PROMISING PRACTICES FOR COMMUNITY PARTNERSHIPS

A CALL TO SUPPORT MORE INCLUSIVE APPROACHES TO PUBLIC PARTICIPATION IN SCIENTIFIC RESEARCH

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ASSOCIATION OF SCIENCE-TECHNOLOGY CENTERS INCORPORATED

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OVERVIEW

Advances in science are critical for improvements to the foundations of our modern world, including public health, technological innovation, the development of energy resources, economic growth, and environmental sustainability. However, participation in the sciences and the U.S. environmental movement remains disproportionately non-Hispanic white and male, even as the proportions of Latinos in the overall population and of women with college degrees steadily rises. The result is inequitable access to the fastest growing parts of our economy, and to participation and representation in decision-making on science-related issues. At the same time, scientific progress relies on a diversity of viewpoints to maximize creativity and ensure that research initiatives are responsive to the needs and priorities of an increasingly diverse nation. In short, there is a need to draw from the full breadth of the national talent pool to facilitate future innovation and improved quality of life for all communities.

Public Participation in Scientific Research (PPSR), organized initiatives in which members of the public take part in scientific investigations, has been effective in engaging participants in the pursuit of scientific knowledge, engagement with scientific practice, and environmental stewardship. However, demographic analyses of large-scale PPSR projects suggest that most participants are white, middle-class, and highly educated (e.g., Raddick et al., 2010). Echoing this research, science center educators and administrators attending a 2012 workshop series on Integrating Citizen Science into Science Center Programming identified the need to engage participants from diverse cultural backgrounds as a priority for their institutions. It is critical that scientists, science educators, community members, and potential funders work together to make PPSR more culturally relevant, more accessible, and more equitable – more genuinely inclusive.

To inspire and improve the efforts of PPSR projects to meet the needs of more diverse audiences, to fulfill the promise of PPSR for all audiences, and with the support of the Association of Science-Technology Centers, we convened a team of PPSR practitioners and researchers, science center administrators, and experts on Equity, Diversity, and Inclusion (EDI) in Informal Science Education (ISE) settings to develop evidence-based recommendations for improving the cultural inclusiveness of PPSR projects and to explore the possible role that science centers might play in this effort. The case studies in this document represent efforts to engage communities that have been most marginalized and disenfranchised in the sciences and PPSR by traditional engagement practices, including communities of color, low income communities, and tribal communities. We hope the insights gained from these studies may also speak to cultural inclusiveness in broader contexts. The aim for this document is to advance the development of cultural competence across the field by highlighting PPSR programs that feature promising culturally inclusive practices. One can argue that traditional practices have been culturally relevant, accessible, and inclusive for a few specific communities. Culturally inclusive practices allow for flexibility to engage participants from other experiences and worldviews. Integrating culturally inclusive practices in PPSR program design is essential for working positively with participants from underrepresented communities. This report is part of an initial exploration of such practices (see also PolicyLink, 2012) to help inspire and inform next steps for the field and to provide guidance for scientists and science educators who are organizing, managing, creating, or expanding PPSR projects.

HOW THE REPORT IS ORGANIZED

We begin this report with a brief overview of PPSR, including outcomes one can expect from it. Following an overview of the case study approach we employed, we outline the most promising practices evidenced in these case studies. Throughout our discussion of these practices, we provide brief exemplary stories and quotations from the case studies. For each of the practices, we include an initial list of potential resources that might be needed to effectively implement the practice. As we mention at the end of the report, further investigation is needed to better ascertain and prioritize these needs and to determine the most effective means by which to support them. We conclude with a discussion of possible future directions, how the insights we draw from the case studies relate to different models of PPSR, and the potential role of science centers in improving the inclusiveness of PPSR projects.

PUBLIC PARTICIPATION IN SCIENTIFIC RESEARCH

Public participation in scientific research (PPSR) – often referred to as citizen science, volunteer monitoring, or community-based research – engages researchers and the public in addressing important questions and issues through scientific investigations. PPSR projects address research questions in contexts as far-ranging as astronomy, public health, genetics, microbiology, weather, animal behavior, ecology, and environmental quality. Projects may be initiated by a scientist, or may emerge in response to a community concern. Participants may engage once or over a long period of time and may take part in person or online.

Broadly speaking, across a wide spectrum of project contexts and approaches, PPSR has advanced scientific research and contributed to a general public that is informed, engaged, and skilled in matters pertaining to science and the environment (Bonney, Cooper, et al., 2009; Bonney, Ballard, et al., 2009). PPSR collaborations yield new scientific knowledge by providing access to more and different data than traditional academic research approaches. Speaking directly to the need to engage more diverse communities in PPSR, the existence of cultural enclaves, particularly within urban areas, with limited participation in data collection has resulted in the underreporting of environmental phenomena from these areas. Without this data and local insights to help interpret them, trends and problems specific to these areas are more difficult to identify, understand, and address. Beyond the potential benefits to science broadly speaking and local environments, PPSR participants may gain new science knowledge, become more interested and engaged in science, and develop more positive attitudes and behaviors related to science, scientific issues, and the environment. Additionally, some projects enable such outcomes as increased social capital and community capacity, and improvements to the economic circumstances of participants (Bonney, Ballard, et al., 2009; Shirk, Ballard, et al., 2012). Of course, these outcomes can only be realized for individuals who become engaged with a given project.

Mindful that there are numerous documents that offer best practices for improving EDI in informal science education and conservation more generally (e.g., Bonta & Jordan, 2007; Bruyere & Salazar, 2010), here we set out to explore how these and other practices align with and may be employed in PPSR settings. The case studies in this report attest to the fact that when underrepresented youth and adults partner with scientists to solve real world problems in local communities, each group gains in scientific knowledge and skills, and in their confidence and motivation for continued scientific pursuits, not to mention the pride that can develop from working together to improve local and global environments.

A CASE STUDY APPROACH

Analyzing a portfolio of case-studies reveals general challenges, overarching themes, and a set of promising practices, while the individual case studies offer concrete examples of both effective practices and challenges. We spoke to representatives from the following projects and organizations:

*** Throughout the document, page numbers refer to the full case studies which are available for download at: http://citizenscience.org/promisingpractices**

We chose our case studies to include different stages and different degrees of progress towards engaging communities that have been historically underrepresented in PPSR. All of the projects presented here also involve significant human interaction, even those that also include a healthy web-component. This is consistent with our personal experience and literature in related fields (e.g., Forster-Cox, Mangad, Jacquez, & Corona, 2007; Gregory et al., 2006): though exclusively web-based self-administered projects may be more effective in terms of cost and administrative time at gathering large amounts of data over larger geographic areas, projects with significant human interaction hold the most promise for successfully engaging underrepresented audiences. We focused on environmentally-oriented projects as they typically involve project staff or community liaisons engaging with participants in outdoor settings (see Porticella, et al., 2013, for the complete case studies).

In these case studies, we see evidence that the following six practices offer promise for enhancing equity, diversity, and inclusion in Public Participation in Scientific Research:

- **Provide concrete benefits for participants**
- **Build on what's familiar**
- **Develop collaborative partnerships**
- **Be flexible and adaptive**
- **Offer genuine, equitable, and sustained personal contact with the community**
- **Uncover and address additional context-specific barriers**

While most of these practices have been recommended for reaching underrepresented audiences in other ISE contexts, we discuss how these practices play out in the context of PPSR and in the process raise several issues that are unique to PPSR (e.g., data collection and submission).

PROMISING PRACTICES

If there were one phrase to sum up what it takes to succeed at bringing together underrepresented communities and PPSR efforts it might be this - it takes time. Most if not all of these practices can be seen as part of a process of establishing common ground and building mutually beneficial trusting relationships, neither of which happens overnight. It takes time to build relationships in any context, but it can be more difficult and slower when it is done across cultural and economic differences. Perhaps equally important is the need to be prepared to work through initial setbacks and to learn from initial missteps moving forward.

> *"It takes time to build trust. We've been told over and over that, when you work large-scale, these conversations just can't happen – the trust building stage must be abbreviated, that it's just not practical – but it must happen."*
>
> *Celebrate Urban Birds (see p. A.19)*

Provide concrete benefits for participants

Providing concrete benefits to all participants of PPSR projects is central to building equitable partnerships. Scientists and science centers generally begin PPSR projects with goals that motivate their own participation, such as facilitating advances in science, providing STEM education to local communities, or addressing environmental concerns. For many communities, the opportunity to make a contribution to science or to help the environment is not, by itself, enough to make the PPSR project a community priority. The goals and aspirations that motivate communities to act in other realms are as diverse as the communities involved. One reason to invest time in building relationships between PPSR practitioners and community members is to understand the goals of each community so that participation in PPSR projects can be aligned with those goals. While much effort is required to understand community goals, this list, drawn from our discussions with PPSR practitioners and community workers, provides a variety of program components that may benefit the PPSR experience:

- Life/job skills
- Healthy outdoor activities
- Youth and adult education, including but not limited to STEM education
- Opportunities to contribute to improving their community
- Cultural connection
- Safe educational activities that can involve the whole family
- Professional, academic, and/or social networking opportunities
- Stipends or paid internships
- Food

Potential Resources Needed: cultural competence training, funding (for stipends, food, etc.), time, commitment to expanding project scope beyond data collection

Build on what's familiar

Engaging underrepresented communities with PPSR involves finding common ground and bringing together the strengths of the projects with the strengths of the communities. As mentioned in the introduction, PPSR, science more broadly, and the environmental movement may all be enhanced by the diversity of geographically, culturally, and historically grounded perspectives, interests, priorities, experiences, practices, knowledge, and skills that underrepresented communities can bring to bear on today's most pressing issues. To truly succeed, PPSR must find ways not only to respect but also to tap into and provide additional outlets for the expression of these capacities. Examples of strategies that have been employed in this regard include creating opportunities to involve family and friends, speaking and presenting materials written in the languages spoken at home, reaching out through bilingual media, providing familiar points of entry to PPSR (e.g. art activities, community events), meeting and working in familiar locations, and using meaningful cultural references. Each of these practices can help bridge the gap between what potential participants are already familiar with and what might otherwise be a very unfamiliar, perhaps intimidating, PPSR experience.

> ***"In order to have culturally relevant PPSR programs you have to start with grounding students first in their cultural connection to plants and animals – the significance, how to care for them, uses, old relationships that are integral to understanding the community's relationships with animals. All of that was done before engaging with any field techniques."***
>
> *Hopa Mountain and the Native Science Field Centers (see p. A.7)*

Potential Resources Needed: cultural competence training, culturally diverse bilingual staff, educational programming expertise, and knowledge of bilingual media outlets and programming and of how to engage them

Develop collaborative partnerships

Directly related to building on what's familiar, partnerships between participants and their families, PPSR practitioners, community leaders, and organizations that serve underrepresented groups have been central to the success of the projects we examined. Partnerships built on a sharing of knowledge, goals, and resources have been successful at bridging the gap between practitioners and underrepresented groups. Effective local leaders and organizations not only know their communities well, but are also known and trusted by their communities. This makes them ideally situated to be good interpreters and liaisons who can help develop new PPSR projects or adapt existing ones so that they are relevant to and accessible by the communities they serve. They can also advocate for the projects to help build trust between their communities and project developers.

In the case of Native Science Field Centers, representatives from Native community schools were intimately involved in the development of the project, informing what participants would learn and how data was to be collected. They focused on strengthening traditional values through understandings of the relationships between plants and animals and the daily activities and cultural traditions of each of their tribes.

> ***"Starting with the cultural grounding helped to reinforce traditional values – how much we take, what is the protocol, only taking what you need...and leaving an offering... Kids had to know why all of this was important before doing scientific data collection."***
>
> *Hopa Mountain and the Native Science Field Centers (see p. A.8)*

Developing an understanding of the needs and goals of local leaders and organizations and providing them with some of the resources to accomplish their missions are perhaps the most worthwhile investments that can be made towards engaging underrepresented audiences with scientific and environmental endeavors through PPSR.

> ***"We have had lots of success partnering with community based organizations of all sorts...that are embedded in and trusted by the community."***
>
> *Celebrate Urban Birds (see p. A.18)*

Similarly, developing partnerships between practitioners, participants, and their families, particularly within the context of existing community-organized activities, is another promising approach that brings together the other approaches discussed in this report. People become more engaged in learning experiences when the content is personally relevant and/or when they have a say in the learning process itself, such as in choosing content or informing the development of activities (Falk, 2001). Developing opportunities for deeper involvement in the project by participants and their families encourages a sense of shared ownership of the project. Drawing again on the case of Hopa Mountain's Native Science Field Centers, parents of the youth participants contributed topics that they wanted their children to learn, including specific skills such as tanning hides.

Other project representatives integrated participant voices in the context of internships and mentoring programs providing opportunities to develop transferrable skills and increased self-confidence. For instance, participants were engaged in developing program materials and activities, and in reaching out to their local communities, among other activities.

> ***"Interns were invaluable to the project. They created engaging educational activities that connected with their audiences' background and interests. Interns also built relationships with community members, educators, and leaders and extended personal invitations to attend educational programs hosted at nearby parks."***
>
> *Environment for the Americas (see p. A.36)*

> ***"Interns see themselves as being scientists and part of a larger community"***
>
> *California Academy of Sciences (see p. A.5)*

Participants in the projects we investigated not only contributed ideas to the projects, but engaged others in the projects by leading workshops, visiting schools and other community organizations, and by encouraging friends and family members to participate. In one case, a youth participant in Nosotros Radio's Latino students, Advancement, Commitment, and Excellence (L.A.C.E.) program was not only recruited by another participant and

friend but also happened to be a pigeon enthusiast skilled in training pigeons. The passion with which he spoke of his birds inspired his peers in the program to engage in the Celebrate Urban Birds project with more interest and greater confidence.

Community members, scientists, and educators all have much to offer the PPSR enterprise and we need to work towards providing the resources that will help transform PPSR into a more open endeavor where the unique capacities of all stakeholders can be brought to bear on the search for better understanding and solutions to the challenges facing the environment and science more broadly.

Potential Resources Needed: Awareness of local organizations who may be interested in partnerships, funding (for food, organization materials, organization staff time, peer/intern compensation), and time to learn community goals

Be flexible and adaptive

Having a flexible structure for a project is necessary for engaging audiences with different levels of familiarity, interest, trust, confidence, and skill with scientific investigation. Providing a variety of ways to participate helps practitioners and participants find common ground.

> ***"...no matter what your audience is, it's important to design a project that's responsive to the participants – that's especially true when you're dealing with diverse groups. You have to get a little creative if you want people to come who don't often participate in these kinds of things."***
>
> *New York Hall of Science (see p. A.29)*

As exemplified in the Hopa Mountain example in the previous section, although the ultimate goal of a PPSR project may be data collection, it may take time with a number of scaffolding activities to develop the interest and confidence necessary to collect and submit data for scientific analysis. These scaffolding activities may be outside of the PPSR project. As exemplified by the partnership between Camp Compass and Celebrate Urban Birds (see p. A.22), practitioners may build on the work of community organizations who have already engaged their members with nature and are able to move more quickly into data collection. In this case, part of Camp Compass' mission is to teach urban youth about conservation and the outdoor activities and philosophies of hunters and fishers. Thus, camp members were already engaged and knowledgeable about the connection between what they observed in nature and environmental conservation. As such, they were prepared to take the next step into recording their observations and submitting them for scientific analysis.

In some cases, however, the data collection and submission process may be exactly the thing that draws people to the project. Some people are excited by the idea that they or their children have the opportunity to be "real" researchers. Likewise, many participants will engage more seriously when a project invests in their ability to make valid observations. Members of the Camp Compass Academy were explicitly told that they were working for scientists at a respected university (see p. A.22). Connecting the activity to a larger professional picture and instilling confidence in the youth that they have the ability to gather authentic data, motivated participation in data collection in an engaged and effective manner. The kids were told that somebody "out there" needs your help; that they could do something good for others. Once again, it takes practitioners, participants, and local leaders working together to come to a mutual understanding of each other's needs and what they can offer one another, and the flexibility to be able to effectively adapt and re-adapt projects over time.

Potential Resources Needed: cultural competence, educational programming expertise, staff time

Offer genuine, equitable, and sustained personal contact with the community

Personal contact means doing more than talking with community members simply to get their input on project activities. Whether speaking directly with project participants or community leaders, the most productive conversations are genuinely equitable, personally meaningful, and sustained over time. It also involves having someone knowledgeable and passionate about the project available to explain it, to express their passion in person, and to figure out how to reach common goals through the project. Our case studies showed this passionate participation by project staff to be more effective than relying solely on community liaisons who were not as familiar with the project, its purpose, its flexibility, or its history. As in the case of Nosotros Radio's implementation of Celebrate Urban Birds, though this community partner had been effective in integrating the project into its plans for a community development program, it was not until project staff visited the program participants and clearly explained the project and demonstrated their passion for it that the participants began to understand and appreciate the value of the project and to begin thinking about how to make the project work for them and their community.

> ***"To me a true dialogue is key. And this is not easy. It takes an enormous amount of time and commitment and nobody wants to fund it because the results are hard to see. It's important not to engage in dialogue in a patronizing way – 'what can WE do to HELP you' – but to really engage in a conversation... Sometimes the conversation needs to happen about things that have nothing to do with the project – (Did I just spend two hours talking about our relatives in South America? The best Cuban food? Our kids?). You need to be patient."***
>
> *Celebrate Urban Birds (see p. A.18)*

> *"The relationships that Tualatin Riverkeepers built with organizations that served communities of color changed with one question: 'What are the outcomes and programs you want, that we can help you achieve?' The question TRK had been asking before was, 'Would you like to participate in our program?'"*
>
> *Tualatin Riverkeepers (see p. A.15)*

Potential Resources Needed: cultural competence, funding (for travel and project sustainability), culturally diverse bilingual project staff, staff time.

Uncover and address additional context-specific barriers

The entire discussion thus far could be reframed in terms of barriers to the success of efforts to connect PPSR projects and underrepresented communities. A project that lacks the commitment or ability to provide concrete benefits for participants, is irrelevant and unfamiliar to a community, employs an inflexible top-down model of community engagement, and is unable to engage communities in a genuine, equitable, and sustained manner can all result in failure to bridge the gap between PPSR and communities whose voices and abilities are underrepresented in scientific and environmental endeavors. While these general strategies can be effective across geographic and cultural contexts, care must be taken to become aware of context specific barriers or constraints that can be uncovered through community partnerships and open discussion with communities.

In our case study discussions with community leaders and seasoned PPSR practitioners, we were made aware of a number of concerns that may need to be addressed. We have already mentioned the importance of using the languages spoken at home by participants and of building awareness of and confidence with project activities and their requirements. However, there is also a need to understand family work time constraints in order to schedule activities and meetings at convenient times. Access to computers with internet access may also be needed, not only to submit and work with data, but to facilitate communication between and among participants, partnering leaders and organizations, and PPSR project staff. There may be a need for transportation to and from wherever the project may need participants and their families to travel to. Varying degrees of participant literacy, family stress, financial constraints, and immigration status may all pose challenges to participation. The case of Rocking the Boat provides an example of how financial constraints, for example, may impact participation:

> ***"Students are pressured by their families to work (for income), as early as freshman year. During the school year it's 'OK' (but not ideal) for them to spend their time with Rocking the Boat, but it's not OK during the summer, so they miss the ideal field season."***
>
> *Rocking the Boat (see p. A.12)*

Potential Resources Needed: time to uncover barriers, culturally diverse bilingual project staff (e.g. for creating bilingual project materials), funding (e.g. for stipends, computers, internet access), local transportation.

DISCUSSION

Given sufficient commitment and resources, locally and nationally implemented PPSR projects have been successful at engaging underrepresented communities through the above practices. Continued effort is needed to better understand and provide the resources needed to facilitate these practices. While a thorough needs assessment and gap analysis of the field is a necessary next step (particularly for geographically large-scale projects), our preliminary investigation suggests that future work might focus on ways to increase access to the following:

- Cultural competence training
- Project staff time (e.g., to build relationships with underrepresented communities and learn about their goals and capacities, to uncover community-specific barriers)
- Funding (e.g., for additional culturally diverse bilingual project staff, project staff travel, materials and staff time for local organizations, participant compensation, general project sustainability)
- Educational programming expertise (e.g., to maintain project flexibility and integrate community priorities into projects)
- Awareness of local organizations who may be interested in partnerships
- Knowledge of bilingual media outlets and of how to engage them

The above list summarizes potential resources drawn from the case studies for which greater support is needed. However, we acknowledge that other needs may exist despite the lack of information about them in these particular case studies. For example, very little appeared in our investigations pertaining to culturally appropriate evaluations of the projects or of the EDI initiatives undertaken by project administrators. Culturally appropriate evaluation, both of projects and of EDI initiatives undertaken to connect projects with underrepresented communities, is vital to programmatic success and deserves further attention and support. Novice PPSR practitioners in particular may first need to learn the value of evaluation. When evaluation was referenced in the studies, it was often either as an afterthought that project administrators wished they had thought of earlier (and hope to incorporate in the future) or it had been conducted at a larger well-resourced institution (e.g. a science center) where a culture of evaluation and the resources to conduct evaluations were already in place. Resources must be developed to facilitate culturally appropriate evaluation and the evaluation of diversity initiatives within PPSR projects.

Additional attention should also be given to exploring what might be needed to facilitate access to PPSR data by underrepresented audiences as well as the development of the ability to pursue important issue-based questions through data analysis. Easy access to and the ability to use accumulated scientific data to address local concerns are potentially very powerful opportunities to engage underrepresented communities with science and the environment, opportunities that are unique to PPSR.

Implications for Different Approaches to PPSR

PPSR projects emerge from different needs and engage the public in different ways, from Contributory approaches where members of the public are asked to collect and contribute data and/or samples, to Collaborative approaches where members of the public assist scientists in developing a study and collecting and analyzing data for shared research goals, to Co-created approaches where members of the public define an issue and pursue a full research agenda with input from professional researchers as needed (Shirk, Ballard, et al., 2012).

Each approach comes with its own structural benefits and challenges and individual projects may employ multiple approaches to satisfy different needs. Geographically large-scale projects are often designed with a Contributory approach, offering opportunities for anyone to participate as data collectors. Because of the geographic scale, these projects often maximize impact but with limited capacity to connect personally with specific communities. Projects that take a more Collaborative or Co-created approach are, by nature, more responsive to community needs, whether adapting priorities and protocols to local research interests, or emerging completely from community initiatives to address issues of concern (Shirk, Ballard, et al., 2012). These approaches have been shown to generate more robust and integrated outcomes for participants but generally engage a relatively small number of people and can be time- and resource-intensive to develop and sustain [See Bonney, Ballard, et al. (2009) for a more thorough discussion of PPSR].

The deeper and more personally relevant engagement Collaborative and Co-created approaches can offer relative to a Contributory approach, along with the hands-on experiences addressing current local environmental concerns with family and friends, can build stronger connections between science and everyday life, expanding and enriching one's perspective on the world and enhancing the belief in the ability to make a positive impact through scientific investigation. While these approaches tend to be used in smaller-scale project implementations, we seek strategies to support practices that facilitate these kinds of learning outcomes for a wider range of participants in any project, regardless of geographic scale.

The majority of the projects we profiled are primarily Collaborative in that local communities informed the design and delivery of the projects. Some were focused projects developed specifically to address local or regional concerns, such as Rocking the Boat (see p. A.11) and Hopa Mountain and the Native Science Field Centers (see p. A.7). Others demonstrated the site-specific use of national projects in locally relevant ways, such as Camp Compass Academy's and La Joven Guardia's use of Celebrate Urban Birds (see p. A.21 and A.23, respectively), Connecting Cultures (see p. A.36), and the use of BudBurst at the New York Hall of Science (see p. A.25). Notably, however, much of the collaboration was experienced at the organizational level while individual community participants were involved primarily in data collection.

We therefore need to better understand promising practices (and the resources needed to facilitate them) for engaging underrepresented communities in all models of PPSR. We see great promise in Collaborative approaches to PPSR, where the resources of existing PPSR projects can be leveraged to support communities in addressing local concerns. Collaborative and Co-created approaches to PPSR offer the greatest opportunity for integrating many of the identified promising practices for equity, diversity, and inclusion. We seek additional strategies for facilitating connections and supporting collaborative relationships between underrepresented communities and existing projects of any geographic scale.

A Potential Role for Science Centers: Facilitating EDI in Collaborative PPSR

The science center community has shown great interest in, and forward-thinking work towards, engaging diverse audiences, and in generating insights into how to be more inclusive in the development of science programming (e.g., Maryboy, Begay, & Peticolas, 2012). This professional community has also shown particular interest in PPSR in recent years, with great potential to facilitate Collaborative research. Some science centers, such as the California Academy of Sciences, have created highly customized opportunities for youth and communities to engage in research (see p. A.3). Others, including the New York Hall of Science, have leveraged existing PPSR projects to offer engagement opportunities that can address both local and national interests (see p. A.25).

Science centers are better situated than national-scale PPSR projects to forge meaningful relationships with local communities, and can provide useful resources (e.g., experience with educational programming, dedicated staff from the local community). Existing PPSR projects (of any geographic scale) can make available rigorously tested protocols, data sheets, training and educational materials, and connections to a larger dataset for situating local observations in the contexts of time, space, and ongoing research. A growing Community of Practice (CoP) around PPSR, facilitated by the Association of Science-Technology Centers and CitizenScience.org, is in development to help facilitate connections between science centers and PPSR practitioners. This CoP will make it a priority to support the application of these promising practices for increasing equity, diversity, and inclusion, and will work to connect all members to larger EDI conversations and expertise within the ASTC community.

CONCLUSION

In line with other national efforts to expand involvement in science and environmental research, practice, and decision making, we must continue to support efforts to connect the capacities of a more diverse public with the opportunities for meaningful engagement that Public Participation in Scientific Research offers. This document is part of an initial move in that direction intended to inspire and inform scientists, science educators, PPSR practitioners, community members, and their supporters towards meaningful next steps. We welcome additional discussion, debate, and examples of similar work in this area to further fuel the effort.

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