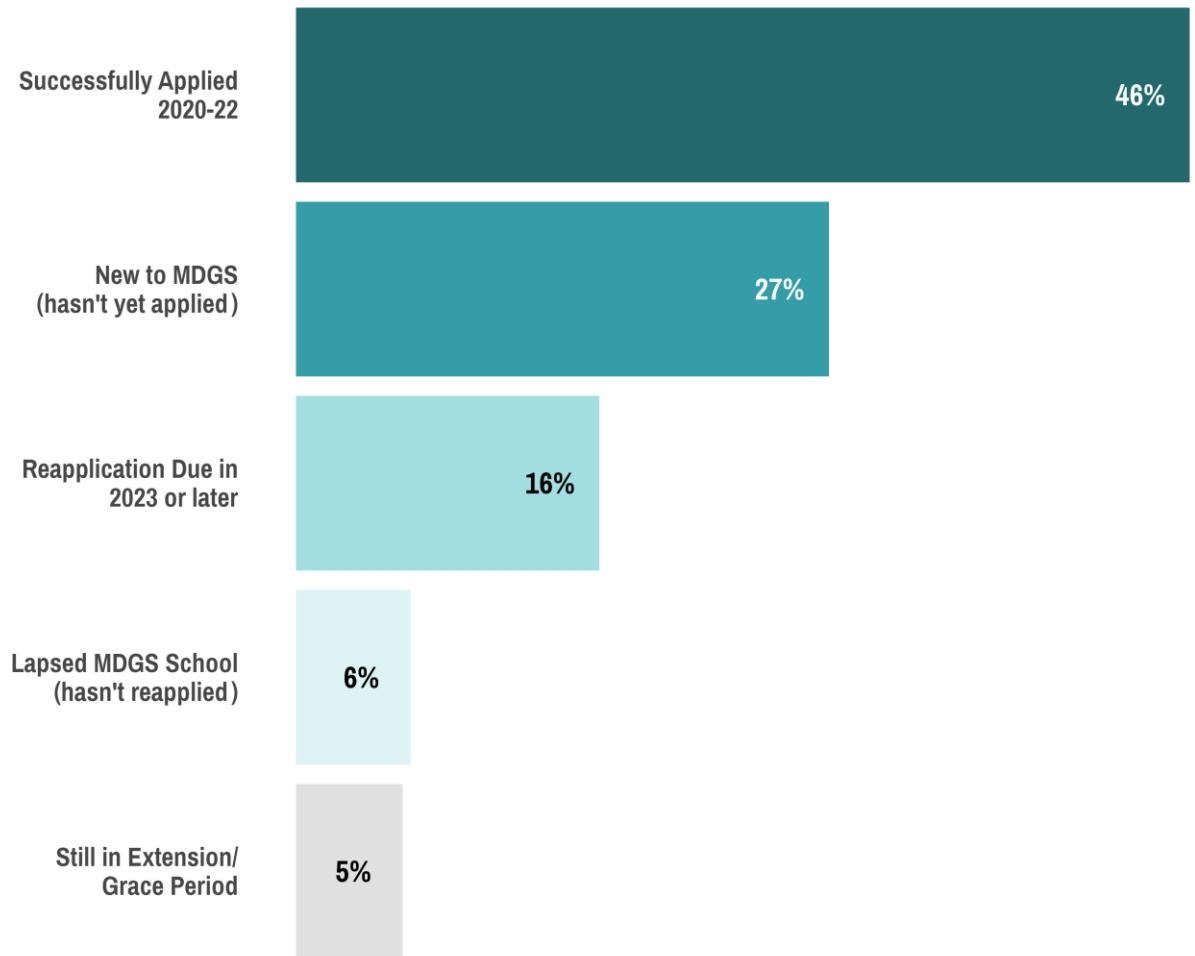
When we look at schools that had at least one staff person attend a MAEOE training, we see that most of the schools attending trainings ultimately were awarded. **This suggests that the trainings were quite successful in helping schools get or maintain their MD Green School award.**

The next major category of schools that took part in training are those that were (and still are) completely new to the MDGS program; but they have still not yet submitted an application. They may be working on the process or were just gaining information. Another segment was schools already in good standing without an upcoming reapplication. This indicates schools staying engaged in thinking about sustainability efforts (not just in their application year).

Finally, a small number of schools attended during their extension period or as a lapsed school, but did not yet convert to an applicant/awardee.

MDGS Outcomes When School Staff Attend Professional Development

For each individual school that had at least one staff person attend a training (n=238 schools), this shows what was the outcome - as of the 2022 cycle - for that school's application to the MDGS program.

Category	Percentage
Successfully Applied 2020-22	46%
New to MDGS (hasn't yet applied)	27%
Reapplication Due in 2023 or later	16%
Lapsed MDGS School (hasn't reapplied)	6%
Still in Extension/ Grace Period	5%

Professional Development & MDGS Achievement

MDGS Application Outcomes by School Year of Tracked Professional Development

This table shows counts of individual schools that were at a professional development session, and the outcome of the MDGS application process that they achieved by 2022..

Outcome of Professional Development Attendance	2019-2020	2020-2021	2021-2022	Total
Successfully Applied 2020-22	5	82	43	130
New to MDGS (hasn't yet applied)	0	42	26	68
Recertification Due in 2023 or later	2	27	17	46
Still in Extension/Grace Period	0	9	4	13
Lapsed MDGS School (hasn't reapplied)	0	11	3	14

When we look at the outcome data by year, we see that the overall pattern is consistent between 2020-21 and 2021-22 school years.

In the two most recent years, the same pattern holds of most schools attending professional development sessions ultimately achieving a successful application during that same period. While overall there were more trainings and attendees in the data from 2020-21, the relative proportions are stable.

The data from 2019-2020 indicate that professional development was likely only tracked for a small number of offerings, rather than for the entire school year.

RESULTS

Collective Student &
Environmental Impact 2021-22

# Number of Students Served by MD Green Schools

Over 437,000 students are currently attending Maryland Green Schools. This is an increase of more than 7,000 students from 2021.

When the total student enrollment numbers are aggregated across all currently awarded Maryland Green Schools (including those in their extension periods), the extent of the impact of the MDGS program is clear. With the increase in the number of schools awarded, the reach of the program to individual students increases as well.

Around 100,000 students are enrolled at schools that were previously Green Schools, but have not maintained their status in recent years.

Awarded Maryland Green Schools serve over 437,000 students

This includes awarded, sustainable, and those in their extension period.
Another 100,000+ students attend schools that were previous Green Schools, but that has lapsed.

Awarded	Extension	Lapsed
358,501 students	78,681 students	101,142 students
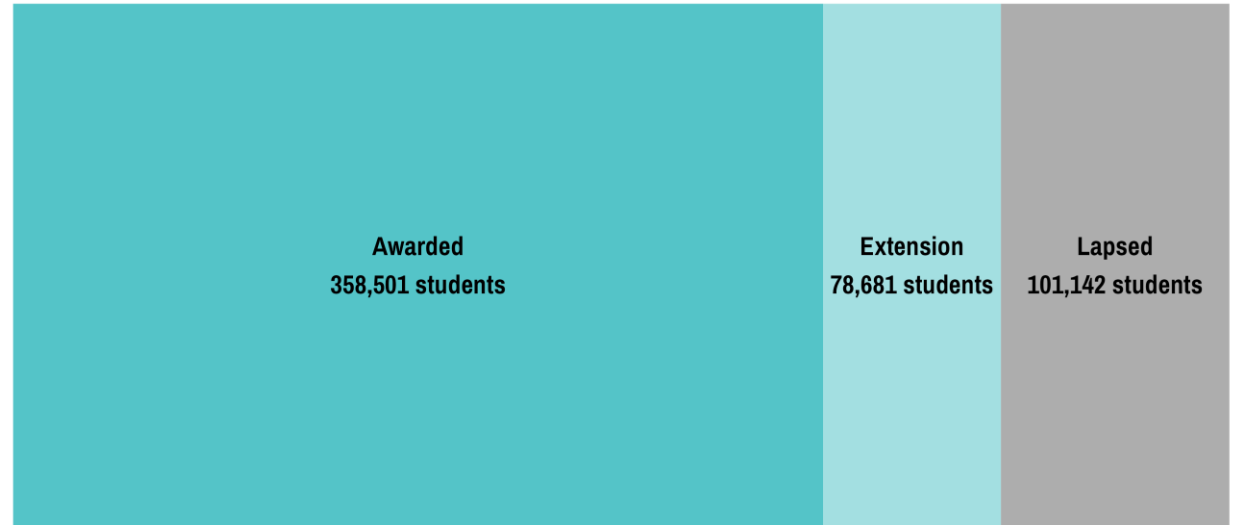
Schools' Green Practices in 2021-22

In the 2021-22 applications, nearly every Green School is making some effort to recycle or reduce waste. Providing healthy school activities and reducing energy use were also very widespread practices among Green Schools.
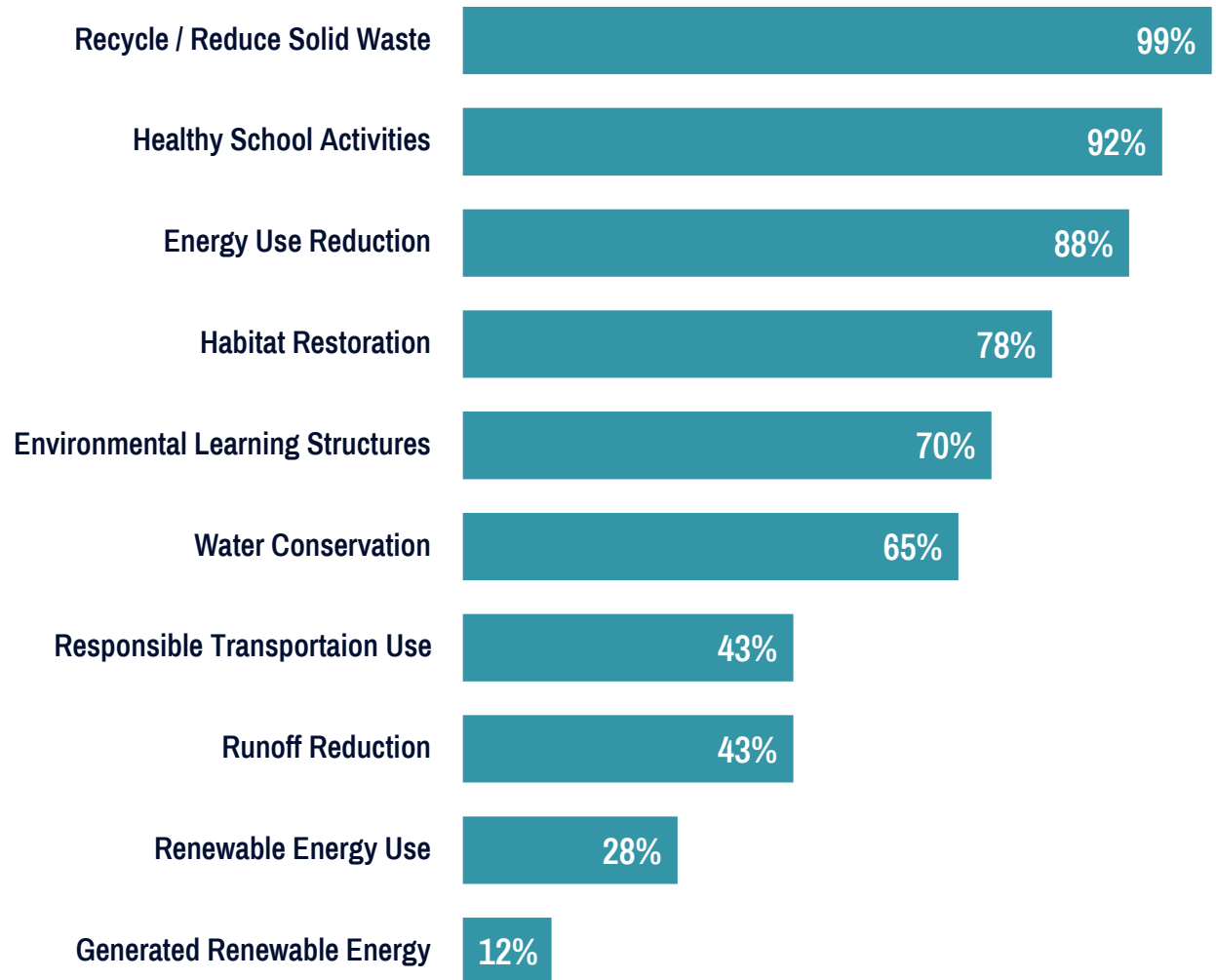
In addition, 65% or more of schools applying for Green School awards this year reported engaging in habitat restoration, developing environmental learning structures, and water conservation.

The less common green practices this year were responsible transportation use, runoff reduction, renewable energy use, and generating renewable energy. Notably, while it remains least common, the rate of schools reporting they generated renewable energy rose from 4% of applicants in 2021 to 12% in 2022. Solar was the most often used renewable energy (n=9 schools).

The patterns of which green practices are more and less often attempted by applicants remained stable from 2021 and 2022, despite each year's applicants being entirely different schools. This suggests that the pattern here reflects what schools find easier and more challenging to do.

Self-Reported Rates of Green Practices Across Maryland Green Schools in 2021-22
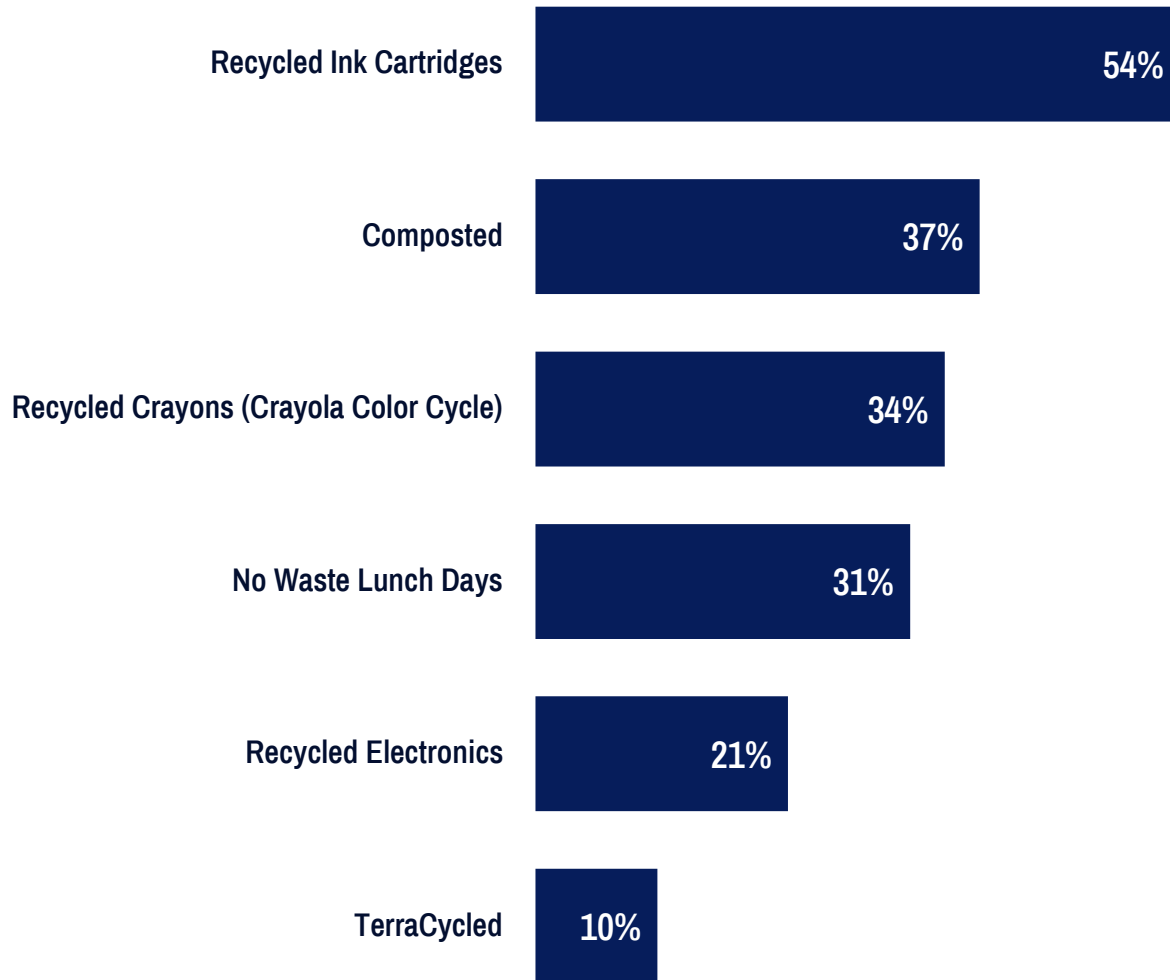
These are the rates of schools answering 'yes' to a yes or no question about whether they have implemented each of the following green practices. (n=137 applicants in 2022)

Practice	Rate
Recycle / Reduce Solid Waste	99%
Healthy School Activities	92%
Energy Use Reduction	88%
Habitat Restoration	78%
Environmental Learning Structures	70%
Water Conservation	65%
Responsible Transportaion Use	43%
Runoff Reduction	43%
Renewable Energy Use	28%
Generated Renewable Energy	12%

Specific Practices: Recycling & Reducing Waste

Self-Reported Rates of Recycling and Waste Reduction in MD Green Schools

A school was counted in the percentages below if they entered any number above zero in a question quantifying that practice, indicating they had participated to some extent. (n=137)

Practice	Percentage
Recycled Ink Cartridges	54%
Composted	37%
Recycled Crayons (Crayola Color Cycle)	34%
No Waste Lunch Days	31%
Recycled Electronics	21%
TerraCycled	10%

Over half of all Maryland green schools reported recycling ink cartridges over the application period. Over a third reported they were composting.

Within the waste reduction category, ink cartridges were the most frequently recycled material, with **schools estimating they had recycled 5,100 ink cartridges** in aggregate.

Drum composting was the most common form of composting (21 schools), followed closely by vermiculture (19 schools). Open frame composting and sending waste to a composting facility were less common (11 and 8 schools, respectively).

One-third of schools reported recycling crayons through the Crayola Color Cycle program, and just over 1 in 5 schools reported recycling electronics. **This totaled estimates of 5,507 electronics and 6,209 pounds of crayons recycled**.

Just under one-third of schools reported having at least one "No Waste Lunch Day," with **764 No Waste Lunch Days across all schools.**

Fourteen schools reported **TerraCycling, for a total of 1,013 pounds of waste** across all schools.

Specific Practices: Energy Conservation

In the area of conserving energy, schools most often reported that they used blinds for temperature and light control, with nearly 80% of schools reported using this strategy.
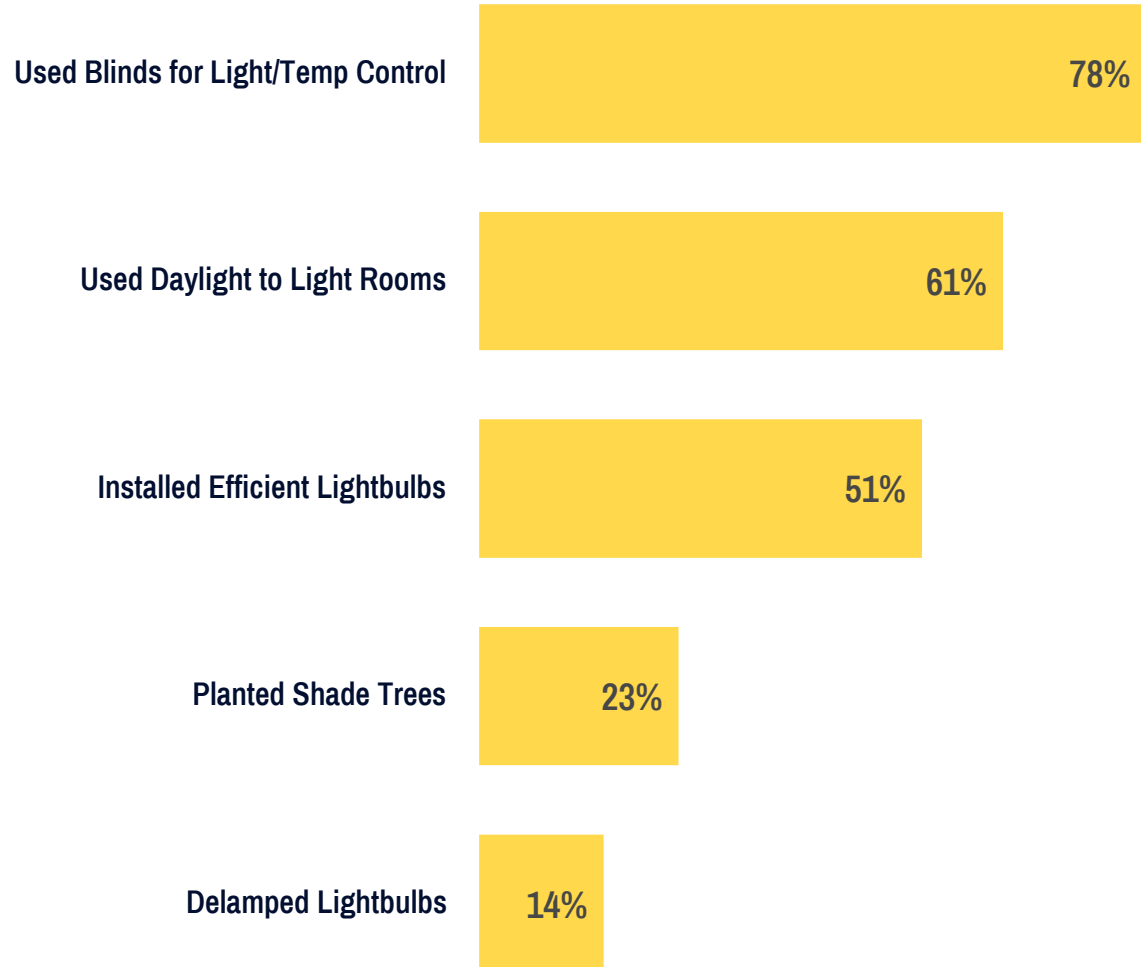
61% of applying schools reported using daylight to light rooms and over half had installed energy-efficient lightbulbs as ways they had used to conserve energy. The total estimated lightbulbs installed by applicants was over 529,000. This is almost 40x higher than last year's estimate of lightbulbs installed (13,432), even though the percentage of schools claiming this strategy was stable. This may indicate that estimations of detailed metrics are somewhat unreliable.

Less common energy conservation strategies included planting shade trees and de-lamping. According to applicants' estimates, this resulted in 456 trees being planted for the purposes of energy conservation by these schools.

This pattern reconfirms from 2021 that **green actions that are student- and teacher-implemented, rather than at a district, building, or administrative level, tended to be most common across Green Schools.**

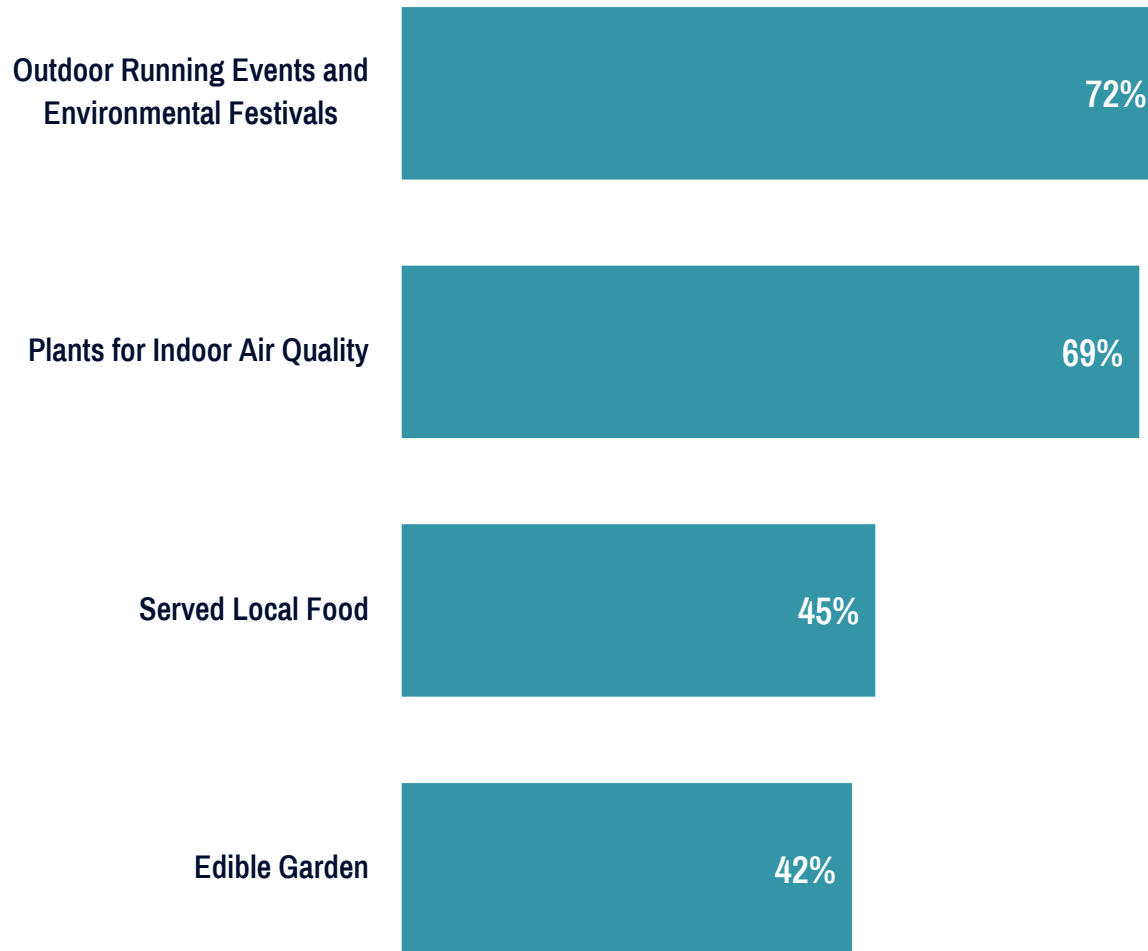### Self-Reported Rates of Energy Conservation Practices Across MD Schools

A school was counted in the percentages below if they entered any number above zero in a question quantifying that practice, indicating they had participated to some extent. (n=137)

Practice	Percentage
Used Blinds for Light/Temp Control	78%
Used Daylight to Light Rooms	61%
Installed Efficient Lightbulbs	51%
Planted Shade Trees	23%
Delamped Lightbulbs	14%

Specific Practices: Healthy School Activities

Self-reported Rates of Healthy School Activities Across MD Green Schools

A school was counted in the percentages below if they entered any number above zero in a question quantifying that practice, indicating they had participated to some extent. (n=137)

Activity	Percentage
Outdoor Running Events and Environmental Festivals	72%
Plants for Indoor Air Quality	69%
Served Local Food	45%
Edible Garden	42%

Within the category of healthy school activities, over 70% of schools reported that they had hosted healthy events, such as runs and environmental festivals.

The other extremely common healthy school activity was using plants for indoor air quality was, with nearly 70% of schools reporting having at least one indoor plant.

Over half of schools who applied to be Green Schools in 2022 reported serving local foods at least once per year.

Similarly, having an edible garden was another fairly common strategy among this year's applicants, with nearly half of schools reporting they had an edible garden. The total area covered by these gardens was 11,812 sq. feet, according to self-reported totals.

Specific Practices: Habitat Restoration

In the green practices of habitat restoration, nearly half of all schools reported creating or installing bird houses.
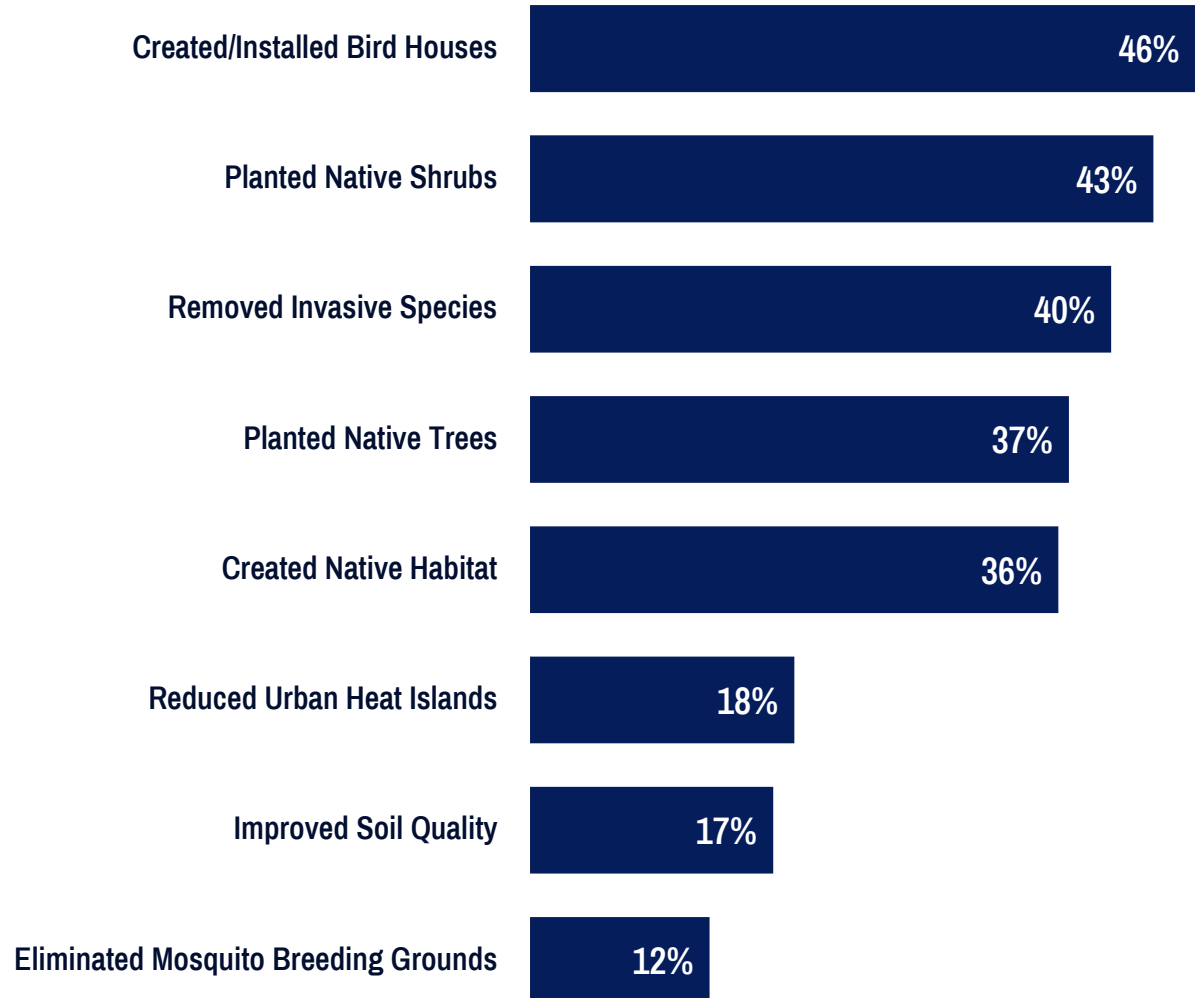
The next most common practices used by schools were **planting native shrubs and removing invasive species, which were reported by more 40% or more applying schools in 2021-22.** Planting native trees and creating native habitat were moderately reported, with more than a third of schools reporting these practices.

Less than 20% of schools reported activities around reducing urban heat islands, improving soil quality, or eliminating mosquito breeding grounds.

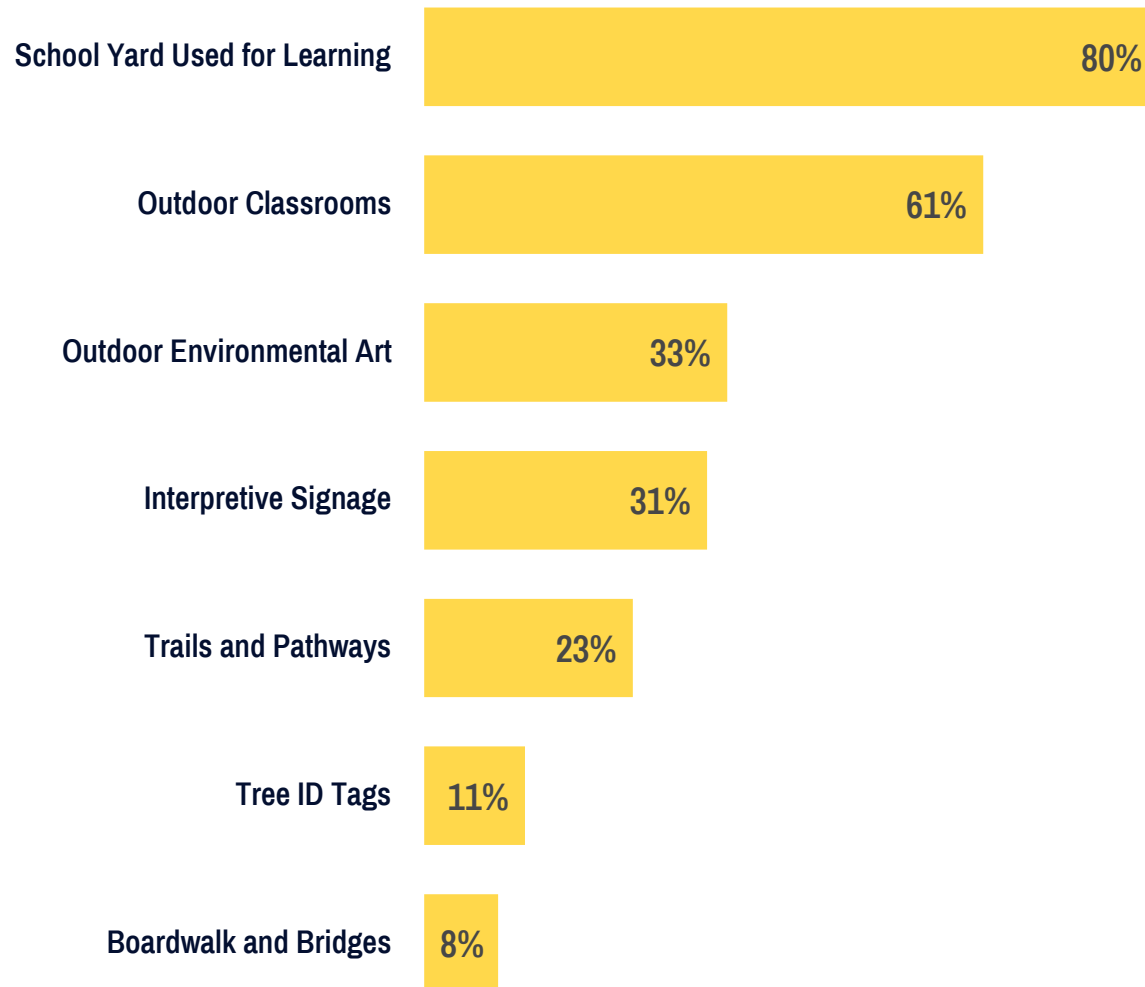**Self-Reported Rates of Habitat Restoration Across MD Green Schools.**

A school was counted in the percentages below if they entered any number above zero in a question quantifying that practice, indicating they had participated to some extent. (n=137)

Practice	Percent
Created/Installed Bird Houses	46%
Planted Native Shrubs	43%
Removed Invasive Species	40%
Planted Native Trees	37%
Created Native Habitat	36%
Reduced Urban Heat Islands	18%
Improved Soil Quality	17%
Eliminated Mosquito Breeding Grounds	12%

Specific Practices: Environmental Learning Structures

Self-Reported Rates of Environmental Learning Structures

A school was counted in the percentages below if they entered any number above zero in a question quantifying that practice, indicating they had participated to some extent. (n=137)

Practice	Percentage
School Yard Used for Learning	80%
Outdoor Classrooms	61%
Outdoor Environmental Art	33%
Interpretive Signage	31%
Trails and Pathways	23%
Tree ID Tags	11%
Boardwalk and Bridges	8%

8 out of 10 schools applying in 2022 reported that they had used their school yard for learning at least once per year. This was, by far, the most common way schools engaged with environmental learning structures, followed by use of outdoor classrooms.

The other environmental learning structures included in the reporting survey had somewhat lower use by schools. One-third of schools reported using outdoor environmental art, totaling 393 art pieces across all schools. More than one in five schools reported having trails and pathways, totaling a reported 40,852 feet of path across all schools.

This area is another with clear patterns that there is more frequent use of actions that are student- and teacher- implemented, rather than at a district, building, or administrative level.

Specific Practices: Water Conservation

By far, collecting litter (to prevent it from getting in waterways) was the most common way that schools reduced water pollution, with two-thirds of applying schools noting they had taken this action.
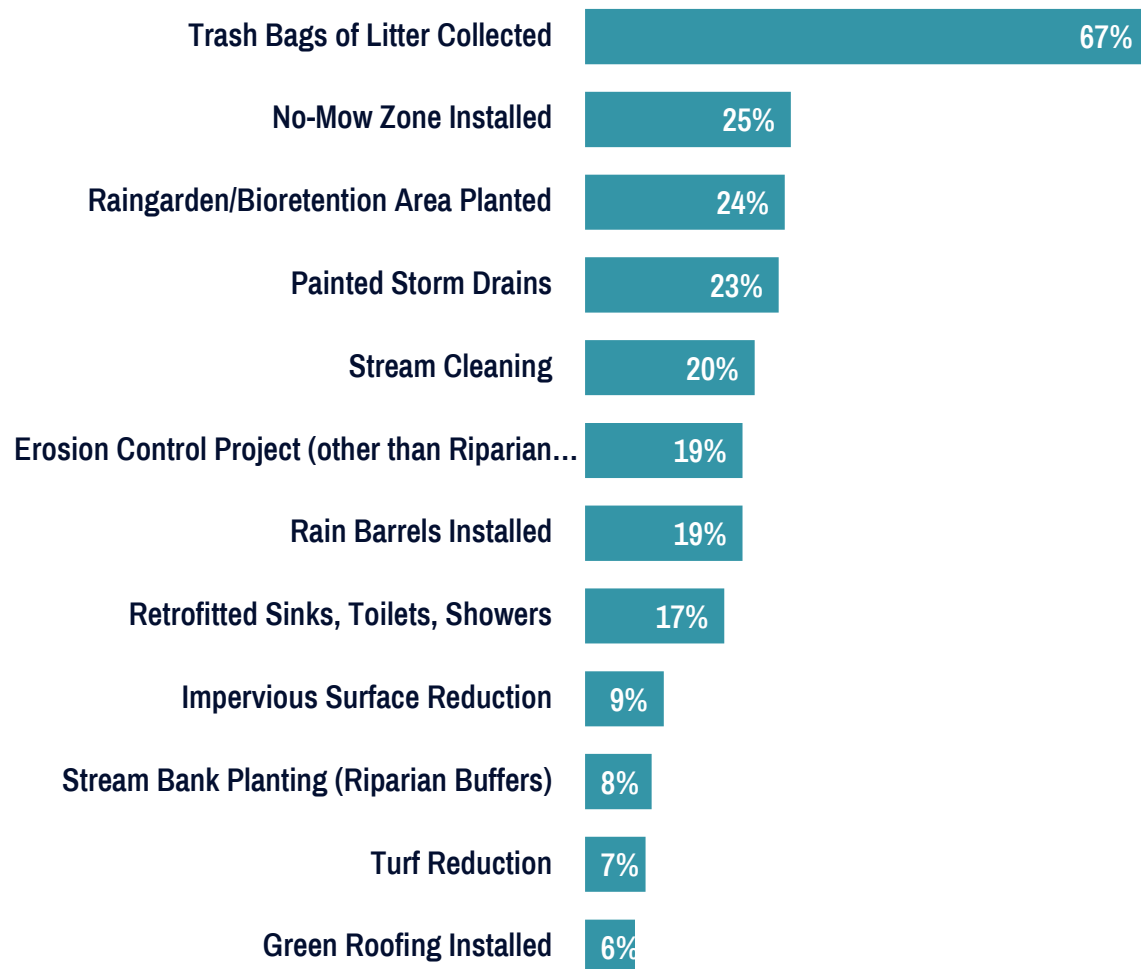
All other water protection actions were reported by fewer than one-quarter of schools, which included installing no mow zones, rain gardens and bioretention areas planted to reduce water runoff, painting storm drains, stream cleaning, erosion control projects, and installing rain barrels.

In total, applicant schools reported a total of 477 pieces of retrofitted plumbing installed.

Infrequently tried strategies included larger changes, including reducing impervious surfaces, stream bank planting, turf reduction, and green roof installation. These likely require substantial investment and/or approval by more stakeholders or entities.

Reported Rates of Water Conservation and Limiting Water Pollution Across Green Schools

A school was counted in the percentages below if they entered any number above zero in a question quantifying that practice, indicating they had participated to some extent. (n=70)

Practice	Percentage
Trash Bags of Litter Collected	67%
No-Mow Zone Installed	25%
Raingarden/Bioretention Area Planted	24%
Painted Storm Drains	23%
Stream Cleaning	20%
Erosion Control Project (other than Riparian…	19%
Rain Barrels Installed	19%
Retrofitted Sinks, Toilets, Showers	17%
Impervious Surface Reduction	9%
Stream Bank Planting (Riparian Buffers)	8%
Turf Reduction	7%
Green Roofing Installed	6%

Summary: Reported Green Practices in 2021-22

Total	Green Practice Measure	Total	Green Practice Measure
1,081,234	Lbs. of recycled materials per year	17,625	Feet of Streams cleaned
109,604	Lbs. of food waste reduced per year	5,482	Trash Bags of Litter collected
33,237	Lbs. of organic waste collected per year	2,220,157	Kilowatt-Hours of Energy conserved
497	Outdoor Running Events & Festivals held per year	5,414,183	Kilowatt-Hours of Green Energy generated
217,847	Sq. Feet of Native Habitat restored	554	Birdhouses created / installed
238	Outdoor Classrooms	1,125	Native Plants and Shrubs planted
393	Pieces of Outdoor Environmental Art	105,371	Sq. Feet of Invasive Plants removed
903,918	Gallons of water conserved	33	No-Idling Zones
123,343	Sq. Feet of Stream Bank Planting & Erosion Control	3,556	Plants for Indoor Air Quality
73,954	Sq. Feet of Rain Garden / Bioretention Area planted	11,812	Sq. Feet of Edible Gardens installed

Note: Metrics come from schools' self-reported measures or estimates of total indicators included in the survey; reported at the time of application for award or re-award. For the purposes of this reporting, we do not verify or adjust the totals reported (using their numbers verbatim).

Range of Self-Reported Numbers in Practices

There were dramatic ranges of environmental metrics reported by schools in 2021-22, indicating there may be limits to the reliability of self-reported numbers.

The table shows the lowest and highest values provided in response to each of the quantified environmental metrics in the MDGS survey. The dramatic spans of estimates indicates that some schools may struggle to accurately measure, estimate, or understand questions when asked to report these numbers.

Estimates of year-round practices, such as energy or water saved per year, have the highest reported ranges across schools. Similarly, projects that get reported in sq. feet also had extremely wide reported ranges. It is unclear whether this is due to the unit of measurement, or if schools are misunderstanding the unit (i.e., reporting '1' erosion control project versus '150 feet' of erosion control on a river).

Some schools that participated in a practice may also have entered '1,' '5,' or '10' to signify that they could not quantify their activities.

Low Estimate	High Estimate	Green Practice
20	600,000	Water Saved per Year (Gallons)
1	468,000	Energy Saved per Year (Kilowatt-Hours)
10	245,483	Efficient Lightbulbs (Total Number)
10	143,271	No Mow Zone (Sq. Feet)
10	87,840	Food Waste Reduced Per Year (Lbs.)
10	80,000	Recycled Materials per Year (Lbs.)
9	60,000	Native Habitat Created (Sq. Feet)
5	57,600	Erosion Control (Sq. Feet)
5	40,000	Removal of Invasive Species (Sq. Feet)
60	40,000	Turf Reduction (Sq. Feet)
1	25,000	Rain Gardens (Sq. Feet)
5	12,000	Organic Waste Collected per Year (Lbs.)
1	11,283	Trails & Pathways (Sq. Feet)

CONCLUSIONS

Discussion & Implications

Progress toward Goals

Overall, MAEOE showed areas of steady progress in its effort to achieve goals around the development and expansion of Green Schools, supporting teachers with professional development, all of which is meant to support a larger goal of students' environmental literacy.

In only its second year, the MDGS program showed several key areas in which it is progressing toward its target of having 50% of all Maryland schools awarded and actively maintaining MD Green School status. While growth has been incremental from year-to-year, and more can be done to expand efforts, the evidence so far suggests several indicators of positive movement.

This year, the evaluation added an analysis of the professional development offerings provided by MAEOE, including the expanded reach of trainings to more educators and the degree to which those trainings supported educators in achieving MD Green School awards for their schools.

The three main takeaways about evidence of achievement this year are summarized to the right.

1

36% of MD schools are Green Schools.

This metric continues to show promise and progress toward MAEOE's goal of having half of all schools in the state (public and private) awarded as Green Schools. In public schools, the program is getting close to meeting that goal already – **44% of all public schools are Green Schools.** Moreover, nine counties have already achieved the 50% goal in their public schools

2

Signs of Improvement in Eastern Counties

A goal identified this year was to improve the reach of the program in Maryland's far eastern and western counties. In 2022, there was promising evidence of growth in two counties. Cecil County increased its percentage of public schools with awards to the 50% mark. More impressively, Worcester County added a number schools, moving from 29% of all public schools awarded to 46% awarded.

3

Trainings Support MDGS Applicants

A new analysis of the data recorded by MAEOE on who has attended their professional development over the last 2-3 years showed that around half of schools that participated in training ultimately were successful at applying and being awarded or re-awarded their Green School status in the last three years. The next largest segment of participants are schools that would be completely new to the program – an important segment for MAEOE to convert to achieve their goals.

Potential Threats to Progress

End of COVID Grace Periods

There has been no loss of awarded MD Green Schools in the last two years, due to automatic extensions granted to any currently awarded school that did not reapply. This extended grace period ends next year, which means any impact of COVID on the MDGS program will be seen in the 2023 data, if previously awarded schools do not reapply when their extensions end. **The 145 schools currently in an extension period should be high-priority candidates for follow-up** and support to get them back on track.

Helping Old, Attracting New

A long-standing challenge for the MDGS program is the need to nurture current awardees as they progress through the stages of reapplication, while also attracting new schools to enter the award program. This year's data suggest that the program's strength is in supporting existing schools through the reapplication stages, with only 16 Green Schools added this year. In pre-COVID years, the program reported adding ~30 new schools per year. After shoring up schools in extension, **recruiting new schools would be the next priority to continue growth.**

Eastern Shore Counties

While there were some positive signs of gains in some of the eastern counties of Maryland, three counties in the Eastern Shore area continue to show very limited engagement or interest in the MD Green Schools program – Kent, Somerset, and Dorchester. These three counties did not appear to add any schools in the past year, and no schools from those counties attended any of MAEOE's professional development in the past three years of records. **These counties likely need special attention to their unique needs**, if the program seeks to make inroads here.
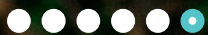
Areas for Strategic Improvement

Clarify Environmental Metrics

Schools' self-reported environmental impact metrics are compelling, but they may only be valid when they report whether a school did or did not do an actions. Estimates of *specific* metrics (e.g., # of lightbulbs installed, kWh generated, etc.) vary wildly in the data, and occasionally include implausible numbers – either very low or very high. This suggests that schools need support to know how to record, access, or estimate these metrics if they are to be reliable indicators of impact.

Urban & Less Affluent Schools

There was continued indication that an area for potential program growth is with schools in urban and/or less affluent communities, which are generally less well-represented among awarded Green Schools. It is worth further investigation with partners and schools in these settings to understand how the MDGS program and environmental education is perceived and if (or how) the program's approach could better align with the priorities, strengths, and needs within schools serving these communities.

Continue Improving Data Quality

All of the metrics measuring progress are reliant on the quality of the data – both from the program's internal tracking and from comparative statewide datasets. The decision to focus the statewide data on schools that could reasonably be a MDGS (e.g., not very small schools, day care, or schools without buildings) improved the accuracy of metrics. The more data are recorded systematically and consistently, the more readily data manipulation can be automated and trends can be uncovered.

Additional Questions from MAEOE

Considering Importance of CPD Units

Upon reviewing the results of analysis of the reach of professional development offerings to schools and how it supported eventual MDGS awards, the MAEOE staff wondered if offering Continuing Professional Development (CPD) units were important for teachers enrolling and using the offerings. MAEOE may want to explore this further in the future.

Other Student Impact Metrics to Consider

Upon reviewing the results, MAEOE staff suggested new metrics they may want to collect via the application process, including presence of an active Green Club, size of the Green Club, and student involvement in environmental actions. Any additions to the metrics survey should be carefully designed and asked to support accurate data presentations. This recommendation dovetails with the recommendation on the prior page to continue improvement of data quality, consistency, and rigor.

J. Sickler CONSULTING