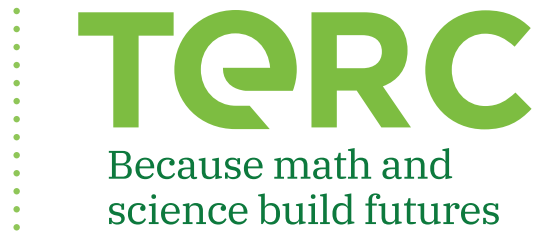


Backyard Wilderness
Educational Outreach Campaign
LIBRARY EVALUATION REPORT



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Executive Summary

Overview

The STEM Education Evaluation Center (SEEC) at TERC conducted an evaluation of the *Backyard Wilderness* educational outreach campaign, as implemented by sixteen sites (fifteen libraries and one nature center) between July 2018 and April 2019. The evaluation focused on understanding libraries' implementation of the campaign, visitors' experiences with the campaign's components, and outcomes that followed from the campaign.

Methods

Multiple instruments were developed to collect data and triangulate findings, including:

- A **survey** of visitors to the *Backyard Wilderness* display;
- An **exhibit observation log** for conducting live observations of visitors interacting with the display;
- A **Bioblitz observation protocol**; and
- **Interview protocols** for telephone interviews with librarians, their partners, and parents who engaged with aspects of the campaign.

Evaluators analyzed quantitative and qualitative data from these sources, as well as from additional data provided by librarians (e.g., artifacts, visitation statistics), to understand how the campaign was implemented and experienced, and to identify outcomes that followed from the campaign.

Campaign Implementation and Experiences

Backyard Wilderness Exhibit

Sites varied in their approaches to set-up and use of the exhibits, as well as in the extent to which they were able to track visitations to the exhibit. Data from observations by library and evaluation staff of 214 live exhibit interactions, across 14 sites, indicated the following:

- At least 830 visitors were observed interacting with the display during periods of time when live observations could be conducted and logged;
- Visitor groupings ranged in size from a single child or adult to a class of 27 kindergarteners, with an average group size of 3.9 people;
- On average, visitor groups spent 13.5 minutes at the exhibit;
- Observers rated the overall level of observed engagement with the exhibit, on average, between 2 and 3 on a scale from 0 ("Not at all engaged") to 3 ("Very engaged"), with slightly higher average ratings for children under 10 years of age than for older children or adults;
- The telescopes were the most prominent feature of the exhibit, with 91% of observation logs indicated at least some level of interaction with them, and drew visitors into the

space; the scavenger hunt featured prominently as well, and librarians generally felt it was the most engaging component.

Bioblitz

Between August 1, 2018, and April 14, 2019, evaluation staff attended 14 *Backyard Wilderness* Bioblitz events, which attracted a total of 430 people. Individual event attendance ranged from 10 to 53. Most librarians included the iNaturalist app (and some used the Seek app), along with other materials to support participants' engagement. The Bioblitz structure varied across locations; for example, some were relatively unstructured, whereas others involved a combination of presentations from area experts and semi-structured exploration of the event site.

Curated Book Collection

The curated book collection was generally a less prominent feature of the campaign, but in some cases really highlighted library collections. Many librarians indicated that materials they set out beside the display received greater than typical visibility during the campaign period, which was sometimes reflected in circulation statistics.

Library Staff Roles

It was clear that library staff served several critical functions as mediators between *Backyard Wilderness* and members of their communities. These functions included:

- Connecting new or supplemental programming with the campaign;
- Modeling, teaching, and guiding, e.g., with regard to using iNaturalist and engaging with the exhibit; and
- Curating experiences to make the campaign really fit the assets and interests in their different locations.

Campaign Outcomes

Library staff were generally positive about the experience of hosting the *Backyard Wilderness* display and facilitating campaign activities. The campaign reached a range of audiences especially well, including families with younger and/or multi-age children, homeschoolers, and groups (e.g., school groups and Girl Scout troops).

Libraries and their surrounding communities benefited from participating in the campaign through:

- New or enhanced partnerships with other organizations;
- Local infrastructure improvements associated with the campaign;
- Enhancement of library materials;
- Increased capacity for new programming; and
- Enhanced visibility for the library and increased engagement with community members.

Additionally, the campaign fostered awareness of, and interest and engagement in, nature and the environment, in the following ways:

- It provided experiences library visitors might not otherwise have had.
- It provided opportunities for rich conversations to occur among families and other participants, experts, and library staff.
- It facilitated awareness of local resources, opportunities, and biodiversity.
- It catalyzed interest and informed engagement in nature and the environment.

Recommendations

Evaluation findings point to specific implications and recommendations for future partnerships with libraries, for improving materials and experiences from *Backyard Wilderness* and future outreach campaign efforts, and for additional topics of interest to libraries and their patrons.

Lessons learned for building and expanding successful future partnerships with libraries include:

- Looking for opportunities for synergy between Tangled Bank Studios materials and the needs of libraries;
- Recognizing that advance planning is critical when working with libraries;
- Creating a staged approach to introducing campaign elements, especially the display; and
- Planning for multiple check-in points with program staff.

Suggestions for improving materials and experiences with *Backyard Wilderness* and other similar outreach campaigns include:

- Expanding the display so that it is multi-sensory and/or dynamic;
- Designing more interactive telescopes;
- Recognizing that cursive writing may be a barrier for some people, especially children;
- Developing additional iNaturalist training materials; and
- Supporting librarians to facilitate use of the family and educator guides.

Other science topics for which a similar display and associated programming might be welcomed include:

- Robotics;
- Astronomy and space science;
- Dinosaurs;
- Machines and how things work;
- Engineering;
- Additional biological science topics, e.g., the human body;
- Culturally inclusive sciences (e.g., Native American interpretations and understandings of scientific phenomena); and
- Climate science

Overview

The STEM Education Evaluation Center (SEEC) at TERC conducted an evaluation of the *Backyard Wilderness* educational outreach campaign, as implemented by sixteen sites selected by Tangled Bank Studios, between July 2018 and April 2019. The sixteen sites (fifteen libraries and one nature center) implemented the campaign in a range of ways. Librarians made implementation decisions in consideration of numerous factors specific to their locales, such as the physical layout of their libraries, perceived access of their patron populations to sites rife with flora and fauna to explore, and a sense of the availability of appropriate partners to support the success of visitors' experiences with the campaign.

SEEC's evaluation focused on understanding the range of ways libraries implemented the campaign, and the experiences visitors and program attendees had with elements of the campaign. Evaluators also identified outcomes that followed from campaign participation for libraries and their surrounding communities, as well as for families and other groups who experienced the campaign materials and associated programs.

Methods

We used multiple instruments to collect data and triangulate findings related to campaign implementation, experiences, and outcomes. Our overall intention was to identify consistent patterns of beliefs and behaviors and to note interesting variations. To this end, we developed several evaluation instruments, described briefly below, and included as Appendices 1 through 6 of this report.

Survey of Visitors to the Backyard Wilderness Display

We developed a survey to collect data on the composition and characteristics of groups visiting the display, the kinds of engagement visitors had, and visitors' opinions about the extent to which the display was engaging and sparked interest in nature. The survey was available for completion either on paper, or online, using NoviSurvey software on a Chromebook provided by the evaluation team and positioned by library staff near the display.

Exhibit Observation Log

To facilitate understanding of how visitors interacted with the display, their reactions to the experience, and the role of library staff and other adults in supporting visitor engagement, we created an observation log to be used on site. Because evaluation staff were generally only able to collect data at each site once during the campaign, library staff were asked to observe patrons at the exhibit, using the logs to the extent that their staffing and other logistical considerations would allow.

Bioblitz Observation Protocol

Evaluation staff traveled to Bioblitz events at fifteen of the sixteen sites. During each event, evaluators used the observation protocol to document the Bioblitz, focusing on aspects such as the role of partners, the resources provided for and used by participants, the structure and

types of activities throughout the Bioblitz (e.g., introductory meeting, debriefing session), and comments and behaviors indicating participants' reactions to the experience.

Interview Protocols

We conducted semi-structured telephone interviews with librarians at all sixteen sites, and aimed to interview at least one partner and at least one parent from each site wherever possible. Parents were identified for interview participation through a combination of direct interaction with evaluation staff at Bioblitz events and a survey question asking for volunteers to provide their contact information for potential interview participation. Interviews were audio-recorded and transcribed for analysis.

Additional Data Sources

In addition to data collected using instruments developed by the evaluation team, we asked librarians to provide circulation statistics for books from the special collections they curated as part of the campaign, and we collected artifacts (e.g., handouts, photographs) from events we attended. Some librarians also maintained their own notes about experiences, implementation decisions, and perceived outcomes, and provided them to evaluators as an additional data source.

Analysis

For analyses of quantitative data, collected mainly through the exhibit survey and observation logs, we generated descriptive statistics using Excel. Because of wide variation across sites in levels of survey participation, and in the extent to which library and evaluation staff were able to log observations of visitors at the display, our analyses of quantitative data focused on the full set of data across all sites together, rather than on variation within and between sites.

Qualitative data (i.e., interview transcripts) were coded by the TERC evaluation team using an iterative process, leading to development of a codebook (see Appendix 7). Coding and analysis took place using NVIVO qualitative data analysis software, and coding reports and queries were subsequently analyzed for emergent themes.

The sections that follow detail the most salient findings that emerged from our analysis, using direct quotations from participants wherever possible to help illuminate the findings.

Campaign Implementation and Experiences

Backyard Wilderness Exhibit

Although the core physical materials for the exhibit were identical, sites varied in their approaches to set-up and use of the exhibits. Some implementation decisions were driven by space constraints. For instance, smaller more rural libraries tended to limited options for where the display could be placed, which in some cases led to the exhibit space being used in flexible ways. Some librarians encouraged use of the space as a gathering area, conducting story hours on the exhibit's rug, and occasionally embellishing the exhibit features with additional materials that connected to their chosen books. As an example, during a pirate week themed story hour for young children, one librarian placed a wooden plank on the exhibit's rug and concluded the story hour with children "walking the plank" into the wetlands depicted on the

rug. In some larger libraries, the exhibit was able to be set up in large, often high-traffic areas. Two sites needed to set up the exhibit in enclosed rooms offset from the rest of the library, which limited access to the materials when staff were unavailable to supervise the space. In general, librarians worked hard to incorporate the exhibit into their library setting, as having it for their patrons was a real point of pride for librarians, as one explained:

(from Marinette, WI) I thought it was pretty cool. I mean, it's something you usually see in like a really neat kids' museum or something, and for our little area, we don't really have something like that, so I thought it was a pretty nice display, and large and easy to understand, and the interactive things were pretty cool.

Set-up of the exhibit materials was generally straightforward enough for staff, with some sites experiencing minor glitches, such as missing components or supplies, or imperfections in the fit of some assembled materials (e.g., one or two “telescope” poles that did not fit together as expected). Dismantling of the exhibit was similarly straightforward, although several librarians commented about challenges and delays in shipping their packed-up exhibits once they had finished with them.

Sites also varied in the extent to which they were able to track specific numbers of visitors to the exhibit, since in most locations, the exhibit was available during all library business hours, and many visitors were not directly observed by library staff. Two libraries reported specific visitor counts during their roughly 8-week display periods (261 visitors in Johnson City, Texas, and 319 visitors in Warren, Michigan), and others provided rough estimates (e.g., approximately 20 visitors per day in Montrose, Colorado, and anywhere from 5 to 20 visitors per day on average in West Bridgewater Massachusetts).

Exhibit observation logs completed by library and evaluation staff provide additional insight into the number and characteristics of visitors to the exhibits, as well as the nature of visitors' interactions. Quantities shown in Table 1, such as the total visitors to the exhibits, are undoubtedly underestimates because observations occurred only sporadically during the period the display was set up in each location. A total of 214 formal observations were conducted at a total of 14 of the 16 sites, which involved focusing on the exhibit behaviors and reactions of a total of 830 exhibit visitors across these sites. Groups of visitors ranged in composition from a single child or adult to an entire elementary school class of children (as in West Bridgewater, Massachusetts, where all of the school district's 114 Kindergarten students visited the exhibit as part of an event where they obtained their first library cards), with an average of 3.9 people in each group. Most groups contained at least one adult and at least one child, and of groups with children in them, about a third had only children of preschool age or younger. Although there was a wide range in the amount of time visitors spent at the exhibit, from a fleeting moment to extensive engagement with and play in the space, exhibit interactions observed by library and evaluation staff lasted an average of 13.5 minutes.

TABLE 1. EXHIBIT VISIT DATA FROM OBSERVATION LOGS ACROSS SITES (N = 14*)

	TOTAL ACROSS ALL SITES	MEAN	MIN	MAX
Observations logs completed	214	15.3	4	47
Group size	-	3.9	1	27
Total visitors observed	830	59.3	11	226
Time observed visitors spent at exhibit (minutes)	2799 (approx. 47 hours)	13.5	<1	90

* Observation logs were completed at 14 of the 16 sites. Due to staffing concerns and exhibit location within the library, two sites were unable to conduct formal observations, and there were no visitors to the exhibit when evaluation staff were on-site to observe.

Observation logs included a space for library or evaluation staff observers to rate visitors' apparent level of engagement with the exhibit overall, on a scale of 0 ("not at all engaged") to 3 ("very engaged"). These ratings were intended to provide a measure of the depth of visitors' interactions with the exhibit materials, distinguishing, for example, a visitor's quick peek into a telescope before moving away from the area from one who was clearly drawn in by information on the display or by the scavenger hunt process. Table 2 provides a summary of ratings of observed engagement by broad age category. On average, participants were moderately to very engaged, with levels of engagement of younger children generally rated higher than those of older children.

TABLE 2. OBSERVER RATINGS OF VISITOR ENGAGEMENT

LEVEL OF OBSERVED ENGAGEMENT*	N	MEAN	MIN	MAX
Adults	157	2.1	0	3
Children over the age of 10	56	2.2	1	3
Children under 10	153	2.4	0	3

* Observers rated engagement on a scale from 0 ("Not at all engaged") to 3 ("Very engaged").

Visitors appreciated the high quality visuals on the display and engaged with its features in many different ways. One mother who visited the exhibit in Peters Township, PA, described how, though her toddler, preschooler, and nine-year-old were drawn to different aspects of the exhibit, engagement with the features collectively prompted conversations within the family:

They had to look at everything, teeny tiny. I know, because my 2-year-old was very interested. You know, he would look through the scope and aim to see the butterfly, and you know, my daughter could identify that it was a monarch butterfly, and then we talked about how we feed them in our yard, but then the 3-year-old kept going back, cause there were three different scopes. So he kept going back and forth. And then there was a worm, and worms are kind of strange, still, and my 9-year-old picks them up with no problem. My 3-year-old thinks they're strange. You know, so my 9-year-old is explaining worms to her 2-year-old brother.

Table 3 indicates the relative frequencies of specific observed behaviors at the exhibit. (The rank order of frequencies is consistent with what participants who completed the exhibit visitor survey reported as well.) These data suggest that the telescopes functioned as the most prominent feature of the exhibit, drawing visitors (especially children) into the space by taking advantage of their natural curiosity to view what is inside. More than three-quarters of observation logs noted visitor engagement with the scavenger hunt as well.

TABLE 3. FREQUENCY OF ENGAGEMENT WITH SPECIFIC EXHIBIT FEATURES (N = 214)

FEATURE	N	%
Looking into telescopes	195	91.1
Searching for scavenger hunt species	165	77.1
Reading information about any of the species on the scavenger hunt banner	140	65.4
Reading text on exhibit walls	122	57.0
Noticing/reading “What’s Next” list	72	33.6
Looking at/picking up curated books	71	33.2
Noticing/reading tree root quotes	70	32.7
Other*	19	8.9

* “Other” responses included playing (e.g., with stuffed animals, or jumping on tree roots and species depicted on rug), reading unrelated books, or drawing in the exhibit space; taking a copy of a family or educator guide; downloading iNaturalist and/or Seek apps; asking library staff questions about exhibit and related programs; and using the exhibit as a backdrop for photographs.

The scavenger hunt was perceived by many librarians to be the most engaging aspect of the exhibit. Several librarians noted that many of their families returned multiple times to continue looking for species they couldn’t find during a prior visit, and some suggested that this challenge made the exhibit relevant for a longer period. A library staff member explained:

(from Thornton, CO) I would definitely say the sort of scavenger hunt of finding the, was it 15 different species, or whatever that was, that was really the most engaging part. Obviously the biggest part of the audience there was parents with younger kiddos who really seemed to enjoy that, searching for them. And I think there’s one species, the wolf spider or something, that was really hard to find, and that was sufficiently engaging for people to find a couple of the species and then like, oh, where’s this, and they really seemed to enjoy that and really get something out of that.

Visitors who were observed tended to be less likely to notice and/or read both the “What’s Next” list on the banner beside the display, and the quotes written on the tree roots pictured on the rug. Only about a third of observed visitors clearly took note of or picked up books in the curated collections that librarians had set up near the exhibits.

Librarians and other observers noted that the quality of children’s engagement with the exhibit often depended on whether, and how, the accompanied adult was engaged with them. One librarian offered some examples of the range in which adults did or did not engage alongside their children:

(from Peters Township, PA) *Some parents would be reading the signs and saying, oh, what did you find? You know, this. Oh, I see it. Do you see it? Like that's how I would describe a more engaged parent, as opposed to a parent that was either checking something out and not even physically there at the time, or just on their phone or talking to another adult while their kids were playing around in the exhibit... And you could also hear the parents who took it an extra step in questioning it, like okay, we're looking for an owl. Where does an owl live? Does an owl live on the ground? Okay, we're looking for a salamander. Where would we probably find a salamander? Would the salamander be in the sky? And engaging their child that way, in more than just, can you find it, but helping them think through like where this animal would be located.*

Some adults supplemented the seek-and-find activity with a discussion of content about the particular species from the banner, or chatted with children about experiences with particular species, making connections to their home environments and what they may have observed or experienced there.

Bioblitz

Most librarians were previously unfamiliar with the concept of a Bioblitz, and librarians appreciated the orientation materials provided by Tangled Bank Studios to support them in hosting their events. Between August 1, 2018, and April 14, 2019, evaluation staff attended 14 Bioblitz events associated with the campaign, and some sites hosted additional events that evaluation staff were unable to attend. Although one event attracted no non-staff participants, the remaining Bioblitzes ranged in attendance from 10 to 53. In total, approximately 430 people participated in Backyard Wilderness Bioblitzes. (In addition, 144 students participated in a mini-Bioblitz led by the Marinette, Wisconsin, librarian at an environmental field day event not explicitly connected with the campaign, hosted by one of her Bioblitz partners.)

Bioblitz events generally followed the guidelines suggested by Tangled Bank Studios through the hosted webinar and Dropbox materials, although they varied in key ways, depending mostly on the nature of partnering organizations and Bioblitz sites. In some locations, particularly where partners had very specific expertise, the Bioblitz activities were combined with nature programming and presentations from partnering organizations. For instance, the Orange County, Florida, branch library organized a series of presentations about local flora and fauna, followed by a period of less structured small-group exploration of various areas of a park. In contrast, the Anythink Wright Farms library branch in Thornton, Colorado, used state parks and wildlife naturalists at its Bioblitz to explore alongside participants, providing guidance particularly with the iNaturalist app. Participants seemed to be generally engaged and interested at most events, although formats that provided a fair amount of opportunity for less structured exploration, especially when accompanied by a wrap-up gathering where participants could discuss their findings, appeared to be particularly successful.

Generally, librarians opted to host events in local, county, or state parks within a relatively short distance of the library. Some held events that were farther afield, including in Montrose, Colorado, where a bus was provided to transport participants to the Black Canyon of the Gunnison National Park for a Bioblitz-style nature walk. In many cases, the involvement of a partner especially familiar with either the Bioblitz site or the concept of a Bioblitz really made a difference for participants' engagement.

Much of the feedback provided by participants and librarians regarding the Bioblitz events concerned use of the iNaturalist app (and, to a lesser extent, the Seek app). There were mixed feelings about the utility and benefit of the apps at the Bioblitz. For example, one partner portrayed the role of the iNaturalist app at the Bioblitz in a very positive light, describing the way in which it enhanced the experience and learning opportunities particularly for an audience of upper elementary and middle school aged students:

(from Kenton County, KY) I think it added significantly, because not many people are botanists or have an interest in botany, so they don't clearly quite know like the different types of plants, you know, other than poison ivy. Like most of our girls were like, I don't know what this is. So it was great for me to be able to see, the girls get excited about nature, and try to figure out, well, you know, that's actually not a ladybug. That's a cucumber bug, and just looks like a ladybug. And that's stuff that they would otherwise not know... I really think the middle school girls, we call them juniors, but they seemed very interested, and I think it was because they could use the app to figure out what it was. And you know, there again, them just trying to know things. At that age, we see such a drive for just knowledge, and they just want to soak up whatever they can. And that app, I felt like, really made a big difference to them to be able to say, oh, well, mom and dad doesn't know what that is. Nobody knows what this is. Here, I can figure it out on my own. So it kind of gives them that knowledge, independence, that they're all looking for at that age.

Conversely, parents at other Bioblitzes found use of the iNaturalist app to be a bit distracting, or less relevant to their children than the action of exploring outside. The following two comments illustrate these concerns:

(from Chewelah, WA) I feel like it's, the kids don't benefit really from it, because they're not, you know, they're just out there using a tool to take a photo, and it's not always ended up being the best photograph for identification purposes. But then once it's uploaded and the adults are the ones who are verifying identification and it's being checked by others. So I sort of feel like there's like this missing link, where the kids are taking photos and they're seeing things, but they're not necessarily learning what they are, like if someone's not there to tell them.

(from Montrose, CO) The reception up at the Black Canyon wasn't very good, so we didn't really take any pictures. And plus, you know, my son wasn't super excited or, I don't want to say not super excited, but he didn't seem to have as much interest as taking pictures of things and finding out what they are. It was more of a, you know, like oh, let's find a blue thing and draw the blue thing. And then he did actually pay more attention than I expected to some of the stopping points. But I think that, I don't know. I think he just may be a little too young to really have much interest in learning specifically about a type of flower, a type of tree, or something like that.

Reactions to the Seek app were generally lukewarm at best, with those who tried both Seek and iNaturalist preferring the latter even for use with children. However, few parents who were interviewed indicated that they had used the Seek app, opting instead for iNaturalist, in some cases due to incompatibility of Seek (at that time) with their mobile devices. One librarian paraphrased the feedback she received about Seek from parents in her community:

(from Chewelah, WA) So the parents who did try the Seek app that was promoted on that particular display usually didn't like it. They did not, they were not a big fan of Seek. And so that was the one aspect that I think they really didn't appreciate, was the fact that the app that was promoted on there was something that they didn't feel like was a great app to be promoting.... They basically said it just seemed like the only point to it was to take a picture of something, and

they didn't understand what the rest of the app was supposed to be for. So other than that, yeah. I don't know. There was just a lot of people saying, yeah, I tried that app that's on that display, and I really wasn't a fan.

In addition to the apps, many libraries provided a bingo sheet of plants, insects, and animals specific to their area. This improved the Bioblitz experience when there were not enough devices available or when the adults deemed the app too cumbersome for young children. Observations suggested the bingo sheet added an element of fun for children of a variety of ages who were excited to fill their cards and, in some cases, earn prizes for this accomplishment.

Curated Book Collection

Although a less prominent feature of the campaign, collections of books curated by librarians often augmented or expanded the *Backyard Wilderness* experience. At many sites, especially in well trafficked libraries, librarians indicated that the curated materials seemed to circulate frequently, although relatively long (generally 3- to 4-week) circulation periods made it complicated to gauge whether the frequency of check-outs during the display period differed significantly from typical circulation patterns. Having books on connected topics displayed near the exhibit appears to have refreshed visibility of some items. In the Johnson City, Texas, library, library staff used signage to connect the exhibit and curated books to another area of the library that housed a permanent special collection of books on the local Texas Hill County environment that had, long ago, been bequeathed to the library. Having an opportunity to highlight this collection gave librarians, and some in the local community, a sense of pride.

At least two libraries used their participation in the *Backyard Wilderness* campaign as an opportunity to build up their collections of books about nature, biodiversity, and the environment. For instance, in preparation for campaign participation, the Peters Township, Pennsylvania, librarians carefully reviewed their existing collection and purchased 37 new items along the same theme as the campaign to showcase during the exhibit period. Similarly, the Kenton County library branch in Erlanger, Kentucky, used the stipend provided for the evaluation to refresh their materials.

In this regard, the curated book collection provides a context in which to see how various elements of the campaign supported one another. A librarian described one function served by the curated books while reflecting on the relationships among different campaign components:

(from Peters Township, PA) I think they were nice promoters for each other. We were able to promote the film, and then people saw this and were able to make it back to the film if they didn't see it. I think the display, and then like the books we had, or the exhibit and then the books we had maybe, it's like a clothing store. You wouldn't think about it if it's not right there in front of you, so having it right there in front of patrons helped them think about, you know, maybe the gardening books for an adult patron, or a story about camping for a younger kid, stuff like that.

Roles of Library Staff in Supporting Campaign Experiences

As interpreters and implementers of Tangled Bank Studios' materials and expectations, and as experts in communicating with members of their own community, librarians played a substantial mediating role in connecting *Backyard Wilderness* to the public. Across all elements of the campaign, there were several critical functions librarians played that emerged as clear drivers of how families were able to engage with campaign materials and experiences.

Connecting new or supplemental programming with the campaign. Especially at larger libraries or those operating within relatively large or complex library systems, we found that programs were often developed around specific themes well ahead of time. In addition, site visits to libraries and discussions with librarians suggest that libraries often mobilize multiple strands of programmatic offerings around these themes. Some librarians artfully developed connections between new or supplemental programming and *Backyard Wilderness*. For instance, Peters Township, Pennsylvania, librarians implemented several new programmatic elements:

We were able to think outside the box with things that we typically do here at the library, and we offered our patrons a lot of programming that we never would have thought to run before, so we did the Backyard Birdies, a citizen science day, as well as World Water Day program, along with Backyard Wilderness, and just completed Backyard Wilderness by doing, in honor of Earth Day, a make-and-take DIY succulent terrariums. We brought in a live rabbit...so we had our Backyard Wilderness bunny.

For the Backyard Birdies, we also have a partnership with the Carnegie Museum of Natural History, where they'll send us different kits and resources. So they actually sent us a bunch of real bird nests of different birds that are in our area, so the kids were able to see that while they were doing the Backyard Birdies event, so that was fun. So we kind of did try to branch out and do different things with it.

Modeling, teaching, and guiding. Especially in the context of the Bioblitz, librarians took on a facilitation role involving the use of iNaturalist (and sometimes Seek) in nature exploration. This role often involved development or adaptation of materials provided by Tangled Bank Studios (e.g., handouts and PowerPoint presentations regarding how to use apps) as well as troubleshooting when challenges arose (e.g., multiple librarians experienced issues putting appropriate boundaries around Bioblitz sites in their iNaturalist projects).

Librarians also provided direction for engagement with the exhibit, such as by encouraging visitors to enter the exhibit space or orienting participants, especially children, to its features. The following two quotations from participants in Thornton, Colorado, the first from a librarian and the second from a parent, illustrate these functions:

I think that it was necessary for the adult with younger kiddos, smaller kiddos in particular, to sort of translate the instruction. I mean, it's not hard to figure out what to do in the space and how to interact, but having an adult say, oh, we're looking for these animals or insects. And once they had that little bit of understanding translated, they were off and running the games for themselves. So I feel like that's the role that adults play for the younger kids.

It actually was the librarian that told us— We were asking her for a seek and find book, and she told us that there was going to be a new exhibit. And we're at the library either once a week or once every other week, so two to three times a month. And she said yeah, you know, it's kind of like a real life seek and find book in this room.

Curating experiences. Librarians were very intentional about how they structured campaign experiences, especially involving their Bioblitz events. Some carefully selected materials to support children's interest and engagement in nature exploration during or after events. These materials included activity books, bug catchers, magnifying glasses, and nature journals, among others. At the Bioblitz-style nature walk event at a national park near Montrose, Colorado, the librarian provided each child with a fairly basic nature journal for recording observations

during the walk, as well as a pencil carved from a twig. One of the rangers who accompanied the group described the merits of having the journal as part of the experience:

It appealed to many different learning styles, either the people that like to draw or the people that like to use words, the watchful mathematical people. So it was very open, and just versatile. And so this child that could not write yet. Like I think he could write his name, and I had to help him write his name, loved, I would point out different things and invite him to draw or think about, or to touch. At one point there were little, we had like baby, I think in that area of the trail we were growing fir trees, like baby saplings. So I encouraged him to touch the leaves, or the needles, and explain how they felt. And there was a plant, a different plant on that trail that I did know what it was professionally, as an ecologist, as a ranger. But I asked him what he thought, and based on how it felt and how it looked, he would name it. And so we named it, I believe it was like skunkbush or something. And he asked how to write it. He knew his letters, and I helped him write it down.

Campaign Outcomes

Staff at all sites conveyed a sense of positivity regarding the experience of hosting the Backyard Wilderness display and facilitating related campaign activities. Librarians, parents, and partners who participated in interviews highlighted specific successful aspects of the campaign and its apparent impact, including reaching a range of audiences; supporting the development of new or enhanced programming, partnerships, infrastructure, and materials; and fostering new or enhanced awareness and understanding of, and interest and engagement in, nature and the environment.

The campaign reached a range of audiences.

Participants in the campaign ran the gamut. However, specific categories of audiences stand out as being especially well engaged by various elements of the campaign.

Families, especially with younger and/or multi-age children. Although geared primarily toward children in grades 3 through 8, the campaign seemed to be particularly attractive to families with younger children, or with children at multiple ages including pre-Kindergarten. On several occasions, we saw that when older children had opportunities to engage with younger ones in the exhibit, their attention was sustained for longer. We also heard that older children seemed more likely to return to the exhibit if accompanying and helping a younger child. Children were drawn to the scavenger hunt component of the exhibit, and parents were delighted to find active, outdoor activities in the Bioblitz and other related events hosted by some libraries. One parent described the exhibit engagement of her two children:

(from Peters Township, PA) It sparked a lot of conversation between my 9-year-old and my 3-year-old, which was nice because they weren't fighting. Like my daughter really took on kind of a teaching role, which was really awesome to see, which is why I think we spent so much time there, because she spent, like we would look at one thing, and then, you know, she would talk about it to him, and we would go from a higher telescope and go point it on the mat or on the board. And then we would go back and look at the next telescope and then they'd do the same thing. So they just kept going round and round until they kind of ran out of things to look at.

Homeschoolers. Several sites have large populations of homeschooling families who often turn to the library as both a meeting place and a source of educational content and materials.

Homeschooling families learned about new resources and ways of engaging with nature through their library visits and campaign events participation. Some families took copies of the Family Guide that was distributed at libraries and added it to their coffers. We heard specifically of one Warren, Michigan, child who occasionally attends meet-ups with other homeschooled children, who made a presentation for his peers about iNaturalist after attending his community's Bioblitz.

Groups. Some people engaged with the campaign in large groups. In Orange County, Florida, an entire school group attended the Bioblitz together with their two teachers. In Kenton County, Kentucky, and West Bridgewater, Massachusetts, groups of Girl Scouts engaged in the Bioblitz together, and in some cases screened the *Backyard Wilderness* film or did other campaign related activities as well. West Bridgewater's library used the exhibit as a focal point of an event in which the town's five kindergarten classes went on a field trip to the library for an orientation and to obtain their first library cards; the librarians highlighted the exhibit and encouraged children to explore it as a way of making the event more special. For Girl Scouts in particular, the BioBlitz aligned with key activities and interests, including particular journeys and badges about citizen science engagement and environmental stewardship, and thus enhanced the work of the entire group.

Libraries and their surrounding communities identified important benefits from participating in the *Backyard Wilderness* campaign.

Many libraries operate on constrained budgets while also being tasked with asserting their value and relevance to their communities, at a time when technological innovations have rendered traditional conceptions of a public library obsolete to some people. The campaign provided libraries and communities with both tangible and intangible benefits, many of which hold promise for supporting libraries' relationships with their communities as well as for leveraging the libraries to engage the communities in new ways.

New or enhanced partnerships. The formation of new partnerships, or the expansion and enhancement of existing ones, was a notably valuable outcome of the campaign. Libraries formed or strengthened working relationships with a range of organizations, including state or national parks or forests; local and state government agencies, such as parks/wildlife or recreation departments; conservation organizations; experts in horticulture or birding; universities and their extension services; and local educators. Although somewhat dependent on the capacities and expertise of library staff, many librarians identified specific ways in which they have worked (or will continue to work in the future) with partners well beyond the end of their *Backyard Wilderness* participation. The following quotations illustrate the quality and importance of these relationships for librarians and partners:

(from Kenton County, KY) For me personally, it was just reaffirming how important community partnerships are. You know, with that kind of a program and how important it is to kind of keep in mind nature to everybody, and kind of the way we affect it.

(from Johnson City, TX) It was real great to actually meet them in person and have conversations with them and get to know them personally a little bit better, and then, you know, know that they are a resource for us for when we have events, that hey, maybe we want to incorporate the master gardeners to come in here.

(from Orange County, FL) *The connections that we made for the Bioblitz... [We] went to Backyard Biodiversity Day, which was an event hosted at a local botanical garden by the Native Plant Society. So [name redacted], who presented for the Native Plant Society at the Bioblitz, invited us to that event, and we tabled with them and did library outreach and had some games for the kids and a leaf rubbing bookmark, so it was really neat.*

(from Kenton County, KY) *The commitment that the state has to collaborative programming with us, and the connection to the Girl Scouts was, I think is good too. We've been in discussions with them a number of times about potential future collaborations since that time. We haven't done anything else with them as yet, but there are a number of things in the works.*

In the following quotation, a partner from a bird conservancy spoke of how her own organization's programming was enhanced through collaboration with a library at a Bioblitz, leading the organization to run its own Bioblitz this past spring:

(from Thornton, CO) *We have been sort of back-burnering the idea of bringing the Bioblitz here to Barr Lake, and it just really helped me to see sort of, you know, how it could work, maybe what would work better in terms of like the group size and things like that. And it helped me to understand iNaturalist, because I honestly didn't know about it, I'm ashamed to admit, prior to that. And so it was very beneficial in my work, cause it was a way for me to get to learn about it first-hand, and not just sitting at my desk trying to figure it out kind of thing.*

Infrastructure. The needs of Backyard Wilderness campaign efforts sometimes required structural changes or enhancements by a library or partner setting. While these changes presented a bit of a challenge, the challenge turned into an opportunity to address a critical local need. In Kenton County, Kentucky, for example, installation of permanent outdoor wireless internet in the city park, where the Bioblitz was held, exemplified this impact, as we heard from a librarian:

(from Kenton County, KY) *One of the things from the Bioblitz that actually showed me how committed the city was to the collaborative programming we've been doing is, they actually installed wifi at that park for the Bioblitz. It was a benefit to the city also, but it was the prompting of the program that made them decide to go ahead and do it.*

Materials enhancement. As described earlier in this report, some libraries used their campaign participation as an opportunity to evaluate their library collections and to enhance these collections with new items that highlighted connections to local wildlife and environmental issues. A librarian described this benefit:

(from Warren, MI) *Based on the books, too, that circulated, that were on display, we are trying to go and increase those collections, especially in our adult section. I mean, the kids' section is pretty good, cause I mean, animal books are always fairly popular. But some of the adult things. When we were trying to go and come up with books on display, we realized that some of the books that we had were a little bit older, or there were new books on these topics that we purchased just for, to go and make sure we had them on display. So that's going to be an area of our collection that we're going to go and be looking at to develop in the future.*

Increased capacity for new and enhanced programming. The campaign pushed libraries to try new structures for programs, including bringing participants off-site and holding events outdoors. Similarly, especially for libraries that have historically run a lot of nature-related programming, the campaign seemed to enhance existing offerings. Librarians spoke of the

programming benefits of various aspects of campaign participation in a range of ways, as the following quotations from staff at five different libraries illustrate:

(from Thornton, CO) *It was a really great active experience for our library customers, which plugs in very well to sort of what we try to do on a regular basis for our staff side anyway, in terms of creating experiences for people to see and engage with that don't necessarily require a ton of staff involvement. And so just having the exhibit for people to browse through, peruse, and you know, be able to come to us and ask any questions, but not necessarily need an immediate introduction from staff, but could just kind of stumble into it, and kind of discover it on their own, plugged in really well to our philosophy and what we try to do on a regular basis.*

(from Mott, ND) *It helped bring the outside in, and it helped me promote the garden too in a way that I wasn't able to do before. Because when we went to the garden, these two work really well together, because we already had an outdoors portion, an outdoors outlet for the library. But this helped me get it a little more organized because of the recourses that were provided, and helped me look at it another way to make it just a more rich experience.*

(from Orange County, FL) *Now I have all those programs in our little program bank that we can draw on, and we share those with the rest of the library, so they have those to call upon.*

(from Akron, OH) *We're working with a local photographer to do a program on using your cell phone to take nature photos, and also on using the iNaturalist app. So half the class is going to be taught by the photographer, and half of it will be taught by one of us, on how to use iNaturalist. And we're taking it to a couple of our different branches, and we're trying to disperse it geographically around our system so that people can come to this and learn how to do that in preparation for either participating in the City Nature Challenge, or with our own Bioblitz, which will probably be in the fall...I don't think that we would have become aware of the city nature challenge, if it wasn't for the Backyard Wilderness kind of shoving us into being aware of iNaturalist and what we can do with iNaturalist.*

(from Montrose, CO) *In addition to the Bioblitzes, about the same time, we did one of the first, one of my first programs off-site. About the same time we were planning to get the Backyard Wilderness, we made a collaboration with the botanic gardens. So we did five programs with botanic gardens spanning from April to September. And the Backyard Wilderness was one of my first ones I did off-site, and then we went to the botanic gardens and did another one shortly after that. So this was kind of the impetus to start not just having things right at the library. Where else can I go? And making collaborations and going somewhere else. So I'm looking at those sort of things of taking kids somewhere else. Can I transport them? This is the first time using the bus. That worked out really well. Can we do that again? Where else can we go?*

Enhanced visibility for the library and increased engagement with community members.

Librarians identified ways in which the campaign drew community members into the library or its programming, as illustrated by the following excerpts from librarian interviews:

(from Thornton, CO) *[A patron] visited the library after the Bioblitz, and she was having a conversation about how excellent it was... So after that experience, she made an effort to come out into the library itself and continue using it. So I thought that was a really neat connection between that being her first program and continuing to want to use the library beyond that point.*

(from Montrose, CO) *Because of the Bioblitzes, we saw an uptick in those patrons who attended our Bioblitz for coming and participating in more library activities.*

(from Johnson City, TX) *It showcases the library isn't just about books. You know, it's about... community and engaging and learning beyond the written word, and about each other.*

(from Peters Township, PA) *Again, great for patrons to see that, instead of, you know, just dusty books on a shelf, we can be physically present in these other spaces, and we could help you get to them. One of the things that we created for our display was backpacking kits, so like four backpacks that could be checked out that had maps to the local park in it, little binoculars, bug guides, and things like that. So getting outside of just like the traditional book world.*

The campaign fostered awareness of, and interest and engagement in, nature and the environment.

Data collected as part of the campaign evaluation highlight evidence of the campaign's fostering library visitor and program participant interest and engagement in, and awareness of, content and resources pertaining to biodiversity, conservation, and other environmental issues in their local communities and elsewhere. For instance, as indicated in Table 4, visitors to the exhibit who completed the survey tended to find the exhibit itself quite engaging, and on average, indicated that engagement with the exhibit raised their level of interest about nature and made them think about nature between "somewhat" and "a lot."

TABLE 4. VISITOR SELF-REPORTED RATINGS OF EXHIBIT IMPACT

RATINGS OF EXHIBIT EXPERIENCE*	N	MEAN	MEDIAN	MIN	MAX
How engaging did you find the exhibit?	98	4.0	4	1	5
How much did the exhibit raise your level of interest about nature	98	3.5	4	1	5
How much did the exhibit make you think about nature?	98	3.9	4	1	5

* Survey participants responded, on scales from 1 to 5, to questions about the extent to which the exhibit was engaging, raised levels of interest about nature, and made them think about nature. A rating of 3, the scale's midpoint, was meant to indicate "somewhat." See Appendix 1 for other response option wording.

Even more compelling are particular forms of awareness, interest, and engagement that we identified through our analysis, illuminated by other data sources.

Opportunities for experiences library visitors might not otherwise have had. One of the powerful aspects of the campaign was that, through libraries, it enabled people to have new and enriching experiences. For instance, an attendee of one of the Montrose, Colorado, Bioblitz events shared that, despite living in the area for many years, he had never been to the national park where the event was held, and he credited the library's coordination of an event with transportation for facilitating this new experience. The librarian in the small town of Mott, North Dakota, articulated the value of opportunities especially for those in remote locations:

The impact that something like this makes at a tiny library, at a tiny town like this, where we don't have a lot of options. I mean, there are not options everywhere staring us in the face. The impact it made here was huge.

Similarly, in Orange County, Florida, children in a school group who attended the Bioblitz at a nearby park had direct access to adults with expertise to support their noticing various species

at a micro-level, in a relatively urban area not generally considered to have much access to nature. The librarian elaborated:

When one of the kids came out of the bus and looked around, and was like, this is so classy. You know, it was just—You know, it's so cute. Like the wonder of like a really nice park, like that kid has never seen before, or been exposed to, or might be exposed to any time again in the near future. So being able to do that, I think was really cool, and the teacher was saying that the kids were asking if they could even do that again tomorrow, like come play at a really nice park. So that's a good thing.

Even in places where outdoor activities were a very prominent part of people's lives and livelihoods, the campaign still had impact by enhancing existing opportunities. For instance, in such a location, a staff member described how the campaign fostered a different kind of thinking about what community members encounter in nature:

(from Shepherdstown, WV) I think it was a really great opportunity for families to get out with their kids and have like a little bit more of a purpose to their hikes. Yeah, I think having people there to expose people to things that they might not see on their own is also, was really impactful. Like we had someone getting fish out of the stream, and it's kind of hard to see without, you know, having particular equipment to get fish

Opportunities for rich conversations to occur among families and other participants, experts, and library staff. Participants appreciated the ways in which the campaign brought people together around a common theme and activities. Many took note of the learning that discussions within these group activity contexts fostered, such as building awareness for local environmental issues. At one Colorado Bioblitz, children could be overheard talking to a parent and a ranger who partnered for the event about whether animal scat found along a trail “counts” for iNaturalist, prompting a discussion about species identification, animal diets, and food chains. In another area at the same Bioblitz, a six-year-old girl noticed a large area of plants growing in a field with a substantial quantity of holes in their leaves and proclaimed, “Hey, those are caterpillar bites! I've never seen so many!” This announcement caught the attention of a Colorado Parks and Wildlife naturalist who then chatted with the girl and her father about her find. Similarly, noticing a pile of animal bones at the side of a trail during a Bioblitz led four 9- to 12-year-olds from two different families to contemplate what might have happened leading to the animal's demise; one child proudly theorized that the animal had been “mauled,” based on the way the bones seemed to be scattered erratically.

The interactions that occurred around the campaign activities were meaningful to librarians and partners as well as families, as in the case of a partner who described a rare one-on-one interaction with an interested child during a Bioblitz:

(from Montrose, CO) I quickly made a friend with a, I think he was 6, 6-year-old participant that enjoyed having one on one time with a ranger, which I could provide because I wasn't the one leading the whole group. And I got to informally help that child explore, interact with the environment around us.

Additionally, an interview excerpt in which a librarian discussed the exhibit and other programming illustrates the power of the campaign, as enacted by librarians, to foster discussion:

(from Peters Township, PA) I think with the exhibit and some of the meaningful conversations that we heard happening with families, and through our different programming that we did,

where it wasn't just, ooh, nature, cool, like the World Water Day was about water conservation and clean water, and we made water filters and things like that. So hearing kids ask about, like what do you mean, people don't have clean water, and asking their parents about that later. So being able to spark those conversations and serving as a space in our community for that was good.

Awareness of local resources, opportunities, and biodiversity. A notable accomplishment of the campaign was raising participants' awareness. Some participants learned about places previously unfamiliar to them to go explore. Others became more aware of the complexity of nature within their relatively urban environment. The following quotations illustrate the importance of participants' heightened awareness as a campaign outcome:

(from Warren, MI) *I think I was expecting they'd be, okay, here's some grasshoppers and maybe a caterpillar. Here's a bee. But we did see, we ended up seeing a lot of cool stuff that I didn't necessarily expect to see there, which I suppose is the whole point, that you don't know what's out there until you look.*

(from Marinette, WI) *I was at yoga, and I was talking to somebody else that I knew there and somebody else overheard me and he said, hey, what's that? What are you talking about? He brought his family to our Bioblitz because of our conversation at yoga. Then while we were at the Bioblitz, his family and another family started chatting, and they started talking about getting families together to do nature walks in the community. And I was giving them suggestions for different places. And even though one of the men had grown up here, he had no idea where half of them were. So again, getting that information out there and just making those connections. That was extremely valuable and really cool, and I hope they do it.*

(from Tullahoma, TN) *It was a great way to help promote the other things that are going on in our community to get people outside and promote environmental awareness around here.*

(from Marinette, WI) *At the exhibit we talked about, cause we live in the city, you know, getting to see stuff in our own backyard, and I think that that, they've always liked foraging and stuff, and so it kind of brought up more conversation about things that we could do like here in the city, versus driving further out.*

(from Marinette, WI) *A lot of people, our little arboretum that we held it at... a lot of people in our county don't even know it's there, because they've never been there, or maybe they've never heard of it. But any time we have a program out there, we always have at least several people who say, oh, I didn't even know this was here, and they just see it advertised, or the event going on there, and then they come out. And then they tend to keep coming back to other events and programs, because it's a really nice resource. But a lot of people just don't even know that we have it. Not only does it expose them to nature, but to the actual access to nature, I guess you could say. Cause it's a free plot of land. Anybody can go and hike or snowshoe, or go on a Bioblitz, whatever, but sometimes people just don't even know it's there.*

(from Shepherdstown, WV) *I believe like with identification, it gives, it adds a level of appreciation to nature when you're able to go outside and see differences, say, between trees, or notice that insects are different. That means you're noticing more, and when you're able to identify things, that means you see, you know that there's different things. There's different types of animals. There's different types of trees. And so therefore you're broadening your outlook on nature. It's like, wow, there's so much diversity. So yeah, I think there's a lot of value in learning to identify things, in the sense that you become more aware of everything.*

(from Chewelah, WA) *Especially the little guys, I don't think it ever dawned on them that there are things to go outside and look at. So I think for the younger kids, it actually did impact them, and made them realize that there's more going on outside than what they ever thought there was.*

Interest and engagement in nature and the environment. Across many sites, participants indicated either new, enhanced, or broadened interest in nature and the environment, and there is some evidence that this interest broadened people's conceptions of what it means to engage outdoors. For example, by the end of their participation in the campaign, several librarians planned to host an additional Bioblitz (or similar event) within the next year to accommodate the level of interest in that form of programming. One librarian elaborated:

(from Chewelah, WA) *I have been asked since we did that Bioblitz to do another nature walk coming next summer. So I've promised the parents that I would organize another outing with them next summer, when the weather starts to get a little warmer. So they definitely want more of what we did, and I have not done that in the past. So that's something that obviously they want to do, though, so we will be doing it.*

Parents and library staff provided examples of ways in which they took the experience of using the iNaturalist and/or Seek app home with them, with a sense of curiosity about what they would find in their own backyards and neighborhoods. The following interview excerpts illustrate this form of interest, which stemmed both from experiences at the Bioblitz as well as interactions with library staff at the exhibit:

(from Warren, MI) *It was a great experience there on that Saturday to be able to go out and explore. Cause we had been to the library there, and never ventured out to the, looking for different kinds of bugs and animals and things like that that we saw, and not just that, but the different types of plants and flowers and things that I had no idea what they were. So that was just a very neat experience. And like I said, to even come back to my backyard and find out what some of these invasive species are that I can't seem to get rid of. It was neat to be able to take a picture of it and to find out what exactly it was. So it was a very good experience for us, and like I said, it did spark a curiosity, not only in myself but in my kids as well.*

(from Shepherdstown, WV) *I think families are more likely to want to go out and, you know, take their kids out with the app and look for more, to log more things that they can identify.*

(from Thornton, CO) *We had a lot of kids who went in obviously curious in regards to what was going on in the [exhibit] room, cause we don't really use that space for that. And so once I did mention the iNaturalist and the Seek app to them, I told them, just go outside and take a picture of anything, and it'll tell you what it is. So a lot of them would come back, really encouraged at the fact that it was fairly accurate. And I told them, there's people looking at what you're documenting in here and correcting it and adding it to a database. and not to mention that throughout the summer that was our focus. We also wanted to encourage our patrons to go outside and use our state parks. So I thought that both complimented each other very well.*

Some also commented about the apps' merging commonly accessible technology with outdoor activity in a purposeful way, suggesting that the experience of participating in the Bioblitz opened some participants' eyes to technology use in ecology and environmental science. For instance, a partner, reflecting on strengths of the campaign, offered:

(from Chewelah, WA) *I think the other piece that really stuck out was the increased enthusiasm. You know, there were some kids who were a little bit older that were kind of dragging themselves*

along with their parents, that came back a little bit more excited about being out and really seeing how technology can be more than just Facebook and texting, you know, really saw that application of the app.

Finally, in addition to the Bioblitz, the exhibit and other campaign elements sparked curiosity about exploring. A parent explained how engagement with the library exhibit prompted a new realization:

(from Montrose, CO) I guess after sitting there and looking at all these bugs and stuff, we were kind of thinking, you know, well hey, we can actually go into nature and not just our library, and see the things for real.

Relatedly, at least three libraries had outdoor exploration “backpacks” circulating throughout their campaign participation period. Even in libraries where the decision to have these backpacks available to patrons was not explicitly connected to the campaign, librarians reported that these items were wildly popular. In some cases, they were checked out almost continuously, and that this popularity appeared to surge in conjunction with the exhibit display period and to continue for months thereafter. For example, one librarian spoke of this phenomenon:

(from Peters Township, PA) Those backpacks are continuing to circulate, so like that’s part of Backyard Wilderness that we’re going to be keeping with us, because those are things that we added, in addition, you know, we added because of Backyard Wilderness, but we’re still going to use them, so they’re still, we have four of them. We never have all four here. They’re always going out, so people are still excited about that.

Recommendations

Findings from the evaluation of the *Backyard Wilderness* campaign in libraries have several implications for Tangled Bank Studios’ future work. A previous report focused specifically on recommendations for library implementation of the outreach campaign, emphasizing strategies with regard to the exhibit, curated books, Bioblitz, and partnerships that were especially successful during this initial implementation. In this section, we describe recommendations with regard to future partnerships with libraries, and materials and experiences with *Backyard Wilderness* and other future outreach campaigns. Additionally, we describe what librarians and parents suggested as additional topics about which they would have interest in a similar campaign.

Lessons Learned for Building and Expanding Successful Future Partnerships with Libraries

The evaluation found that Tangled Bank Studios’ decision to focus on libraries as a vehicle for bringing *Backyard Wilderness* to the public was wise, for it resulted in a successful campaign in many ways. Librarians have their fingers on the pulse of their communities, and often have considerable experience facilitating multi-faceted programming that connects with what their patrons want and need. We saw many librarians’ enormous capacity to capitalize on community assets, their own creativity, and a commitment to engaging patrons through programming, reflected across many sites’ implementations of *Backyard Wilderness*.

However, looking across sites, it is clear that the level of success with the campaign varied from library to library, and some aspects of the campaign were not as successful, despite a positive regard for the experience of participating across all sites. Individual challenges included one library that was unable to attract any non-staff participants to its Bioblitz and was unable to identify a willing partner. Another canceled a Bioblitz due to weather and did not reschedule the event. A third library lost some of its relatively few Bioblitz participants when challenges with iNaturalist emerged toward the end of a Bioblitz, drawing the attention of library staff away from supporting participants' engagement. In a few sites, librarians were unable to keep the exhibit constructed and displayed for a full eight weeks due to prior commitments to other programming or a need to use the space the exhibit occupied for a different purpose.

Although the aforementioned challenges were disappointing, the vast majority of data, from across the full set of libraries, was positive and offered salient take-aways with regard to partnering with libraries in the future.

Look for opportunities for synergy between Tangled Bank Studios materials and the needs of libraries. Libraries want to be seen as relevant to the lives and lifelong learning of their patrons, and to serve as resources within their communities. Identifying and understanding the needs and wants within communities can inform how Tangled Bank Studios chooses to engage with libraries. For example, the participating branch library in Orange County, Florida, functions more as a community center than a traditional library, offering technological resources, support for English language learning, and a free lunch program for children, in a compact space with relatively few books. In this location, where the librarian indicated that children are more likely to visit the library with an older sibling than with an adult, having materials and experiences that are engaging and relevant to children without other adults present is key. The librarian shared anecdotes about finding a range of objects inside the exhibit telescopes (a Cheeto, a small toy car, a piece of mulch) that, while somewhat silly on the surface, really speak to the need for durable, child- and food-friendly materials, and also highlights some of the natural curiosity children have that sometimes leads them to use materials in ways other than what the designers intended.

We also learned that libraries may need to really own their own programming. One librarian referred to the library system's expectation for staff to create "experience zones" within the physical library space that speak to library patrons and also have a common look and feel consistent with the library system's brand:

(from Thornton, CO) We're often looking for museum quality experiences like that that we can bring into the library. So that was something that attracted us to this particular display. We felt like it was interactive. We felt that it was informative. It really just felt like something we could build, what we call an experience zone around. Definitely was high quality visuals, and some of the other tools there that I think just really went to it being the next level.

To this end, the opportunity to collaboratively design materials, or campaign elements expectations, might be especially well received in some locations, especially in larger library systems. For instance, a librarian we interviewed suggested that, "Having a collaborative component would have enriched the process, from a planning perspective."

Recognize that advance planning is critical when working with libraries. Librarians often plan their programming a year in advance. Although they were willing to accommodate displays that arrived later than expected, delays did raise issues for many of them, as neither their program calendars nor the physical space they have available allows for considerable

flexibility to deviate from intended schedules. Similarly, we learned that librarians did not anticipate needing to support evaluation efforts and, even when they were enthusiastic about this, it was hard for them to make changes and accommodate.

At most libraries, timing the campaign to coincide roughly with summer reading programs presents both a challenge and an opportunity. Most librarians invest heavily in summer reading programs, which bring a lot of elementary and younger middle school students to the library. A program that conflicts with summer reading will likely be problematic, as librarians often cannot devote sufficient time or attention to another program, *unless* it is sufficiently integrated with the summer reading theme and schedule. Consequently, future efforts should either be scheduled to avoid overlap with the summer reading programming period, or should involve collaboration with librarians well in advance to ensure that this integration can happen. Several librarians seemed willing to collaborate in this manner.

Consider a staged approach to introducing campaign elements, especially the display. Several librarians suggested planning to introduce elements over time, rather than all at once, would help prolong patrons' engagement. One librarian explained:

(from Peters Township, PA) Our patrons are basically the same people, give or take, on a week to week basis. So after the novelty of Backyard Wilderness sort of wore off, people didn't really go to the display anymore, because they had already seen it. They already knew where all the creatures were to find.

While librarians are excellent planners, they are not designers. Providing supports to help librarians think about how they roll out exhibit materials and activities to keep them fresh would be beneficial. In addition, there may be aspects of the design of displays to consider that would help to address this concern. Two participants offered suggestions for design elements that could help address this issue:

(from Thornton, CO) You could just layer on, you know, like the first time they're here in the exhibit, try and do this, and the second time you're in the exhibit, try and do this. Like layer on either a slightly harder task or slightly different task. And then older kids potentially could do all of those rounds in one visit.

(from Kenton County, KY) If it's going to be up for a very long period of time, like it was at our library, it would be kind of neat if there was a way to kind of change things out periodically, and kind of refresh it, to give people something new to look for.

Plan for multiple check-in points with program staff. Although several librarians were remarkably adept at receiving instructions and materials and running with them, and were comfortable reaching out with questions as needed, on the whole, librarians' experiences suggest the need for more structured program support. Some libraries dropped the ball on elements of the campaign, and/or misconstrued expectations around participation. In some cases, communications between librarians and the evaluation team focused more on getting support and reminders, especially around Bioblitz planning and troubleshooting. Dedicated program personnel at Tangled Bank Studios, in regular communication with librarians about program elements and implementation, would really support these endeavors going forward.

Suggestions for Improving Materials and Experiences with *Backyard Wilderness* and Other Similar Outreach Campaigns

Evaluation findings also have implications for materials and campaign design, including aspects of the exhibit display, as well as training materials to support the role of apps at the Bioblitz.

A more multi-sensory or dynamic display. On the whole, patrons and librarians really liked the visual display, appreciating especially that it is “vivid” and “colorful.” (One participant offered that “it really felt like you were looking through a window outside.”) Some offered suggestions for additional elements that might engage participants who are blind or visually impaired, or who thrive with multisensory materials. For example, one parent felt that adding a tactile element to the display, such as a “bump-out on the cardboard” in some places, could enhance the exhibit. Other suggestions for incorporating additional sensory elements and/or making the display more dynamic are included in the following three interview excerpts:

(from Shepherdstown, WV) An audio component I think may have been helpful in attracting people to it, and also furthering engagement once people are looking through the scopes and things like that.

(from West Bridgewater, MA) If there were movement, or some type of more lighting, or interactive screens. Interactive, anything, like nowadays gets those, the children’s attention.

(from Shepherdstown, WV) Integrating more like puppets and native, native wildlife puppets and things like that, having them maybe even hanging up over the top of the exhibit, like a squirrel up in the tree or something like that that they could interact with a little bit more and role play and things of that nature.

(from Kenton County, KY) It would keep it interesting, you know, if there was a way to make it to where like they could look at something in a different type of backyard, like a desert backyard, or, you know, you have more like a suburban backyard, maybe, or maybe even an urban setting. You know, just because you can find wildlife in an urban setting.

More interactive telescopes. The exhibit’s telescope feature was a successful tease, piquing the curiosity of visitors and passers-by and drawing them into the exhibit area. However, some felt it would be helpful to make the telescopes more interactive, such as through the addition of a view-finder element that might enable the image inside the telescope to be changed. The following two interview excerpts reflect this suggestion:

(from Shepherdstown, WV) You expected it to guide you to a certain area or to do something. You know, you expected it to be interactive. You expected it to do something, and it didn’t really, I never did quite figure out the purpose of that.

(from Peters Township, PA) Kids were really drawn to the telescopes, because they knew that they could look into something. I think whenever they looked in and they saw that like it didn’t move and stuff, there might have been slight disappointment.

Cursive writing may be a barrier. While relatively minor, most librarians raised the concern that quotations on the exhibit’s rug’s tree roots were written in cursive, which made them unreadable to many visitors, as cursive is no longer taught in elementary schools ubiquitously. Although observation data indicates that exhibit visitors tended not to pay much attention to

the tree root quotations, it may be helpful to consider the issue of readability when using similar features in the future.

Additional iNaturalist training materials. Generally, librarians were able to be successful in supporting use of iNaturalist at Bioblitz events and exposing participants to the app as a citizen science tool. However, there were several issues that arose around Bioblitzes involving iNaturalist, and addressing these issues during the event itself was either impractical or came with the consequence of losing the engagement of participants. For instance, a few sites had issues defining boundaries for their Bioblitz projects on iNaturalist, so participants were unable to see what other participants were finding in real time. (The most extreme example of this occurred where the librarians were unable to have iNaturalist recognize a smaller geographical region than the entire state, so, as the librarian explained, “there’s a picture of a fish that somebody somewhere else in Pennsylvania took because I couldn’t narrow it down any more.”) The Tangled Bank Partners at California Academy of Sciences were supportive and generally able to help troubleshoot when librarians or members of the evaluation staff reached out to them, but generally this happened after the event had already ended. Librarians benefitted from the webinar and other materials that had been shared with them to support use of iNaturalist as part of the campaign. However, these resources did not appear to entirely sufficient. It may help in the future, especially if it is impractical to provide additional resources about the app’s use and hosting a project, to explicitly encourage librarians to try out the process of using iNaturalist within a project they create with a small group before using it at a Bioblitz.

Support for use of the family and educator guides. Most librarians made copies of the family and/or educator guides available alongside their exhibit displays or at Bioblitz event tables. In some cases where printing multiple copies of the guides was impractical or inconsistent with libraries’ resource conservation efforts, librarians instead displayed signs encouraging people to ask for copies or links to the guides if they were interested. Although some library patrons and event participants clearly took copies of the materials, librarians seemed unsure of how to support families and educators to use them. A brief webinar, or link to video among the Dropbox resources shared with libraries, could provide an overview of the content of the guides (not all realized the richness of resources offered via embedded links in the guides) and how to use them. A webinar or video might also give librarians a sense of how to give a quick orientation to the guides and what to highlight for their different audiences, thus helping the librarians to be more effective disseminators of these materials.

Other Science Topics of Interest to Libraries and Patrons

In interviews with members of the evaluation team, parents and librarians offered several suggestions for topics they would be interested in having addressed through a similar approach as the *Backyard Wilderness* display and associated materials and experiences. Some suggestions (e.g., engineering) were offered with particular reference to dominant local industries, and some were cited as potential summer reading topics. Others were informed by current events in the community (e.g., recent discovery of dinosaur fossils in the area). These are the topics that were suggested:

- Robotics;
- Astronomy and space science;

- Dinosaurs;
- Machines and how things work;
- Engineering (although two librarians specifically said not engineering due to existing programmatic and resource emphasis on STEAM);
- Additional biological science topics;
- The human body;
- Culturally inclusive sciences (e.g., Native American interpretations and understandings of scientific phenomena); and
- Climate science.

Appendices

Appendix 1: Exhibit Survey Instrument

TERC IRB Informed Consent Form Backyard Wilderness (BYW) Educational Outreach Evaluation

We invite you to participate in a Howard Hughes Medical Institute-funded research project. The name of the project is *Backyard Wilderness (BYW) Educational Outreach Evaluation*. Participation is voluntary. The research has two purposes. One is to understand how people use *BYW* materials. The other is to understand how much the materials make people interested in science. The STEM Education Evaluation Center (SEEC) at TERC is conducting the project. Dr. Eric Hochberg is the director. TERC is a non-profit education research and development company in Cambridge, MA.

If you agree to participate, we will ask you to answer a survey. If you give us your email address on the survey, we may contact you to follow up. Participation is just for today. However, if you give us your contact information, we may call or email you again to follow up.

The possible risks or discomforts of participating are low. You may feel uncomfortable by something you write. Benefits of participating may include helping science educators create better materials and experiences.

Again, participation is voluntary. You may choose not to participate. You may choose to stop participating at any time. If you don't participate, you can still use the *BYW* exhibit. You can also still go to *BYW* programs or events.

If you share your contact information, we will protect your identity by not linking you to specific answers without your permission. We will summarize what you and other visitors answer all together. All digital data will be kept on password-protected systems. We will not use or share any information we collect from you for future research studies without your permission.

If you have any questions or concerns about the project and/or your participation, you may contact Dr. Eric Hochberg, at eric_hochberg@terc.edu, or (617) 873-9778. If you want to talk about the research with someone outside the project, please contact Teon Edwards of TERC's Institutional Review Board at teon_edwards@terc.edu, or (617) 873-9630.

Thank you for your consideration.

Do you agree to participate by responding to this survey? *(Please check one box only.)*

- Yes. I agree** to participate in the Backyard Wilderness Educational Outreach Evaluation. *(If you agree, please continue to the survey on the next page.)*
- No. I do NOT agree** to participate in the Backyard Wilderness Educational Outreach Evaluation. *(If you do not agree, please stop here.)*

1. Please select the location of the Backyard Wilderness exhibit you visited.

- | | | | |
|---|--|--|--|
| <input type="checkbox"/> West Virginia – Cool Spring Preserve | <input type="checkbox"/> West Virginia – National Conservation Training Center | <input type="checkbox"/> Akron, OH | <input type="checkbox"/> Chewelah, WA |
| <input type="checkbox"/> Erlanger, KY | <input type="checkbox"/> Johnson City, TX | <input type="checkbox"/> Laurel, DE | <input type="checkbox"/> Marinette, WI |
| <input type="checkbox"/> Meade, KS | <input type="checkbox"/> Montrose, CO | <input type="checkbox"/> Mott, ND | <input type="checkbox"/> Orlando, FL |
| <input type="checkbox"/> Peters Twsp, PA | <input type="checkbox"/> Thornton, CO | <input type="checkbox"/> Tullahoma, TN | <input type="checkbox"/> Warren, MI |
| <input type="checkbox"/> West Bridgewater, MA | | | |

2. What is your home zip code? _____

3. How many adults (NOT including yourself) visited the exhibit with you?

- 0
- 1
- 2
- 3
- 4 or more

4. How many children visited the exhibit with you?

- 0 → *Please skip to question 6.*
- 1
- 2
- 3
- 4 or more

5. How old are the child(ren) who visited the exhibit with you today?

Please check all that apply.

- Toddler or younger
- Pre-school age
- Elementary school age
- Middle or high school age

6. Approximately how long did you spend at the Backyard Wilderness exhibit?

- 5 minutes or less
- 10 minutes
- 15 minutes
- 20 minutes or more

7. How engaging did you/your family find the Backyard Wilderness exhibit?

Not engaging		Somewhat engaging		Very engaging
1	2	3	4	5
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

8. How much did visiting the Backyard Wilderness exhibit raise your level of interest about nature?

Did not raise my interest at all		Raised my interest somewhat		Raised my interest a lot
1	2	3	4	5
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

9. How much did visiting the BYW exhibit make you think about nature?

It did not		It did somewhat		It made me think a lot
1	2	3	4	5
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

10. Did you do any of the following? Check all that apply.

- Read the display banner text
- Read the exhibit text
- Look through the telescope(s)
- Try to find animals from the display banner hidden in the exhibit (scavenger hunt)

11. While at the exhibit, did you do any of the following? Check all that apply.

- Identify plants/animals you've seen in your neighborhood
- Identify plants/animals you've seen in other places
- Wonder about any of the wildlife in your community

12. Are you planning to do any of the ‘what’s next’ steps listed on the exhibit banner?

- Yes
- No → *Please skip to question 14.*

13. Which “next steps” do you think you might do?

- Download the SEEK app
- Use the family activity guide
- Participate in a bioblitz
- Watch the Backyard Wilderness film (if it’s playing nearby)

14. Did visiting the exhibit make you more interested in exploring nature?

- Yes
- No

Please explain why visiting the exhibit did or did not make you more interested in exploring nature in the space below.

- 15. Is there anything else that you would like to share about your experience at the Backyard Wilderness exhibit?**

- 16. We are interested in talking with some visitors to find out a little more about their experience. If you would consider participating in a brief telephone interview (to be scheduled at your convenience in the coming weeks), please provide your email address in the space below. A member of our team will contact you to set up a time for the phone call.**

Email address:

Thank you for completing the survey. Your feedback is invaluable to us!

Appendix 2: Exhibit Observation Instrument

Backyard Wilderness Exhibit Observation Log

Number in Group		Group Description (w/approximate ages)					
Approx. Arrival Time at Exhibit		Approx. Departure Time from Exhibit					
Exhibit Engagement and Level of Adult Direction <i>(For each activity listed, indicate how much of the exhibit visit was spent engaging in the activity, and whether the activity was adult-led and/or child-led.)</i>							
	How much of the exhibit visit was spent on this?					Adult-Led	Child-Led
	0 None	1 A little bit	2 A moderate amount	3 A great deal	4 The entire visit		
➤ Reading text on exhibit walls							
➤ Reading information about any of the species on the scavenger hunt banner							
➤ Noticing/reading "What's Next" list							
➤ Noticing/reading tree root quotes							
➤ Searching for scavenger hunt species							
➤ Looking into telescopes							
➤ Looking at/picking up curated books							
➤ Other (Specify)							

<u>Comments and Questions Overheard</u>	<u>Role of Adult(s)</u>
<p>What do participants say or ask? (consider, for example, connection to their own home environments, curiosity about nature, excitement for exploration, confusion)</p>	<p>-How were library staff involved? -How were parents/grandparents/other adults accompanying children involved? (e.g., reading text aloud, pointing out something interesting, focusing children, etc.)</p>

Please rate the overall level of engagement (actively talking about and/or doing something with) of each of the following categories of group members during their time at the exhibit.

	0 Not at all engaged	1 A little bit engaged	2 Moderately engaged	3 Very engaged	NA
Adults					
Children ages 10+					
Children under 10					

Is there anything else to note?

Appendix 3: Bioblitz Observation Instrument

Bioblitz Observation Protocol (v. 7/30/2018)

How is the event organized/orchestrated? [\[Can be filled in after the Bioblitz if needed\]](#)

Things to consider include:

- Highly structured, semi-structured, open-ended? (for example, we know that some Bioblitzes will have components, like ranger stations and a visitor center orientation, while others will not)
- What does the flow of activities look like?
 - Those which are highly orchestrated (move from point A to point B to point C)
 - More organic flow - the different patterns of movement if multiple activities
- Roles of the library staff and/or partners?

Resources - what is provided, what do participants bring, and/or what are used?

- Naturalist kits, field guides, bird whistles, binoculars, etc. - Who: comes with the resource? gets help with it?
- iNaturalist - Who: comes with it? downloads it? gets help with it?
- SEEK - Who: comes with it? downloads it? gets help with it?

Description of group interactions

- Size of groups and their make-up (families, all adult, all children, organized in advance by librarian or a leader)
- Intra-group interactions (what are they pointing to, doing, finding, asking? Is there a leader?)
- Inter-group interactions (do groups ask each other for help, share findings, etc.)
- Who/how much do members of a group consult with iNaturalist and/or SEEK? How do these apps affect their investigations, how much they notice?
- How long do most groups actively participate? OR When do groups seem to disengage or stop exploration? If it is before the end, note why if possible

Connections

- Do you see or hear anything that connects back to the BYW Exhibit?
- Do you see or hear anything that suggests that participants might do something else (related to exhibit or curated books and/or other activities)?
- Do you see or hear anything that connects to previous natural/environmental education experiences (e.g., “remember when we saw the exhibit about the food web”)
- Are their indicators of prior interest (“we belong to Audubon and do nature hikes”)
- Do you hear comments that connect the Bioblitz activities to ideas about science and science process?

Overall impressions [\[Can fill in after the Bioblitz, if needed\]](#)

- Rate the level of Bioblitz engagement for groups you observe (extremely, highly, moderately, minimally, not). Is there something in particular that makes you rate it in a particular way for groups?
- What, if anything, makes you think that the Bioblitz is raising awareness or interest?

Appendix 4: Librarian Interview Protocol

Backyard Wilderness Librarian Interview Protocol

This interview is intended to be semi-structured to capitalize on relationships already built (and recognizing that some information may have already been shared) between interviewee and interviewer. It is not critical that questions are asked exactly as worded or in the precise order in which they appear, but the interviewer should strive to stay true to the spirit of the questions on the guide. Also, throughout this interview guide, there are several questions with answers that the interviewer may already know. Factual questions can be omitted if the interviewer is certain of the response (for instance, if the interviewee already provided this information in a different interaction). However, it may still be necessary to probe for supporting details (e.g., factors influencing implementation decisions).

Prior to beginning the formal interview, the interviewer should thank the interviewee for taking the time for the call/meeting, review language from the previously signed consent document and/or confirm and document consent, confirm consent to record, and start the recorder.

The interviewer should say at the start of the recording, "This is [interviewer] speaking with [interviewee, along with library affiliation] on [date]."

Introduction

1. *If not already known through previous interaction:*
 - a. Before we begin, I'd like to know a little about you. What is your role at the library?
 - b. How did you become connected to the Backyard Wilderness campaign at your library?
 - c. In what ways have you been involved?

Throughout this interview, I am going to refer to the Backyard Wilderness "campaign." The campaign refers to the display, curated book collection, Bioblitz, family and educator guides, and any related materials provided to you by HHMI Tangled Bank Studios, including iNaturalist and Seek app materials.

2. I'm going to ask you several questions about your experiences with the Backyard Wilderness campaign. Before I get into specifics, would you tell me what you've thought of the experience more generally? *Probe on any details.*

Initial interest

3. *If the interviewee is the original applicant:*
Thinking back to when you first applied, what initially motivated you to apply to host the Backyard Wilderness display and participate in the campaign?
4. To what extent is the Backyard Wilderness campaign characteristic of the kinds of special exhibitions or programs your library hosts?
 - a. What other nature-related special events or displays have you had recently?

General Campaign Implementation

5. *If the interviewee is the original applicant and/or lead on the implementation at that site:*
 - a. Who were the other people at the library who assisted with implementing BYW?
 - b. What roles did library staff play?
 - c. How did you get others involved?
 - i. What, if anything, did you do to orient them to the Backyard Wilderness campaign?
6. *If the interviewee is the original applicant and/or lead on the implementation at that site:*
What factors influenced the decisions you made about how to engage with the campaign at your site?
 - a. *Probe for factors that influenced decisions regarding applying, exhibit placement, book selection, publicity, dissemination, and Bioblitz location and logistics.*
7. Thinking about the entire campaign:
 - a. How would you describe the amount of time you've committed?
 - b. Which resources did you find particularly helpful with the exhibit, bioblitz, etc. at your library?
 - i. How much did you use these resources?
 - c. In retrospect, was it worth the time (and energy)?

Questions about the Display

8. (If not known already) Approximately how long did you have your display set up at your library?
9. How was the process of setting up and packing up the display?
 - a. To what extent were the instructions helpful?

- b. What, if any, challenges did you encounter?
10. Did you observe patrons interacting with the display? *If no, skip to 10. If yes:*
- a. From what you observed, how interested did your patrons seem in the display?
 - i. Which features seemed to draw people in the most? (e.g., banner text, telescopes, scavenger hunt...)
 - ii. Were patrons of particular demographics more interested than others?
 - iii. What aspects of the display did people seem to pay the least attention to?
 - iv. What, if anything, did patrons seem to dislike?
 - b. In what ways did you and other library staff members interact with patrons while they were using the display? *(Examples of interactions might include pointing out particular features, reading text, or focusing children.)*
11. If you had the opportunity, would you be interested in hosting another science related display at your library?
- a. Are there other science topics your patrons might like to learn about with a display like this?

Questions about the Book Collection, Guide Dissemination, and Library Programming

12. We're interested to know about the decisions you (and your colleagues, if applicable) made about the collection of books in conjunction with the display.
- a. How did you go about selecting books to include?
 - i. What factors influenced your selection?
 - ii. To what extent did your selection include books for adults as well as children?
 - b. How interested did your patrons seem to be in the book collection?
 - i. What, if any, feedback did you receive?
 - ii. Did you notice any changes in patrons' level of interest in the curated books?
 - iii. Were there any titles that stood out as particularly popular?
13. Did you share the Backyard Wilderness family or educator guides with any patrons? *If no, skip to 12. If yes:*
- a. How did you share the family guide?
 - b. How did you share the educator guide?
 - c. What, if any, feedback did you hear from patrons about these guides?
14. Did you host any activities or programs that you intended to connect with the Backyard Wilderness campaign, that were not specifically part of HHMI Tangled Bank Studios' specifications? *If no, skip to 13. If yes:*
- a. Please tell me about these activities or programs.

- b. How, if at all, did you draw a connection with the Backyard Wilderness campaign or materials?

Questions about the Bioblitz

- 15. What was the experience of organizing and running a Bioblitz like for you? *(Get the librarian to reflect on the areas below. Words could be changed.)*
 - a. Who did you partner with?
 - b. What resources did you find helpful in planning?
 - c. What, if any, challenges did you encounter?
 - d. How well attended was/were your event(s)?
 - e. Did you use the iNaturalist or Seek apps?
 - i. How did you use them?
 - ii. What was your rationale for whether and how you decided to use them?
 - f. What, if any, feedback did you receive from participants?
 - g. What advice would you offer to another librarian considering hosting a Bioblitz?

Promotion and Publicity

- 16. Thinking across all elements of the campaign, what, if anything, did you do to draw people’s attention?
 - a. In what ways did you publicize the exhibit, Bioblitz, or other programming?
 - i. When did you start your promotion and publicity efforts for the exhibit?
 - ii. What was your timeline for publicizing the Bioblitz?
 - b. Were there approaches to promotion and publicity that seemed more effective than others?

- 17. To what extent have you noticed or heard of patrons’ interest in viewing the Backyard Wilderness film?
 - a. Did you try to screen the film in your location? *If no, skip to 16. If yes:*
 - i. Were you successful? How did that go?
 - ii. If you screened the film:
 - 1. What feedback did you hear from participants?
 - 2. To what extent did patrons seem to connect the film to what they saw or did at the library or the bioblitz?

Questions about Outcomes

- 18. How, if at all, do you think the Backyard Wilderness campaign at your library has been an effective way to encourage patrons’ interest and engagement with nature?

- a. What, if any, evidence of interest or engagement comes to mind? (E.g., anecdotes, things patrons have said, interest in particular books or other activities)
19. We are trying to understand whether, and how, the various elements of the campaign might work together to support patrons' interest and engagement with nature. To what extent did you notice patrons engaging with **multiple** aspects of the campaign?
- a. Did patrons' experience with the display encourage them to attend the Bioblitz, and/or take out library books/resources related to nature?
 - i. If not, did BYW activities (e.g., the Bioblitz) cause people to stop by the exhibit?
20. What, if any, new contacts or partnerships did you establish through participation in the Backyard Wilderness campaign? (These partnerships could be within or outside the library organization.)
- a. To what extent do you anticipate working with these partners in the future?
 - i. Do you have any specific plans?

Implementation Supports and Challenges

21. Thinking about your implementation of the entire campaign, what resources (including people, organizations, etc.) did you find to be especially helpful for you?
22. What, if any, challenges did you encounter in your efforts to implement the Backyard Wilderness campaign?

Conclusion

23. Based on your experience with the Backyard Wilderness campaign, what, if any, plans do you have for future library programming?
24. Is there anything else you would like to add that I haven't already asked you?

The interviewer should thank the interviewee following the end of the call, and then upload the audio file.

Appendix 5: Partner Interview Protocol

Backyard Wilderness Partner Interview Protocol

Name(s) of Partner(s) being interviewed:

BYW library:

General Information (collected from partner directly or from librarian/others during visit)

1. How did you learn about the BYW project, and what led to your collaboration with the library (e.g., were there discussions and/or specific details that needed to be worked out before partner “signed on”)?
2. What about the BioBlitz prompted you to agree to participate?
3. How, if at all, have you collaborated with the librarian(s) in planning the Bioblitz and on other aspects of the BYW project?
4. Does your organization and the library have a history of working together in recent years? If so, in what ways?

Prior to the Bioblitz

5. What did you expect your role to be at the Bioblitz? Was that the role you ended up playing?
6. In what ways did you have to prepare?
 - Was it time-consuming? Worthwhile?

During the Bioblitz

7. Describe your experience interacting with the library staff, other partners, and participants during the Bioblitz?

8. Describe your experience orchestrating Bioblitz activities, including supporting the use of iNaturalist and/or SEEK?

Probes for Q.8 & Q.9:

- *Did things go as expected? If not, what happened?*
- *Did the iNaturalist and/or SEEK apps add to participants' experience. If yes, how?*
- *How positive did you feel about your contributions? Why?*

Assessment of the Bioblitz (ask same questions about other aspects of the BYW project, if needed)

9. To what extent and in what ways was the Bioblitz an enjoyable and interactive experience for participants?

- Did that vary by *groups* (families vs. student groups) or *age* (preschool, elementary, preteen, teens, adults)?"
- If yes, probe for examples.

10. Did the Bioblitz *expose* participants to nature/local ecosystems? And/or did it help them *learn* new things about ecosystems where they live?

- If yes, probe for examples.

11. (If appropriate): Were participants making any connections between exhibit and Bioblitz activities?

12. To what extent did the Bioblitz/BYW project encourage families/other participants to explore nature (formally or on their own) in the future? Why?

13. In what ways, if at all, was your participation in Backyard Wilderness valuable for your own work or for future work you'd like to do?

Appendix 6: Family Interview Protocol

BYW: Family Interview Protocol

Thank you so much for taking the time to speak with me today. I wanted to ask you some questions about your family’s visit to the BYW library exhibit and/or the BioBlitz. It’s OK if you don’t remember all of the details of your visit to the exhibit/the BioBlitz event, please just share what you remember. This interview will take about 20 minutes. Is it OK if I record our interview? [turn on audio recorder]

For everyone:

- Before we get into specific questions about the BYW exhibit/Bioblitz, I wanted to first get a sense for the types of activities your family likes to do together. How often does your family do activities that get you involved with nature?
 - [Probe] Does your family like to do activities where you interact with or talk about nature, like gardening, or exploring in the woods, or take nature walks?
 - Can you tell me about those activities - what do you do, what do you talk about?

If you are speaking to a family with NO survey data, please ask them the following questions:

- Which library did you visit?
- How many adults (not including yourself) visited the exhibit with you?
- How many children visited the exhibit with you? How old are they? (toddler, preschooler, elementary school age, middle/high school age)
- Do you remember how long you spent at the BYW exhibit, roughly?

Questions for families who have been to the BYW exhibit:

- How many times have you visited the BYW library exhibit?
- What were your general impressions of the exhibit?
 - [Probe] Did your family enjoy the exhibit?
- How engaging did you/your family find the BYW exhibit? [for families who participated in the survey - look at their survey response in lieu of this question]
 - [Probe] What parts of the exhibit were most engaging for your family?
 - [Probe] Were there any parts of the exhibit that were not engaging for your family?

- [Probe] Which parts of the exhibit did you spend the most time at?
- [Probe] Did the children in your group need help to use the exhibit, or were they able to do it themselves? (if there were kids of multiple ages, probe which ones needed help)

- We're interested in learning whether the exhibit is more engaging to children in certain age groups than to others. Did the exhibit engage all of the children with you? Did some of the children with you find the exhibit more engaging than others? If so, which ones/how old were they?

- What parts of the exhibit did you use? [for families who participated in the survey, see answer to the question, "Did you do any of the following?"]
 - [Probe, if applicable] Was the scavenger hunt fun? Did everyone in your group enjoy it, or was it better for kids of a specific age group? Was your family able to find all of the animals in the exhibit? (nudge a little for stories of how things were found?..)
 - [Probe, if applicable] Was your family excited about the telescopes? Did everyone in your group enjoy using them, or were they better for kids of a specific age group?
 - [Probe, if applicable] Did your family find the exhibit and banner text interesting? Did you think it was appropriate (right reading level, content) for all of the children in your group?
 - [Probe, if applicable] Did your family read the writing on the tree roots (on the ground/carpet)? Was it easy to read? Was it fun to read?

- [see response to the question, "While at the exhibit did you do any of the following"...identify plants/animals you've seen in other places, etc.]. In your survey, you said that you [talked about animals/plants in your neighborhood... whatever they said in the survey]. Can you tell me more about that?
 - [Probe] Do you recall what you discussed?

- How much did visiting the BYW exhibit make you think about nature? [for families who participated in the survey – look at their survey response in lieu of this question]
 - [Probe] What, specifically, did the exhibit make you think about?
 - [Probe] Did the exhibit spark any conversations in your family about nature? If so, what did you talk about?

- [For families that answered the survey, see answer to "Did visiting the exhibit make you more interested in exploring nature?" and follow up on any concrete activities that were suggested/planned]

- [For families that answered 'yes' to the question about doing the next steps] Have you done any of these other activities related to the exhibit?
 - [Probe] Did you use the family activity guide? If so, how?

- [Probe] Have you participated in a Bioblitz? [If yes, also ask BioBlitz questions on next page]
- [Probe] Did you download the SEEK or iNaturalist app? If so, have you used it? How?
- [Probe] Have you seen the BYW movie? If so, what did you think of the movie?
- [If the respondent has done multiple BYW activities] Can you say anything about how these different BYW experiences did or did not fit together for your family?
 - For example, did seeing the library exhibit make you more interested in attending a Bioblitz, or vice versa?
 - If you saw the library exhibit after attending a BioBlitz, did you think or talk about the Bioblitz as you engaged with the exhibit?
- Are there ways you would change the BYW exhibit so it's more fun/educational for kids?
- Are there other science topics you'd like to learn about with an exhibit like this?

Questions for families who have been to a BioBlitz:

- What was your overall impression of the Bioblitz?
 - [Probe] Was it engaging? Fun? Did your family enjoy it?
- Do you think participating in the Bioblitz impacted your family's level of interest in nature? If so, how?
 - [Probe] Did participating in the Bioblitz make your family *more interested in* doing other nature-related activities?
 - [Probe] Did participating in the Bioblitz *inspire your family to do* other nature-related activities? Like what?
 - [Probe] Did participating spark any family conversations after you got home from the event, about nature or things you encountered during the Bioblitz? If so, what did you talk about?

Thank you so much for your time!

Appendix 7: Codebook for Analysis of Interviews

These are the codes used for analysis of librarian, partner, and parent/family interviews as part of the library portion of the *Backyard Wilderness* evaluation.

Implementation (includes descriptions of decisions made in the enactment of events and campaign components; descriptions of *what happened* during events and interactions that were part of how the library operationalized BYW; objective information about campaign enactment, e.g., numbers of participants, details about site, set-up, etc.; challenges specifically pertaining to implementation issues/decisions)

Exhibit

Curated books

Bioblitz

Other event (refers to events other than the official bioblitz(es) that libraries hosted in conjunction with their Backyard Wilderness implementation, e.g., story hours)

Partnerships (use this code for descriptions of *with whom* libraries partnered or tried to partner, and *how* libraries partnered with other individuals or organizations during their implementations)

Apps (refers to implementation intentions, decisions, and realities involving iNaturalist and Seek)

Film (use this code for implementation-related discussions about the Backyard Wilderness film)

Family and educator guides (these are the actual guides developed by Tangled Bank Studios, which libraries were tasked with disseminating)

Publicity or Promotion- How the event was promoted by libraries/partners, how participants were recruited or informed of the event.

Active BYW Campaign Participation (“Mediating” category between Implementation and Outcomes; includes anything pertaining to the reactions and opinions of the target audiences, e.g., what parents and their kids *thought of* particular experiences or components; engagement in multiple aspects of the campaign due to experiences with one (e.g., interest in exhibit sparking attendance at bioblitz))

Exhibit engagement (descriptions of how visitors used the exhibit, e.g., length of time, how kids/families engaged with the exhibit)

Bioblitz engagement (descriptions of how participants experienced the bioblitz)

Excitement (affective response to experiences with elements of the BYW campaign, e.g., the exhibit seek-and-find, the telescopes, something that happened on the bioblitz)

Campaign connections (movement or connections among campaign element, e.g., checking out a curated book leading or visiting exhibit catalyzing attendance at bioblitz)

Outcomes – all refer to “**post-campaign**” (descriptions of things that happened within families, partner organizations, or libraries *after*, or as a result of, or in isolation from, BYW campaign experiences and components)

Benefits to Library or Community (e.g., enhanced infrastructure or capacity, new kinds of programs)

New or Enhanced Partnerships

Awareness (e.g., realizations that could or will be precursors to active engagement in outdoor exploration or environmental stewardship)

Interest (stated intention to do things beyond the campaign?; affective; includes desire to engage, though not necessarily actual engagement)

Understanding (cognitive; includes learning about ecosystems, biodiversity, human impacts, and other content)

Engagement (active; includes actions like at-home learning/exploration, “doing” citizen science, environmental stewardship)

Recommended Strategies (includes reflections on what implementers would do differently if they were to implement again, and advice for new libraries/sites that may implement campaign components)

Recommendations for HHMI (specific suggestions for how HHMI/TBS could improve physical materials developed for Backyard Wilderness, or for how HHMI/TBS could improve management of communications, expectations, or instructions for participating libraries)

Recommended STEM Topics (librarians’ suggestions for new topics for similar STEM related displays that might interest their patrons)

Motivation for Enactment (e.g., reasons why libraries/partners are participating in elements of the Backyard Wilderness campaign)

Motivation for Family Engagement (e.g., reasons why families chose to participate in campaign elements like the bioblitz)

Good quotes (use to enable easy identification of good sound bites for illustrative use in reports)

Original outcomes definition before 3/8/19 restructuring: (includes anything pertaining to the reactions and opinions of the target audiences, e.g., what parents and their kids *thought* of particular experiences or components; descriptions of things that happened within families, partner organizations, or libraries *after*, or as a result of, or in isolation from, BYW campaign experiences and components; discussion of the success (or lack thereof) of campaign components; descriptions of anything that HHMI hoped the campaign would catalyze -- engagement in multiple aspects of the campaign due to experiences with one (e.g., interest in exhibit sparking attendance at bioblitz), learning/excitement about/interest in nature or local environments, progress toward becoming citizen scientists, use of iNaturalist beyond just the bioblitz, different ways of partners and libraries relating with one another, new library programs, new policies or infrastructure in local communities or progress toward these things, etc.)