

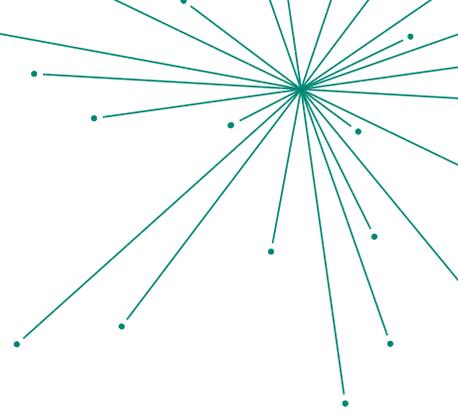
Impacts from COVID-19: Resilient Outdoor Science Programs Need Support as Challenges Persist

Melissa Collins, Aparajita Pande, Craig Strang, Jedda Foreman, and Rena Dorph

EXECUTIVE SUMMARY

More than a year after the COVID-19 pandemic struck the United States and forced widespread lockdowns, closures, and social distancing, the field of outdoor science education continues to be fragile, with many organizations teetering on the brink of collapse. Despite easing restrictions and with new concerns about coronavirus variants, the challenges facing the field persist. Data show that the past year brought devastating programmatic, financial, educational, and organizational impacts. In the first year and a half of the pandemic, organizations were forced to drastically redesign their programming to comply with public health guidelines, often resulting in less and lower-quality programming. Organizations have been faced with massive reductions in revenue and staffing. The number of students who have had opportunities to learn about and make connections to the outdoors has been reduced to a fraction of pre-pandemic levels. However, while the majority of program leaders were unsure at the beginning of the pandemic if they would ever reopen, relatively few have permanently closed as of now.

Program leaders look toward the future with a mix of concern and hopefulness. However, they anticipate even greater revenue losses this year as they work to re-enroll school groups and rebuild partnerships with local educational agencies that are also focused on recovering from the pandemic. Forty percent of the Outdoor Science Programs (OSP) that participated in this study think it is unlikely they will be back to the normal quality and quantity of programming by the end of 2021. At the same time, there are also signs of hope. The majority of program leaders in this study anticipate hiring in coming months to rebuild their staff, and they foresee engaging more youth learners than last year. Even more promising, program leaders seem to have used the past year to reprioritize and clarify their organizational goals, particularly regarding equity and inclusion. Nearly half of the responding organizations reported interest in or prioritization of efforts to increase their equity and inclusion initiatives. It remains to be seen which programs will survive and whether this re-prioritization will allow for organizational changes that would otherwise take decades to achieve. In the meantime, this field requires funding, capacity building, and advocacy to rebuild, redesign, and rehire.



INTRODUCTION

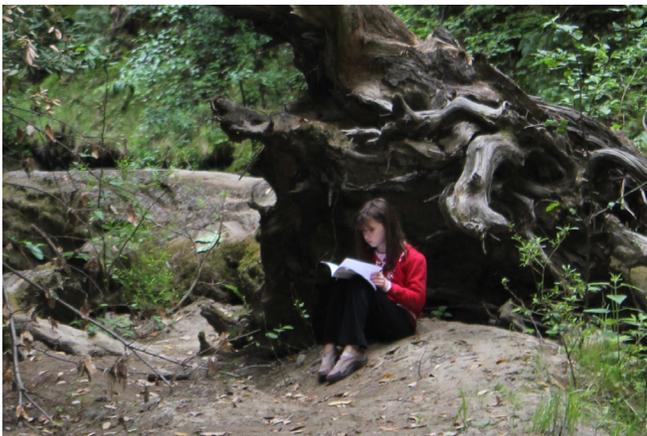
In April 2020, the Lawrence Hall of Science at the University of California, Berkeley, conducted a study to learn about the impact of the COVID-19 pandemic on the environmental and outdoor science education field nationwide. Findings from the survey with an initial sample of 995 programs included concerning projections through the end of 2020; key among them: a projected 11 million learners would lose opportunities to engage in these educational experiences, nearly \$600 million was projected to be lost in revenue, and approximately 30,000 staff would be furloughed or laid off. The study formed the basis of a policy brief (Collins, Dorph, Foreman, Pande, Strang, & Young, 2020) that describes the importance of this field, analyzes the findings from the survey, and makes recommendations for mitigating the potentially devastating threats facing this field. The results of this study of the US were mirrored in similar studies of outdoor education around the world (Borelli, Gigli, & Melotti, 2020; Institute for Outdoor Learning, 2020; Quay et al., 2020).

Though much was learned through the April 2020 study, a number of critical questions remain. In a projection-based study, the most salient question is: to what extent did these dire projections come

to pass? To what extent, and in what ways, did programs adapt to the daunting challenges of the pandemic? Additionally, as we now know, the COVID-19 pandemic (and resulting health-related restrictions) outlasted 2020. Over a year since the start of the pandemic, what is the current status of programs, and what are their prospects and priorities moving forward?

In April 2021, we conducted a follow-up study to investigate these questions and understand the state of the field today, drawing from an existing network of outdoor science programs, the *Better Environmental Education, Teaching, Learning, and Expertise Sharing* (BEETLES) network. Though the initial study's design (widely disseminating the survey through extended networks) yielded a large sample and provided a quick pulse of a field in crisis, it was challenging to fully understand the population(s) from which our sample was drawn to contextualize our findings. The study described in this document focused on an existing, cohesive network of outdoor science programs as a proxy for the wider field, enabling us to have more-targeted data collection, and a clearer understanding of the sample and response rates.

In 2011, The Lawrence Hall of Science at the University of California, Berkeley, launched the BEETLES project to build the capacity of outdoor science programs (OSP) to facilitate learner-centered and nature-centered science learning experiences for youth. The BEETLES project designed a capacity-building model that includes a leadership institute, professional learning sessions, student activities, and myriad resources for program leaders and educators that draw on research-based pedagogical



PROCEDURES AND SAMPLE

From April to May 2021, the Research Group and BEETLES project at the Lawrence Hall of Science, with the support of the National Science Foundation (Award #1612512), distributed an online survey to outdoor science education programs within the BEETLES network. The recruitment pool included program leaders representing 156 organizations that participated in BEETLES Leadership Institutes from 2014 to 2019. A total of 122 surveys were submitted representing 111¹ organizations that participated in a BEETLES Leadership Institute (98 full surveys, 13 partial surveys). This report focuses on these 111 organizations attending a BEETLES Institute (71% of all organizations that participated in an Institute). Organization leaders reported the following characteristics.

GEOGRAPHY

Respondents from **32** U.S. States



PARTICIPANTS

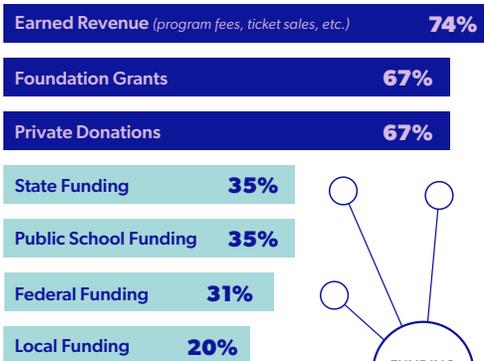
Responding programs serve these audiences. ➤

PROGRAM TYPE

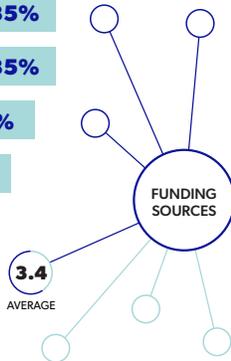
Responding programs were split in terms of whether they were primarily residential or non-residential.



FUNDING SOURCES

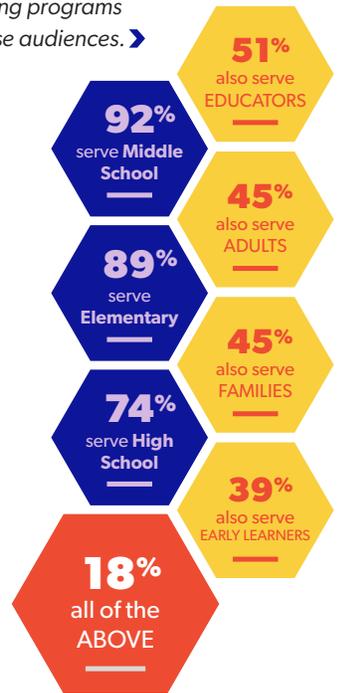
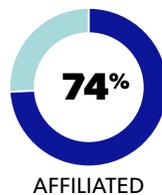


Organizations reported up to 7 funding sources, with an average of 3.4.



AFFILIATIONS

Most responding organizations (74%) were affiliated with at least one external entity.



RESULTS

Approximately 75² percent of the organizations that responded to this survey were able to estimate program losses resulting from the school closures, shutdowns, and social distancing resulting from the COVID-19 pandemic. Based on these data, we estimate significant and long-term effects to the BEETLES network and the larger OSP field.

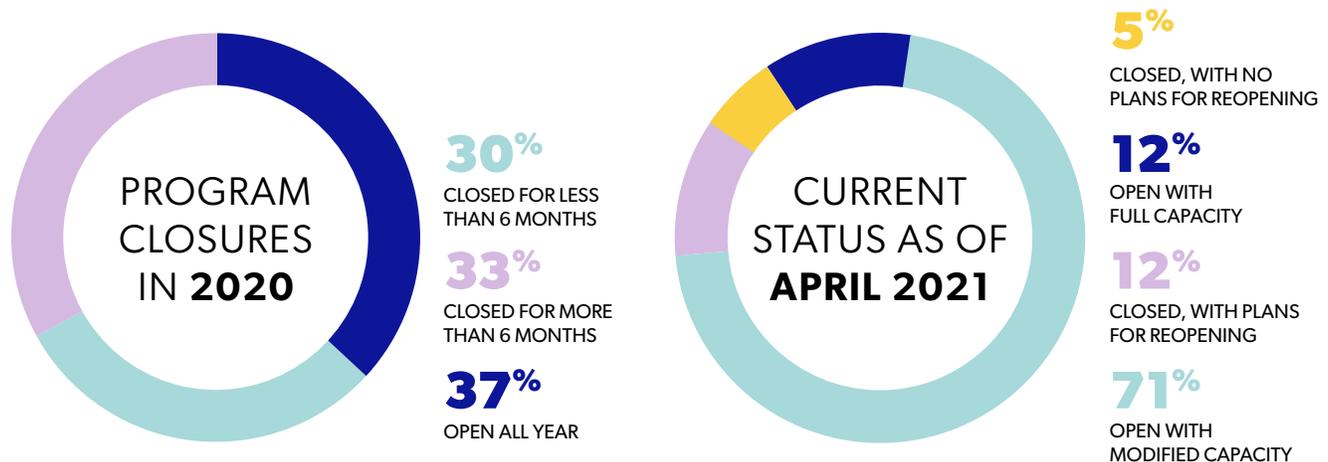
¹Website research and informal correspondence suggested that 3 of the non-responding programs were permanently closed (2% of 156 organizations attending a BEETLES Leader Institute), and 5 of the non-responding programs (3% of organizations) were currently closed for COVID-19 but seemed potentially positioned to reopen. The status of the remaining 38 programs that did not respond is unknown.

²N's for each question are included in tables.

MOST ORGANIZATIONS CLOSED FOR AT LEAST SOME PERIOD OF TIME AND ARE CURRENTLY OPERATING AT MODIFIED CAPACITY.

Over the past year, 63%³ of responding organizations closed down at some point. One of the organizations that responded to the survey reported that it has closed permanently due to the effects of COVID-19. At the time of taking the survey, most programs (71%) were open with modified capacity, though nearly one in five (17%) programs remained closed. Figure 2 describes specific patterns of program status.

Figure 2. Program Status in 2020 and April 2021

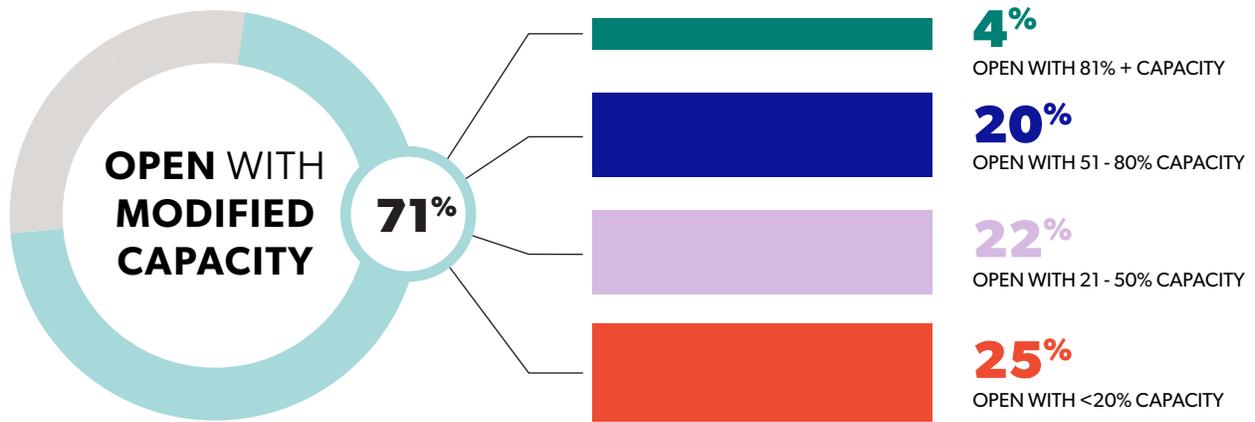


PROGRAMS EXPERIENCED SHIFTS IN CAPACITY, PARTICIPATION, AND EXPERIENCE AS A RESULT OF THE PANDEMIC; MANY OF THESE SHIFTS RESULTED IN DECREASES IN THE QUANTITY AND QUALITY OF THE EXPERIENCES OFFERED.

Capacity and Students Engaged. Those programs that were open reported significant shifts in capacity. Within the 71% of programs that were open with modified capacity at the time of the survey (see Figure 3), most (47%) were offering less than half of their pre-pandemic programming (including 25% that were offering less than 20% of their pre-pandemic programming). Just 4% reported offering the majority (more than 80%) of their pre-pandemic programming.

³Unless otherwise noted, percentages are out of the total number of respondents (111) – e.g., 63% of the respondents, or 70 out of 111 programs.

Figure 3. Spring 2021 Modified Capacity Levels



In total, program leaders reported a 54% reduction of students (~775,000 youth) from 2019 to 2020. This vast reduction in the number of youth translated into an estimated 9 million educational contact hours lost from 2019 to 2020. However, program leaders did anticipate participation increasing in 2021 by nearly 575,000 learners, nearly resuming pre-pandemic participation numbers (with 2021 participation being approximately 86% of 2019 participation). Table 1 summarizes these data.

Table 1. Impact of the Pandemic on Number^a of Students Served

STUDENTS SERVED^a

2019	2020	2021 (anticipated)	Change from 2019 - 2020	Anticipated change from 2020 - 2021
1,425,000^b	650,000^b	1,225,000^c	-775,000	+575,000

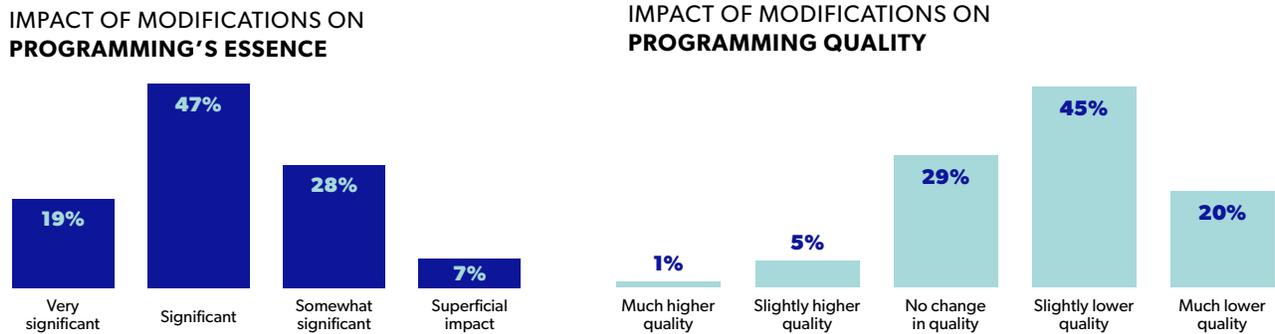
a. Rounded to the nearest 25,000. b. Extrapolated from n=91 to n=92. c. Extrapolated from n=83 to n=92.

Accommodating Public Health & Safety Practices. In response to public health guidelines, organization leaders reported several accommodations and modifications to their programming in both educational content and logistics. Detail about these modifications is included in the figures below. Nearly all organizations required masks (85%), enforced social distancing (81%), and reduced the number of learners participating (81%). Many others reported shifting to a hybrid model (58%) to combine online and in-person experiences, while others either added online as an optional choice (50%) or shifted entirely to online learning (49%). Many modified the educational content of their programs (41%), with some reducing hands-on activities (29%), increasing individual work (19%), or reducing peer discussion (12%). A third (33%) of programs ceased offering residential experiences altogether. Another common modification was to add physical barriers between students (22%), or to make other physical changes, such as supplying hand sanitizer, decreasing shared materials, and moving all activities outside (each mentioned by at least one program).

Quality of Programming. In reflecting on the impact of these modifications, program leaders reported an overall negative effect. Approximately two-thirds (65%) reported that the modifications had a significant impact on the nature or essence of their program experience. In reflecting on changes in quality, approximately two-thirds (65%) reported lower quality/effectiveness as a result of the modifications. See Figure 4 for more detail on these findings.

Figure 4. Impact of Pandemic Modifications on Essence and Quality of Programming

*Percentages do not equal 100% due to rounding.



PROGRAMS EXPERIENCED SIGNIFICANT AND CONSEQUENTIAL REVENUE LOSSES DURING THE PANDEMIC.

Overall, Table 2 depicts that program leaders reported approximately \$130 million in lost revenue from 2019 to 2020, or an estimated 53% reduction in revenue. Looking at averages per program, the typical program lost approximately \$1.4 million in revenue from the 2019 calendar year to the 2020 calendar year, and anticipates an additional loss of approximately \$50,000 from the 2020 calendar year to the 2021 calendar year.

Table 2 also depicts that despite relaxing restrictions, program leaders in the current study predicted an additional \$3 million (3%) in revenue losses in the 2021 calendar year compared with 2020. One possible explanation for this trend is that some services booked and paid for in 2020 were postponed to 2021, limiting the capacity for organizations to bring in new revenue because they need to honor previous commitments. Another conceivable explanation is that programs were able to access relief funding between April 2020 through summer 2021 that is not anticipated to be available during the rest of FY 2022.

Table 2. Impact of the Pandemic on Revenue

	REVENUE - FULL SAMPLE ^a	REVENUE - PER PROGRAM ^b
2019	\$247,000,000 ^c	\$2,680,000
2020	\$116,000,000	\$1,260,000
2021 (anticipated)	\$113,000,000 ^d	\$1,230,000
Change from 2019 - 2020	-\$130,000,000	-\$1,420,000
Anticipated change from 2020 - 2021	-\$3,000,000	-\$30,000

a. Rounded to the nearest 1 million.

b. Rounded to the nearest 10,000.

c. Extrapolated from n=78 to n=92.

d. Extrapolated from n=70 to n=92.

Compared to the anticipated lost revenue (\$600 million for 995 programs) reported in the April 2020 field-wide study, the current organizations reported more than double the loss per program (\$603,015 per organization in April 2020 study, compared with \$1,420,000 per organization in this April 2021 study) that was anticipated⁴ for the wider field.

⁴Note: Due to differences in samples between Study 1 and Study 2, we cannot know for sure whether these differences reflect higher losses for the field overall, or perhaps higher losses for the types of programs in Study 2 versus Study 1.

PROGRAMS MADE SIGNIFICANT REDUCTIONS IN THE NUMBER OF STAFF AND TO PROFESSIONAL LEARNING IMPLEMENTATION EFFORTS.

Given the considerable loss of revenue and participation, programs faced difficult staffing decisions, and program leaders reported laying off over a third of their staff due to the pandemic. Layoffs/furloughs disproportionately affected part-time staff, over half of whom were laid off (compared to about one quarter of full-time staff).

Table 3. Impact of the Pandemic on Number^a of Staff

	Before the pandemic	Since the pandemic	Change
Full-Time Staff	6,200	4,600^b	-1,600 (-26%)
Part-time staff	4,600	2,200^b	-2,400 (-52%)
Total Staff	10,800	6,800^b	-4,000 (-37%)

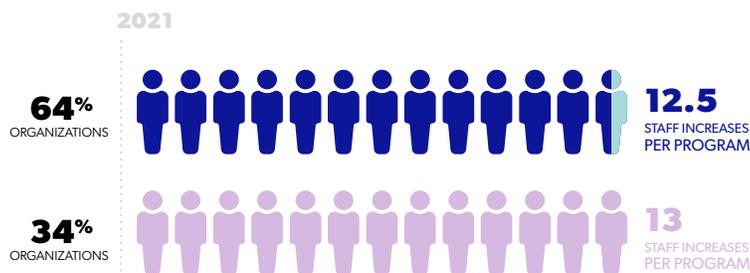
a. Rounded to the nearest 100. b. Extrapolated from n=87 to n=92.

Of the remaining staff at these 92 organizations (just 62% of pre-pandemic staff), 12% have faced a reduction in pay or hours. Again, these cuts disproportionately affect part-time staff who are still employed, 20% of whom have had their pay or hours reduced (compared with 9% of remaining full-time staff).



Organization leaders feel optimistic that the worst of their staffing reductions are behind them. Only 8% of organizations anticipate upcoming reductions in hours or pay for staff (some of which are related to seasonal work and would be expected in a normal year), and just 3% of organizations anticipate additional furloughs. Those few organizations that do expect additional reductions estimate needing to reduce an average of 8 additional staff and also to furlough or lay off 8.

Impact on professional learning. When asked whether programs had continued to access BEETLES materials and resources throughout the pandemic, responses reflected a shift in practices. Specifically, though 99% of program leaders reported that their organizations did use the BEETLES professional learning sessions with their staff before the pandemic, nearly a third (30%) of organizations did not use them at all during the pandemic, reflecting either the reduced staffing available or the shifted priorities during the year of crisis. This pattern suggests that, in addition to rehiring after the pandemic, organizations will need to invest significant time in professional learning for new and existing staff to be able to provide high-quality programming.

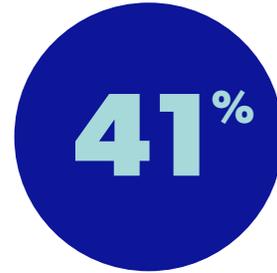


64% of organizations anticipate making additional hires before the end of 2021 (average of 12.5 hires per program), while 34% of organizations anticipate increases in time or pay (average=13 staff increases per program).

THE PANDEMIC EXACERBATED PREEXISTING ISSUES IN EQUITABLE ACCESS TO HIGH-QUALITY OUTDOOR EDUCATION FOR LEARNERS FROM LOW-INCOME COMMUNITIES.

Within the context of outdoor science education, overall patterns mirror those from other contexts (e.g., Tai et al., 2021) – that is, the impact of the pandemic was disproportionately negative for individuals from communities that have been historically marginalized in STEM, namely youth of color and youth from low-income communities. From 2019 to 2020, the overall percentage of learners engaged from these communities decreased due to the pandemic. In 2019, program leaders estimated that 48% of their learners came from either BIPOC (i.e., Black, Indigenous, People of Color) or low-income communities. In 2020, the overall percentage decreased to 44%.

While 26% of programs reported an increase in the percentage of their learners from BIPOC and low income communities, 41% reported a decrease in the same population. Among those programs that increased the percentage of their learners from those vulnerable communities, 52% reported that they had switched to fully online programming (compared with 33% of programs reporting a decrease or no change in percentage of learners from these communities). These program leaders also reported the biggest negative impact of pandemic-related modifications on the quality of their programming – 33% of program leaders reporting an increase in BIPOC and low-income communities also reported a very significant impact on their programming’s essence (compared with 10% and 13% for decrease and no change, respectively) and 32% noted much lower quality (compared with 22% [reduced BIPOC and low income] and 15% [no change in BIPOC and low income]). Therefore, overall patterns suggest that the pandemic exacerbated pre-existing issues in equitable access to high-quality outdoor education for learners from BIPOC and low income-communities (Deines, 2021).



While this is a small percentage drop overall, around two-fifths of programs reported a decrease in the percentage of learners from BIPOC communities (compared with 26% that reported an increase, and 33% that reported no change).



THE PANDEMIC HAD A NEGATIVE IMPACT ON BIPOC STAFF.

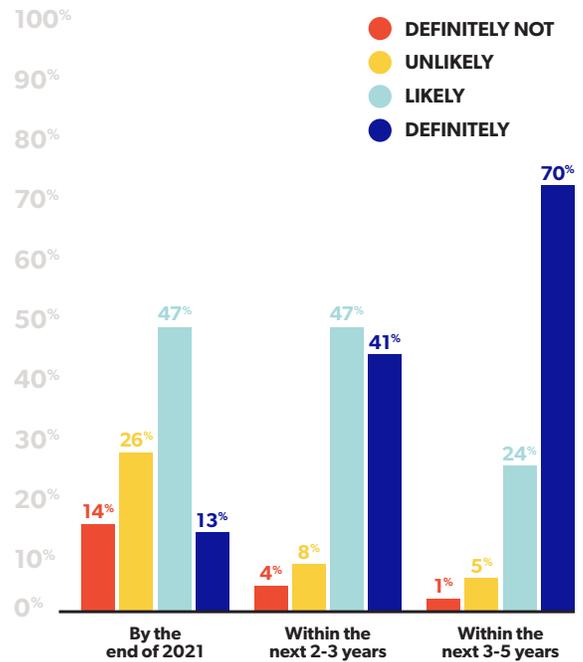
The impact of the pandemic was also pronounced for BIPOC staff. Before the pandemic, BIPOC staff comprised just 26% of all employed staff across responding programs, and, importantly, a quarter (24%) of programs reported that they employed zero BIPOC staff members. Of the remaining programs, program leaders estimated that they laid off or reduced 37% of BIPOC staff due to the pandemic, further decreasing the overall representation of BIPOC individuals in staffing positions. Though the rates of layoffs/furloughs were comparable for non-BIPOC staff, any reductions of an already underrepresented community are a step backward. Some program leaders reflected that the effects of the pandemic on BIPOC staff extended beyond their positions at the organization. As one program leader reflected: *“The pandemic in addition to the social injustices has deeply impacted our BIPOC staff members. Many of them have felt an increase in racial tension and racism in our community and beyond.”*

MOST ORGANIZATIONS BELIEVE IT WILL TAKE BETWEEN 2 AND 5 YEARS TO GET BACK TO “NORMAL”; AT THE SAME TIME, IT’S NOT CLEAR IF SIGNIFICANTLY WEAKENED ORGANIZATIONS CAN SURVIVE FOR THE NEXT 2 OR EVEN 5 YEARS.

Looking ahead, the majority of program leaders are mixed in their perceptions of how quickly they will be able to resume the quality and quantity of programming they offered before the pandemic. In this context, “returning to normal” refers to the conditions that enable organizations to resume their pre-pandemic programming capacity—not to the nature of the programs or ways they operated in the past. In responses to other questions, many leaders recognized the need to change programming, structures, and even goals to address post-pandemic conditions.

While some program leaders believe things will definitely (13%) be back to normal by the end of 2021, many (41%) feel more optimistic that things will definitely return to normal within the next 2 to 3 years, and 70% believe things will definitely be back to normal within the next 3 to 5 years. Though this is promising for the majority, it’s important to note that 30% of program leaders cannot

Table 4. Likelihood of resuming pre-pandemic quality and quantity of programming



confidently say that they predict that things will return to normal within 5 years. It is also not clear if already weakened organizations can survive for the next 2 to 5 years while hoping things return to normal. While many organizations seem to have survived one very difficult year, it is not certain that they can survive multiple difficult years.

PROGRAM LEADERS INDICATED A DIVERSE ARRAY OF PRIORITIES AND NEEDS FOR SUPPORT, THE MOST COMMON OF WHICH WERE THOSE RELATED TO DIVERSITY, EQUITY, AND INCLUSION.

When asked about their current priorities, program leaders listed a combination of logistical as well as strategic needs and goals. These diverse priorities were reflected in program leaders’ responses to a later question about how the BEETLES project could best support the network moving forward. Specifically, program leaders expressed the greatest interest in supports that help develop their staff, leadership, and partner capacities.



Diversity, equity, and inclusion (e.g., developing more culturally responsive curriculum and programs, hiring staff more reflective of the communities they engage; and engaging youth within communities of color and low income communities)



- Financial stability
- Reopening
- Establishing partnerships with school districts



Hiring/rehiring



COVID-19 safety



Returning to pre-pandemic capacity and participation



In-person learning



Redesigning or developing programming materials

RECOMMENDATIONS

More than a year after the COVID-19 pandemic struck the United States and forced widespread lockdowns, closures, and social distancing, the field of outdoor science education continues to be stressed, severely contracted, and even fragile. Substantial revenue losses were reported in 2020 and were projected to increase for 2021. The second year of anticipated losses is especially harmful because virtually all organizations were already weakened, operating with reduced staffing and diminished resources. Despite easing restrictions, the challenges facing the field persist. As was the case in our previous policy brief, this field continues to require significant and immediate support to preserve and enhance the rich, irreplaceable learning experiences it provides to millions of learners every year.

Overall, this field requires funding, capacity building, and advocacy to rebuild, redesign, and rehire.

These organizations need support to rebuild or sustain infrastructure so they can redesign their workplaces and programs to better serve the evolving needs of their communities as well as their staff, and to invest in hiring and leadership pathways for new staff. Below are summarized a number of key recommendations that highlight the most critical, actionable, and consequential investment opportunities that are required to save and eventually uplift this critical piece of our national educational infrastructure.

Prioritize resources to address the needs of the communities of color that were most impacted by the pandemic.

In recent years, momentum had been building for field-wide efforts to increase access and cultural relevance for marginalized communities, but the pandemic significantly disrupted these efforts, potentially setting them back by years. As they rebuild, organizations may feel the need to demonstrate their “resilience” by rebuilding their numbers served as quickly as possible. This will inevitably result in deprioritizing initiatives to design equitable and inclusive workplaces, to redevelop curricular materials to be more culturally relevant, and to provide subsidized programming (such as scholarships, fee waivers, and transportation grants), all leading to the exclusion once again of communities of color and low-income communities. Budgets focused on first centering equity, inclusion, cultural relevance, and social justice can maintain and advance the gains made toward broadening participation in the field and then can allow the field to immediately address the most acute challenges in our society, rather than merely striving to hit simplistic numeric goals. Many program leaders in our study expressed a commitment to these efforts, yet they need encouragement as well as financial support to shift to new ways of defining and measuring resilience as well as efficacy.

Invest in professional learning.

Almost two-thirds (65%) of organization leaders shared that changes due to COVID-19 have negatively affected the quality of their programming. These leaders need significant support to rebuild the capacity of programs to provide teaching and learning experiences that are equal to or better than those of pre-pandemic levels. Improving the quality of programming will require an investment in professional learning, as organizations rehire and rebuild their educational staff so that they can again provide the rich, immersive science-learning experiences they have shown they can provide. In the short term, this initial investment in professional learning may result in lower numbers served, but in the long term, it will result in higher-quality programs, better staff retention, and increased efficacy.

Establish partnerships with local educational agencies.

The COVID-19 pandemic laid bare the vulnerability of the field of outdoor science education, with many organizations operating despite lacking deep ties to local educational agencies that could establish them as essential partners in overcoming the educational impact of the pandemic on students. When these partnerships existed prior to the pandemic, we saw evidence that they flourished during this difficult time. We know that initiating, designing, and sustaining these kinds of nuanced and mutually beneficial partnerships are challenging. Additional support (in terms of both funding and capacity building) for organization leaders to establish and sustain relationships with local education agencies would support a more durable, resilient, and effective field. In addition, organization leaders and network leaders require support to develop and share more-complex partnership models as well as to devise strategies for more-effective advocacy with the decision-making bodies of school systems.

Advocate to promote the value of outdoor learning as safe, engaging, effective, and essential.

The COVID-19 crisis has highlighted the value of being outdoors, where student participants can enjoy space, healthful fresh air, effective learning opportunities, and the calming effect of connecting with nature (Day, 2021; Deines, 2021; Outward Bound Trust, 2020). However, pandemic-related concerns and the ripples of its long-term impacts will likely continue well into the future.

Thus, it is critical that organization leaders, professional associations, policy-makers, K-12 educators, and parents alike understand that outdoor learning offers a valuable and even essential opportunity to meet educational, socio-emotional, and societal goals in safe and effective ways. Support is therefore needed to communicate the value of outdoor learning spaces, made available by nature centers and residential outdoor schools as well as by parks and zoos, to deliver high-quality, in-person education safely. Investment is needed in a coordinated, nationwide campaign to communicate the role these programs play in meeting educational and societal goals. Leading organizations in the field could pool their thought leadership, communications, outreach, and advancement capacities to accomplish this. As well, the funder community could provide access to top-level communications and public relations firms to help engage the public in partnership with provider networks.



CONCLUSIONS

- Over a year since the start of the pandemic, the field of outdoor science education has been sorely tried and tested, while facing innumerable challenges and suffering devastating cutbacks, yet also demonstrating adaptability and resilience. Data show that the first year of the pandemic brought
- devastating programmatic, financial, educational, and organizational impacts. In response, program leaders have expressed a diverse array of priorities, needs, and suggestions for support moving forward. Reeling from massive losses in
- revenue, staffing, and the number of students experiencing outdoor learning, today the field is laser-focused on rebuilding, redesigning, and rehiring. There
- is an urgent need for financial and structural support to rescue the field and to rebuild it in ways that improve access and outcomes for communities of color as well as low-income communities. The field's stated commitment to improving its
- efforts in diversity, equity, inclusion, cultural relevance, and social justice reinforce
- the importance of ensuring the stability and growth of this essential yet fragile piece of the nation's educational infrastructure.

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