

**Institute of Museum and Library Services**  
Final Report  
IMLS Award Number: LG-25-12-0585-12

**Project title:** Investigating the Value of Nature Centers in Communities

**Project partners:**

The **National Audubon Society** (NAS) served as the lead organization for this project. Staff from the NAS Education and Centers Department oversaw the management of the project and was responsible for coordinating, preparing, and submitting grant reports. Working closely with the project partners, NAS staff members were responsible for coordinating the identification and involvement of the eight participating NAS Centers and the eight **Association of Nature Center Administrators** (ANCA)-member centers. NAS staff served as the liaison with ANCA leadership and individual partners at the ANCA centers and the NAS centers.

**Virginia Polytechnic Institute & State University** (Virginia Tech) served as the official academic institutional partner and led the research team comprised of representatives from two additional universities: **The Ohio State University** and **Stanford University**. This team designed, developed, and implemented the research, including the case studies and surveys in each of the 16 sites. Each of the three team researchers oversaw the case-study sites in his/her region, working closely with the lead researcher at Virginia Tech, who was assisted by a PhD student research assistant (RA). Together the Research Team members, with support from NAS staff, analyzed the data from the case study sites including interviews, textual analyses, and surveys.

**Overview:**

Nature centers hold tremendous potential to serve as hubs for learning and connection, not only with nature, but also with other community members. This study examines the values that people living near nature centers ascribe to those institutions in an effort to uncover ways to strengthen the links between nature centers and their local communities. Through surveys with over 2,400 respondents living near 16 nature centers across the United States, we identified 4 distinct values community members feel their local nature should, and often does, provide: environmental connection, leisure provision, community resilience, and civic engagement. Those community members who believe that nature centers provide these values are more likely to support their local centers through donations, volunteering, or political actions. The results suggest that both nature centers and communities benefit when centers go beyond traditional environmental programming.

**Changes:**

We extended our original schedule by one year due to a longer-than-expected coordination-and-approval process with our contracted marketing firm, which was in charge of recruitment to the survey, and due to a lower-than-expected response rate. We conducted a second round of survey invitations to enhance the study's sample size.

**Activities completed during the project:*****Research activities***

To identify the sample for the study, we first consulted with experts from the National Audubon Society and the Association for Nature Centers Administrators. From lists developed by these experts, we selected 16 centers for the study to represent diverse geographies and center types.

We first interviewed 16 center directors and 20 staff members at 16 nature centers across the United States. We also invited the staff members whom we did not interview to a brief online survey (we received 25 responses). These interviews and surveys helped inform the development of larger surveys conducted with local communities surrounding each center. We did find that, in addition to the three values identified by Carol Scott (2000, 2008), two additional values emerged: educational value of the center, and an inherent value of existence of the nature centers.

In the process of survey development, we conducted psychometric scaling on a panel survey to test potential items for the study survey. For this work, we developed extensive item banks based on a thorough review of the literature across the five values to identify first the factors of importance to consider, and then the variables within each factor. We looked at how the variables have been measured before and, where possible, took items from these measures.

Once the items were banked, we contracted with Qualtrics for a national panel of 700 respondents representing a national census. Because of the tremendously long list of items for the hypothesized five factors, panel respondents responded to one to three randomly assigned factor tests.

Data were then combined into one complex database for analysis using SPSS+. These data were explored using both exploratory and confirmatory factor analyses within and across all factors. We then began use of scale-level psychometrics to remove items using the central measures approach as described by Likert. When we did this, we had a reasonable-sized scale. We then used a Qualtrics panel of 450 respondents again using a national panel representing census reports. These data were again placed into SPSS+ for analysis.

In this case, the factors did have variance when examined individually. However, when attempting measures across the factors, the reliability was too high, suggesting single

factor. Additional factor analyses were again conducted. We used confirmatory factor analysis and five factors emerged, but using eigenvalues, almost all items were in one dominant factor. We then correlated the factors and discovered high correlates across all factors.

As we explored what this could mean, we came to the hypothesis that general values toward nature centers is not the same as the values toward a specific nature center or park. We further hypothesized that the context of the nature center in a particular community might create greater variance. Because of this finding, we removed the values as specific psychometric measures and, instead, included indicator attitudinal items in the instrument. Pilot testing suggested that this did capture variance in the value items.

We contracted with DirectMail, an e-marketing firm, to develop representative sampling frames around each nature center. They invited 4,000 people per center (64,000 in total) with a postal letter and two email reminders between July 31 and August 13, 2014, sent from the research team's mailing or email address. Half of the invitees received a \$2 bill with their letter as a pre-paid incentive to take the survey. These were included to boost response rate and test non-response bias. These invitees were randomly selected from the marketing firm's mailing list. Invitees were geographically limited to a circular area surrounding each center (urban = 3 miles, suburban = 6 miles, and rural = 20 miles). These radii were determined by averaging community directors' estimations of what geographic areas encompassed their center's 'local community' and by calculating the smallest radii that included adequate numbers of people from the marketing firm's mailing list.

Because our initial survey invitation effort resulted in a lower-than-expected response rate (4.0% after accounting for invitation bounce-backs), we conducted a second round of survey invitations with 8,000 additional randomly selected people per center (128,000 total) using an initial email and two email reminders. These were sent between November 13 and 25, 2014. The sampling frame was again developed from the marketing firm's mailing lists to avoid re-contacting the same respondents and limited to each center's local geography. Circle radii were set at the minimum size required to obtain adequate new sampling frames at each center (urban = 4 to 5 miles, suburban = 6 to 12 miles, and rural = 20 miles). This second round of invitations resulted in 583 additional survey completions (response rate = 0.6% after accounting for invitation bounce-backs) for a total of 2,402 responses and overall estimated response rate of 1.7%. This is a conservative (low) estimate, however, because we could not adequately determine how many emails actually passed through spam filters.

We planned to follow the Tailored Design Method (Dillman, Smyth, and Christian, 2009) and contact each person five times (pre-notice, invitation, and three reminders), but we were limited by our Institutional Review Board to contacting each person a maximum of three times.

Between March 9 and 17, 2015, we conducted a non-response bias test by re-inviting non-respondents from the second sampling frame to a shortened version of the survey (approximately 20% of the original length). To do so, we used an initial email invitation and two email reminders. This effort resulted in 67 responses.

### ***Products and sharing of research activities***

Thus far, we have submitted three manuscripts to peer-reviewed academic journals; we also have two more manuscripts in preparation. Additionally, we have presented key findings in numerous settings, listed below:

- “Values of nature centers in local communities.” Environmental Education Association of Illinois. Canton, IL. March 11, 2016 (accepted forthcoming presentation).
- “The value of nature centers to communities: discussing broader impacts from a nature center community value study.” Association of Zoos and Aquariums Webinar. December 15, 2015.
- “Measuring the articulating the value of museums and libraries.” IMLSFocus panel discussion. New Orleans, LA. November 16, 2015.
- “The value of nature centers to local communities.” National Audubon Society webinar. November 5, 2015.
- “The ways in which communities value nature centers.” North American Association for Environmental Education Annual Conference. San Diego, CA. October 16, 2015.
- “The value of nature centers to communities.” North American Association for Environmental Education Research Symposium. San Diego, CA. October 15, 2015.
- “The values of nature centers to their local communities - workshop.” American Nature Center Association Summit. Gainesville, GA. August 22, 2015.
- “The values of nature centers to their local communities.” Association of Nature Center Administrators Summit. Gainesville, GA. August 21, 2015.
- “The ways in which communities value nature centers.” North American Association for Environmental Education Annual Conference. San Diego, CA. October 16, 2015.
- “The value of nature centers to communities.” North American Association for Environmental Education Research Symposium. San Diego, CA. October 15, 2015.
- “The value of nature centers in communities.” Virginia Tech Graduate Research Symposium. Blacksburg, VA. March 27, 2015.
- “The value of nature centers to communities.” Penn State University guest research presentation. Champaign, IL. February 26, 2015.

- “The value of nature centers: Environmental education and access to nature, or more?” University of Illinois guest research presentation. Champaign, IL. January 26, 2015.
- “Investigating how and why different ethnic/racial groups visit and support informal leisure settings differently.” Virginia Tech Graduate Research Symposium, Blacksburg, VA. April 1, 2014.
- “A nation-wide study on how people value nature centers.” North American Association for Environmental Education Research Symposium Poster. Ottawa, Canada. October 7, 2014.
- “Museums take the lead.” IMLS Convening, Denver, CO. September 19-20, 2013.

At these conferences and gatherings, the participants represent a wide array of institutions and settings; as such, we have had strong participation in our sessions, and we have received very positive feedback about the transferability of the findings to diverse contexts. Because of this wide appeal, we have found strong interest among colleagues whose work stretches beyond the nature center context. We have conducted, for example, a well-received webinar with the zoo and aquarium community. Similarly, we are planning two more: one with ASTC members and one with more AZA institutions.

Two other potential partners that have indicated interest in hosting similar sessions include eePro and ChangeScale. eePro is NAAEE’s new professional development web portal and platform; the NAAEE leadership has invited us to lead a webinar on our research findings. Additionally, in the San Francisco and Monterey Bay Area, the ChangeScale consortium—which operates at a 12-county scale and incorporates more than 100 nonprofit, government, and philanthropic partners in informal science and environmental education—has invited us to present our findings at one of their regional meetups. These meetups draw education leaders, practitioners, and researchers from around the region who are interested in research-and-practice links. The ChangeScale steering committee sees our research as being an ideal representation of such linkages.

Specific to nature centers, we have shared center-specific results with all participating nature centers in the study. The short reports developed for each center are included with this report.

Upon acceptance, we will submit the journal articles about this research to the program officer as they become available. At this time, two articles are in review and two articles in preparation for submission.

Once the journal articles currently in process are accepted for publication, we will upload this IMLS report plus our instruments and citations for the study papers onto [informalscience.com](http://informalscience.com). [Informalscience.com](http://informalscience.com), an open-access site, encourages and facilitates sharing of instruments and, in this way, helps to enhance critically rigorous

methods across the field. The combination of the papers, this report, and the instruments will contribute to that effort.

Finally, we intend to submit an overview of this work to the News and Notes column of the *Audubon Magazine* to share our findings with a more popular audience. In this update, we will describe the research in a way that is of interest to a lay audience and connect our work with the larger mission of Audubon. The magazine reaches an audience of more than 1,500,000 nationwide.

### **Project results:**

We identified four distinct values that local community members perceive their nature centers to provide:

1. *Environmental Connection*: promoting environmental awareness and behaviors, protecting wildlife habitats and natural areas that provide ecosystem services, and providing places to learn.
2. *Leisure Provision*: Providing opportunities for physical exercise, safe outdoor recreation, retreat, restoration, and relaxation.
3. *Civic Engagement*: Bringing together people from different races and ethnicities and linking people to political action
4. *Community Resilience*: Beautifying the local community, contributing to the local economy, and developing a sense of pride in the local community

These values (among other factors) were statistically linked to local community members' reported willingness to support their centers through volunteering, donating, or otherwise. While these values were the strongest and most consistent predictors, other factors were also linked with self-reported likelihood of supporting local nature centers, including visitation frequency, respondents' commitment to nature, perceptions of staff performance, perceptions of shared values with staff, awareness of nature center activities, perceptions of the attitudes of other known people, personal acquaintance with a staff member, perceptions of whether nature center staff volunteer in the local community, and past donations or volunteering.

Taken together, the above findings suggest that nature centers can and do provide a broader array of values than their missions statements typically reflect. Moreover, nature centers might enhance their constituencies by committing to providing these values more broadly.

We also measured the extent to which various issues may dissuade or prevent community members from visiting these centers. We asked respondents about 11 possible visitation constraints identified in past research on informal education and outdoor recreation literatures. Our results suggest that lack of awareness was the most prominent issue in our sample. Also prominent were several intervening factors (e.g., financial, time, and transportation limitations) that might prevent someone from visiting even if they intended or desired to do so. Those constraints related to people's attitudes

toward nature centers (e.g., feeling unwelcome/unsafe at centers and preferring other leisure activities) were least constraining in our sample, on average.

With regard to analyses of qualitative data, we have two primary avenues of focus for this: (1) One relates to the definitions of nature centers as elicited from survey respondents, and (2) the second relates to the interviews with nature center directors and staff at each of the sites and communities where we conducted the surveys. With regard to the “definitions” aspect, we included in the surveys an open-ended item: “How do you define a nature center?”

We are in the midst of analyzing those data using NVivo, a qualitative data software package. We first identified frequently used terms within the definitions, then grouped related terms together into themes; definitions could be coded to more than one theme. The emergent overarching themes are: community, conservation, ecosystem, education, local, people, place, plants, recreation, and wildlife.

Our initial findings suggest that, among our 2,400 respondents nationwide, there is convergence around several key terms at the core of what defines a nature center: Place (including local, setting, museum, and so on) (2,211 mentions); education (including topics such as programs, interpretation, schools) (1,681 mentions), wildlife (960 mentions), and plants (861 mentions). We are also analyzing these data for differential perceptions of nature center definitions among various populations such as, for example, those who live in urban versus rural areas; those who have or have not visited their local nature center; older versus younger respondents; and so on. We plan to focus one of our publications on this emergent definition of a nature center as our work has revealed that little consensus exists as to how a nature center is defined or perceived and we, therefore, believe that our large, diverse dataset would be a valuable contribution to the conversation.

### ***Limitations***

Our study’s findings were limited both by our site selection and by the non-representative sample of survey respondents we achieved. First, we selected nature centers that experts believe to be among the most successful in the United States. We might expect levels of donation, volunteering, visitation, and staff familiarity to be higher in our sample than among a broader population of U.S. nature centers. Second, comparing our respondents to census tract populations of the 16 centers suggests that our sample over-represents certain socio-demographic characteristics (i.e., male, non-Hispanic White, higher education levels, older people) while under-representing other characteristics (having children in the home). Non-response bias tests did not reveal any systematic biases we believe would influence our identification of the four value sets nature centers provide communities. However, we cannot know the extent to which our results are generalizable beyond the particular sample we were able to survey. Our findings thus represent only a first step toward understanding the reasons why people might support local nature centers or other educational leisure settings, such as

museums and libraries and suggest that future opportunities exist to pursue similar questions with a more diverse audience that is perhaps more representative of the wider population.

These limitations also prevented us from comparing center director's responses with the attitudes of the local communities. Such analyses would have suggested the relative importance of different center values for staff members versus visitors and non-visitors in the local community. Although we were not able to accomplish this original goal, we believe our identification of four types of values that centers provide is a significant theoretical contribution to our understanding of the perceived value and societal worth of nature centers specifically and informal education centers more generally.

As such, we believe it is imperative that the findings from this study be disseminated and explored in other informal learning institutions. Some preliminary additional analyses are providing some possible evidence that community-level values are not the same as the aggregate of individual held values; these explorations emerge from our work in the psychometric measures of values and then considering how individual responses vary. These findings are suggesting that the community value appears to be more than just the summation of individual values, but that the values are emergent properties. Even as we continue to explore this, it does provide fodder for critically considering the values of the geophysical community as well as the target audience communities. Throughout the project, we established a solid track record of sharing our findings—both with the academic as well as practitioner community—about our findings. We solicited input and worked with colleagues on the ground to ensure the relevance and applicability of our findings to nature centers and other similar institutions; we intend to continue to do so with the findings from this study as well as with related work.

### **Next steps:**

The identification of the four main value sets in the study and their relationships with hypothetical support for local nature centers create the potential for additional meaningful research questions with strong ramifications for museological institutions within their communities. The value sets could be explored, for example, across representative samples of subpopulations surrounding nature centers or other institutions to understand the extent to which different groups are served (or not). Such research could also provide valuable insights into how to better build bridges with these communities and provide relevant services that enhance mission achievement across a broader swath of the population. A future study in this vein would involve different sampling strategies (either phone surveys or door-to-door) to ensure stratified representative samples of local communities. We are considering applying for future funding, from IMLS or elsewhere, to conduct such a study at a smaller number of nature centers.

We are also continuing to dive further into the rich data we obtained in this study. We are exploring deeper qualitative analysis, more critical triangulation among data sets and sources (e.g., qualitative and quantitative data from respondents, center directors,

community members, and center staff). We anticipate additional articles and conference presentations, along with the webinars we plan for ASTC and AZA/CEC as well as with other professional organizations and collaborators.