# NSF AISL
# Summative Evaluation
## for National Audubon Society

**INFORM**
EVALUATION & RESEARCH

This report was produced by Inform Evaluation & Research
for the National Audubon Society in October 2024.

For more information, please contact:

Brian Johnson, Ph.D.
Co-founder and Partner
Inform Evaluation & Research
brian@informeval.com

www.informeval.com

# FINDINGS SUMMARY

**National Audubon Society: NSF AISL Summative Evaluation**

## PROJECT IMPLEMENTATION WAS SUCCESSFUL, THOUGH WITH CHANGES TO ORIGINAL PLANS.

The Covid-19 pandemic, findings of the audience research study, and limited advisory board engagement brought both challenges and new opportunities.

## GUIDED NATURE EXPERIENCES RESULTED IN STEM AND CLIMATE CHANGE LEARNING OUTCOMES.

Participants learned about the threats climate change poses to birds, and helped shift participant thinking about the relationship between nature and STEM.

## PARTICIPANTS WERE MORE INTERESTED IN TAKING PART IN FUTURE STEM ACTIVITIES.

80% of young adults were likely to seek out another STEM experience based on their participation in the guided nature experience.

## EDUCATORS WERE MOTIVATED TO INTEGRATE STEM AND CLIMATE TOPICS IN FUTURE PROGRAMS.

Educators appreciated the multidisciplinary nature of some of the guided nature experiences and were enthusiastic about building relationships with the young adult audience.

## EVIDENCE WAS LIMITED THAT THESE EXPERIENCES CREATED LASTING CONNECTIONS.

The opportunity for Audubon is to shift these experiences from being a single touch point to the foundation for long-lasting engagement with young adults.
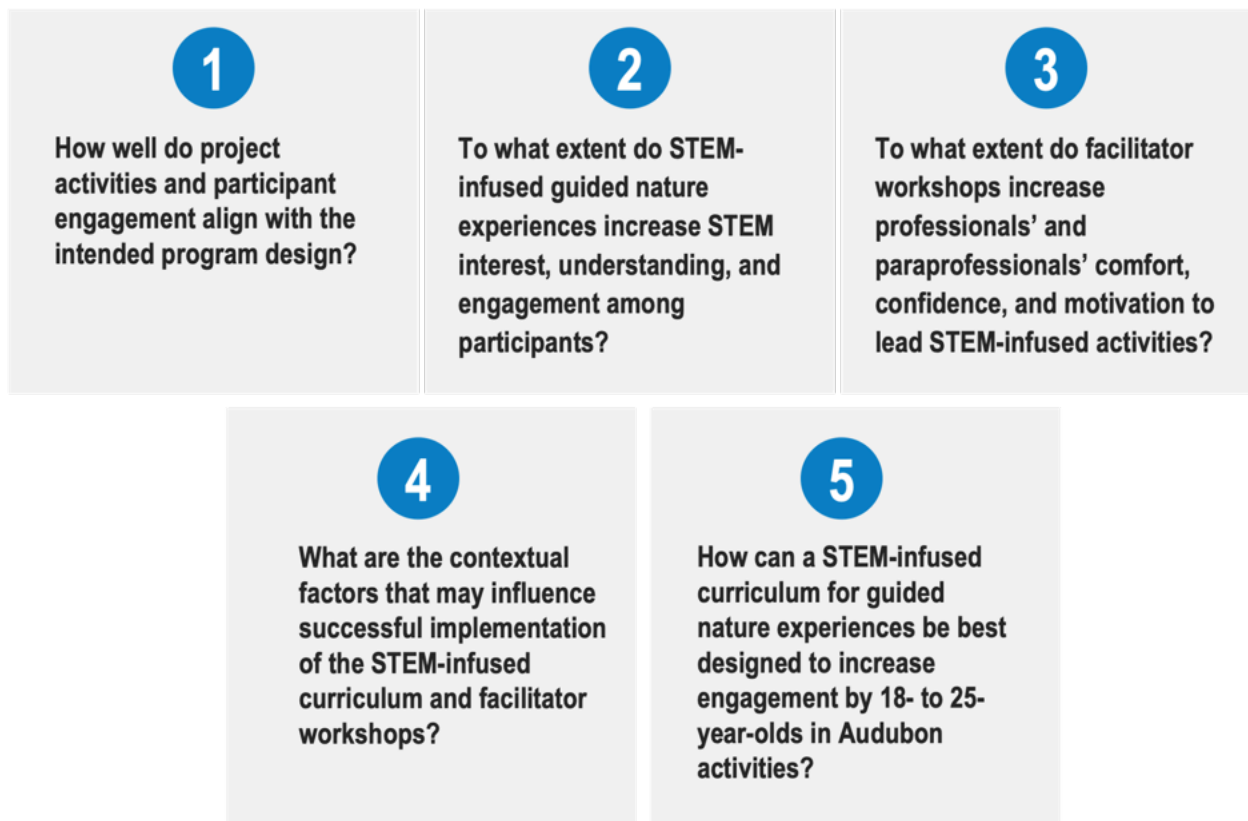
**INFORM**
EVALUATION & RESEARCH

# Project Background

*Using Audubon's Guided Nature Experiences to Engage 18-25-Year-Olds with STEM and Climate Science Content* was a four-year project supported by the National Science Foundation. The project focused on broadening the National Audubon Society's engagement with a diverse constituency of 18- to 25-year-olds through STEM-infused guided nature experiences (GNEs). The first phase of the project (years one and two) focused on developing a new guided nature experiences curriculum and accompanying training sessions for Audubon educators. The second phase (years three and four) of the project were dedicated to implementation, evaluation, and continued refinement of the curriculum and experiences based on data collected. Project evaluation served to inform internal decision-making and knowledge building toward understanding how nature-based conservation organizations can better engage a diverse population of young adults. The following report shares the culmination of findings and synthesis of results from all four years of the project implementation.

# Evaluation Questions

The evaluation of this project was guided by the following five overarching questions:

**1** How well do project activities and participant engagement align with the intended program design?

**2** To what extent do STEM-infused guided nature experiences increase STEM interest, understanding, and engagement among participants?

**3** To what extent do facilitator workshops increase professionals' and paraprofessionals' comfort, confidence, and motivation to lead STEM-infused activities?

**4** What are the contextual factors that may influence successful implementation of the STEM-infused curriculum and facilitator workshops?

**5** How can a STEM-infused curriculum for guided nature experiences be best designed to increase engagement by 18- to 25-year-olds in Audubon activities?

# Methods

Inform Evaluation & Research (Inform) led the evaluation of this project. The evaluation consisted of annual implementation fidelity evaluation, an audience research study, and a summative evaluation. A summary of the data collection methods and analysis strategies for the audience research study and the summative evaluation is included in Table 1. All instruments used in data collection are included in Appendix A.

**Table 1: Audience Research Data Collection**

|  | Method | Sample Size | Timeline |
|---|---|---|---|
| **Implementation Fidelity Evaluation** | Project Management Meetings | n/a | Biweekly or monthly meetings between Inform and the project PI |
|  | Staff Interviews | n = 7-11 (annually) | Annually in July |
|  | Document Review | n/a | Annually in June-July |
| **Audience Research Study** | Young Adult Survey | n = 353 | January-February 2021 |
|  | Young Adult Focus Groups | n = 48; 8 focus groups | February-April 2021 |
|  | Staff Interviews | n = 10 | March 2021 |
|  | Market Research Interviews | n = 3 | March 2021 |
|  | Literature Scan | n/a | January-February 2021 |
| **Summative Evaluation** | GNE Participant Retrospective Pre/Post Survey | n = 100 (42% response rate) | November 2023-June 2024 |
|  | GNE Participant Focus Groups | n = 60; 3 focus groups | February-March 2024 |
|  | GNE Observations | 11 observations of GNEs with 177 participants total | November 2023-June 2024 |
|  | Educator Survey | n = 20 (80% response rate) | May-June 2024 |
|  | Educator Focus Groups | n = 14; 5 focus groups | May 2024 |
|  | Tracking Logs | n/a | n/a |

# Project Implementation

# Findings: Project Implementation

The project implementation findings respond to the research question: *How well do project activities and participant engagement align with the intended program design?*

Each year of the project, we conducted fidelity of implementation evaluation consisting of project team interviews, document review, and attendance at project team meetings. These data sources allowed us to monitor the project activities and compare them with the intended plan. The following findings represent the synthesis of all four years of fidelity of implementation data collection.

## Finding #1: The audience research study of young adults was a critical juncture for informing subsequent project implementation.

In the first year of the project, Inform completed a study of young adults ages 18 to 25 years old to better understand their needs, interests, and barriers to participating in guided nature experiences and STEM activities. We utilized a mixed method approach to pursue the fullest understanding of these concepts. These efforts allowed Audubon to learn directly from young adults and make design decisions based on data rather than assumptions.

The findings of this study highlighted a number of factors important for Audubon to consider as the project moved forward. These findings included:

- The importance of building relationships with young adults and other institutions who serve young adults.
- The desire—and need—of young adults to be included in the program design process.
- Strategies for keeping programs relevant and attractive to young adults, including making programs (1) small and social, (2) inclusive and accessible, and (3) facilitated rather than lectured.
- Young adults' unfavorable perceptions of Audubon, which could be a barrier to engagement.
- The use of technology as a tool to enhance young adult engagement in programs.

The project team carefully considered these findings and applied them to subsequent project activities. For example, rather than have Audubon project team members solely design the guided nature experience curriculum, the team recruited young adults to join in the design process. Project team members continued to frequently refer to the findings from the study and used them as a north star for decision making throughout the project.

# Finding #2: Shifts in activities and audiences impacted the overall trajectory of the project.

The best laid plans for any project are always subject to change, and this project was no exception. First, the project began right at the precipice of the Covid-19 pandemic. This timing meant an emphasis on virtual engagement as opposed to in-person. The pandemic left a lot of uncertainty as to when in-person experiences would happen again and who would be comfortable participating in them.

Second, the findings of the audience research study emphasized the importance of involving young adults in the program design process, and as such the project team shifted curriculum development plans. The project team recruited young adults from within Audubon (e.g., current educators, recent interns) to join a series of design charrettes and directly contribute to the design of the guided nature experiences. Overall, this was a positive change for the project, but one that had not been anticipated.

Third, the original intention of the project was to engage both professionals (educators) and paraprofessionals (volunteers) in the training and implementation of the guided nature experiences. However, due to extenuating circumstances (i.e., lingering effects of Covid-19 pandemic on staffing levels at Audubon Centers), the decision was made to only engage educators. Additionally, again due to capacity at Audubon Centers post-pandemic, educators from all Audubon Centers did not participate in the training for or delivery of the GNEs, which was part of the original project proposal. These decisions, in turn, meant the sample size for data collection for this part of the evaluation was far less than expected.

Fourth, the original proposal for this project called for substantial participation from the office of Equity, Diversity, and Inclusion, and representatives of the Audubon on Campus program. Collaboration with these Audubon teams was designed to guide the project's efforts to reach a diverse group of 18- to 25-year-old participants for the GNEs. During the project Audubon was facing significant public-facing and internal challenges related to its equity efforts. In addition, the Covid pandemic impacted participation by Audubon on Campus chapters, especially Historically Black Colleges and Universities and Minority Serving Institutions (HBCUs and MSIs). Participation by Audubon on Campus staff was commensurately reduced as a result. Three graduates from Audubon on Campus chapters at HBCUs and MSIs did play a significant role in reviewing curricular activities. As a result, additional opportunities remain to work closely with HBCUs and other diverse constituencies of young adults.

Lastly, in the first year of the project, the PI assembled and engaged with a strong advisory board. However, subsequent years lacked any engagement with them. Audubon staff had experienced numerous leadership changes within the organization over the project tenure, and this led to the project team needing to prioritize curriculum development and engagement with young adults. Further engagement with the advisory board was a missed opportunity.

# Finding #3: Project dissemination reached a range of professional audiences.

Over the years, the project team worked to disseminate this work in a diverse range of venues, including a conference focused on visitor studies in informal learning spaces and a handbook sharing effective practices for climate change education. Table 2 summarizes dissemination activities.

**Table 2. Project Dissemination**

| Dissemination Activity | Description | Delivery Date |
| --- | --- | --- |
| Visitors Studies Association presentation | Audubon PI and an Inform evaluator co-presented with an Audubon young adult educator about the audience research methodology and findings. | July 2023 |
| Ecological Society of America presentation | An Audubon Center Director and field practitioner presented about the facilitation of guided nature experiences. | August 2024 |
| *The Handbook of Climate Change Education: Research, Policy, and Practice* book chapter | Audubon PI and Inform co-authored a chapter about engaging young adults in climate change education, highlighting the results of this project. | In review (ETA 2025) |

# Finding #4: The project accomplished its primary objective of creating a new, young-adult oriented STEM-focused guided nature experience.

Ultimately, the project team achieved its primary aim of developing a new curriculum to engage an underrepresented audience. The curriculum consists of three STEM-focused activities: 1) Hello, Birds, 2) Community Science, and 3) Envisioning Our Climate Future. The curriculum integrates STEM and climate change topics in nature-based experiences at Audubon Centers with the goal of elevating young adult STEM identity and inspiring them to take climate action. The curriculum is aligned with the strands of informal science learning[1] and explicitly details how and why STEM is important in climate change education. This final product is the output of all the hard work of not only the project team, but the young adults they engaged throughout the process.

---

[1] Learning Science in Informal Environments: People, Places, and Pursuits. Washington, DC: The National Academies Press. https://doi.org/10.17226/12190.

# STEM Outcomes

# Findings: STEM Outcomes

GNE participants were invited to complete a survey at the end of the experience to reflect on the program and associated outcomes. (Demographics for the participant survey respondents can be found in Appendix B.) Additionally, three GNE participant groups were invited to participate in a focus group at the end of the experience for an even more in-depth outcomes investigation. Eleven GNE programs were observed by an evaluator or Audubon staff member to collect further data on STEM engagement during the experience (Table 3).

**Table 3: GNE Participant Data Collection**

| Method | Sample Size | Timeline |
|---|---|---|
| GNE Participant Retrospective Pre/Post Survey | n = 100 | November 2023-June 2024 |
| GNE Observations | 11 observations of GNEs with 177 participants total | November 2023-June 2024 |
| GNE Participant Focus Groups | n = ~60; 3 focus groups | February-March 2024 |

The data collection was primarily focused on the question: *To what extent do STEM-infused guided nature experiences increase STEM interest, understanding, and engagement among participants?* However, the participant perspective was also vital to understanding the effective design features and potential participant outcomes of the program. The following section describes what emerged from these data collection efforts as it relates to these core questions.

## Finding #1: The guided nature experiences helped participants learn about the threats climate change poses to birds.

Using a retrospective pre-post format, participants were asked to rate how much they understood how birds and their habitat are being affected by climate change. On a five-point Likert-type scale (where 1 = strongly disagree and 5 = strongly agree), participant ratings (n = 91) increased from 3.8 to 4.4 from pre to post ($p < .001$). This represented the largest change out of 11 retrospective pre-post questions included in the survey. In focus groups, participants also said they learned more about climate change. One participant noted, "I had just heard that it [climate change] exists, but I didn't know that it has so much influence." Participants also said they learned about how climate change is affecting bird migration, and how art can be used to communicate about climate change.

> Usually when you think of climate change, you think of just scholarly articles, journals and stuff that only science nerds care about, basically. Being here with the birds, you feel more real, the climate, because you only see on the news that it's very far away. Having been here today, you feel more related to that.

Further, the participant survey also suggested that learning something new was the main motivator for taking part in a GNE. Of the four motivating factors investigated in the survey, learning scored the highest, with an average of 4.3 on a 5-point agreement scale (n = 100) (Figure 1).

**Figure 1. GNE participants were most often motivated by a desire to learn something new.** (n = 100)
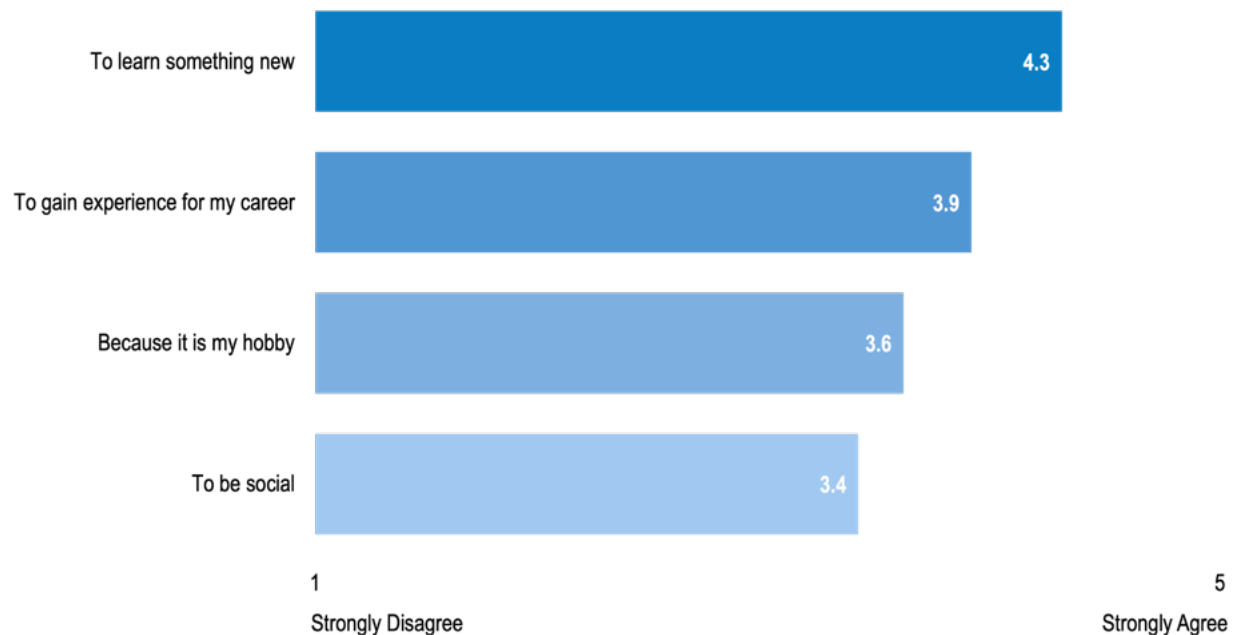


Overall, participants said they learned something from the experience, whether it was birdwatching, environmental impacts, or a new place to visit for time in nature.

> It was interesting to hear the different noises [the birds] make. I know I hear it whenever I go outside on a daily basis, but I've never actually thought about what bird is making that noise.

> I think it's really worth it just to step outside, get some fresh air, and then you learn something new... I think I learned three new things. So just coming out, and then meeting new people, and having these discussions are nice.

Participants also reported sharing their experience and new knowledge with others, whether while spending time with a friend or through posts on social media. Participants also said they would like to learn more about how to be involved, both in conservation action and also as volunteers at the sites where the GNE took place.

> There were several students who partook in this and then when we had a free hour or two later, four of us all went hammocking, I saw it on four different people's Snapchat stories in four different locations.

> It's really fun. And then I can share what I observed and what I have learned today to my friends, and then they can be interested in new things like me, what I have done today. And then they can also share the experience to other people.

## Finding #2: The guided nature experiences helped shift participants' thinking about the relationship between nature and STEM.

In the survey, when asked whether they agreed or disagreed (where 1 = strongly disagree and 5 = strongly agree) with the statement "Nature is a part of STEM," participant ratings (n = 100) increased from 4.2 to 4.5 from pre to post (p < .001) (Figure 2).

**Figure 2. After the GNE, participants were more likely to see nature as a part of STEM.** (n = 100)

Nature is a part of STEM.

(4.2) — (4.5)

1
Strongly Disagree

5
Strongly Agree

Many respondents were already interested in STEM prior to taking part in the guided nature experience. However, in focus groups, some participants said that the experience helped them realize STEM activities could be nature based. Many participants were surprised that the guided nature experience would be considered a STEM activity because it did not fit within their assumptions of what counted as a STEM activity. Some even identified "fun" as the element that stood out when compared with STEM activities they were familiar with.

> It didn't feel like STEM. Well it did, but not... to the degree I'm used to... When I think of STEM, I think homework, doing chemical reactions or Bio and Chem, and doing all that stuff, but... it really is STEM.

## Finding #3: For some participants, the guided nature experiences stimulated greater interest in participating in future STEM and climate change activities.

In the participant survey, 80% of the young adults (n = 80) were either likely or very likely to seek out another STEM experience based on their participation in the guided nature experience (Figure 3).

**Figure 3. After the GNE, most participants were either likely or very likely to seek out another STEM experience.** (n = 100)
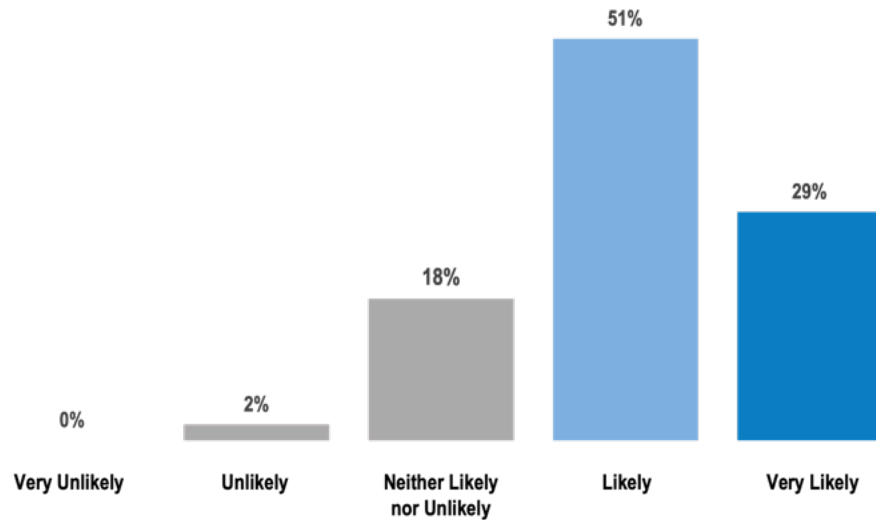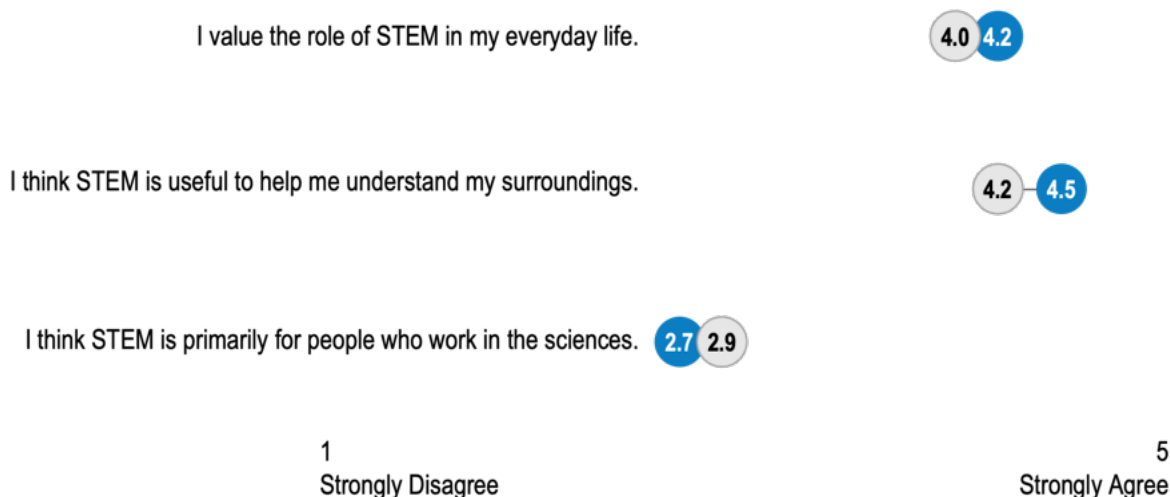


Survey findings also suggested that participating in a GNE led to a greater interest in STEM overall, with statistically significant increases in all four STEM interest items (Figure 4).

**Figure 4. Participants indicated a statistically significant (p < .01) increase in STEM interest from PRE to POST.** (n = 100)
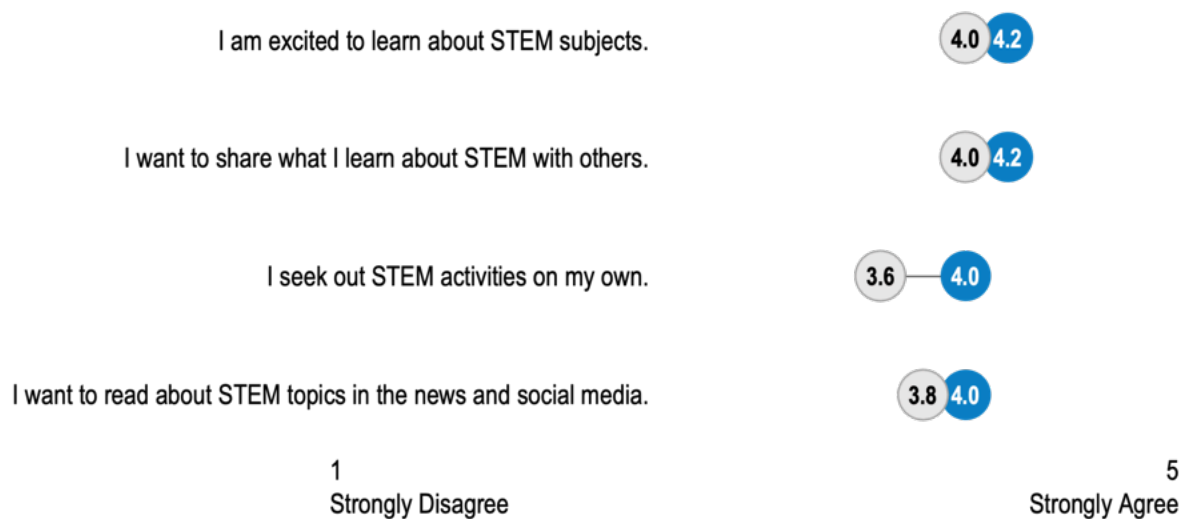


Finally, the GNEs helped shift participant thinking related to the role of STEM in their everyday lives. Agreement ratings for three items included in the participant survey changed from pre to post (p < .01), suggesting that taking part in a guided nature experience resulted in more favorable attitudes toward STEM (Figure 5).

**Figure 5. Participants expanded their perceptions of STEM from PRE to POST.** (n = 100)

I value the role of STEM in my everyday life.                    4.0  4.2

I think STEM is useful to help me understand my surroundings.    4.2 — 4.5

I think STEM is primarily for people who work in the sciences.   2.7  2.9

1                                                                                    5
Strongly Disagree                                                      Strongly Agree

Overall, most of the young adults who participated in a guided nature experience enjoyed the experience–especially the interdisciplinary aspect of the experience (e.g., art integration). However, it is important to keep in mind that the guided nature experiences tended to attract young adults who had previous experience with birding or nature activities through outdoor recreation (e.g., hiking, camping, nature walks), with 60% (n = 57) of respondents having previously participated in birding or a similar nature-based activity. The majority of young adults who participated in these experiences were already motivated to spend time in nature or sometimes participated in STEM activities (Figure 6), though the experience with Audubon further reaffirmed this interest and inspired them to pursue more ways to engage with nature and STEM.

**Figure 6. Roughly half of GNE participants frequently participated in STEM-focused activities.** (n = 100)

|  | 40% |  |
| --- | --- | --- |
|  27% |  |  |
| 19% |  |  |
|  | 11% |  |
| 3% |  |  |
| Never | Rarely | Sometimes | Often | Always |
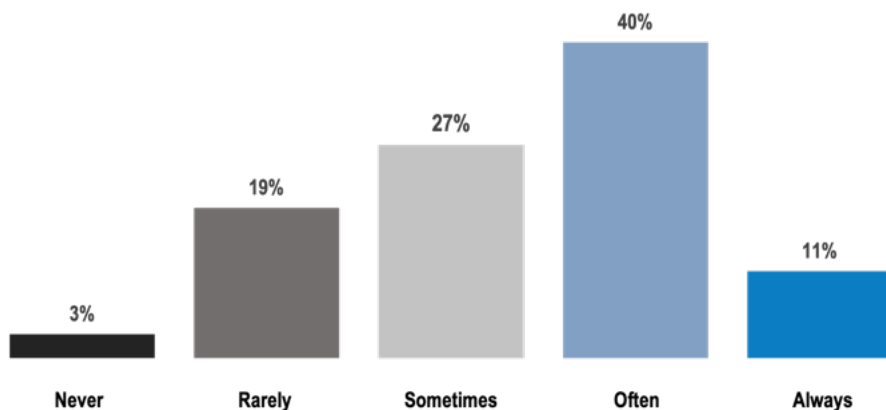
# Finding #4: While limited, data suggested that the GNEs provided opportunities to engage in scientific thinking and processes.

Structured observations were carried out during 11 GNEs, using the Strands of Informal Science Learning[2] as an evaluative framework. While more observations would need to be carried out in the future, the data gathered during this project suggest that the GNEs created opportunities for participants to engage to some extent with each of the six strands (Table 4). For example, participants at a GNE at Debs Park Audubon Center reflected on what the site looked like years ago and what it might look like in the future, particularly in relation to how climate change might change the landscape (Strand 3, Engaging in Scientific Reasoning). Using Audubon's app to identify birds seen or heard during the GNE provided opportunities related to Strand 5 (Engaging in Scientific Practice). However, while a virtual training video was provided to all observers, the observation data was of inconsistent quality and content. Therefore, it is not possible to draw generalizable conclusions related to GNEs and the Strands of Informal Science Learning at this time.

**Table 4: GNE Observations Aligned with Strands of Informal Science Learning**

| Informal Science Learning Strand | Observation Data from Guided Nature Experiences |
|---|---|
| Strand 1: Develop interest in science | Participants compared where the GNE took place with other outdoors spaces that they had visited.<br><br>Participants were eager to explore outdoor areas at the Audubon Center and to practice using binoculars. |
| Strand 2: Understand science knowledge | Participants discussed characteristics of birds they saw to identify them.<br><br>Participants identified individual choices they can make to reduce the impacts of climate change. |
| Strand 3: Engage in scientific reasoning | Participants asked, "Why are we seeing so many Red-winged blackbirds this early?" and then hypothesized, "Is it due to the warmer temperatures we experienced this winter?"<br><br>Participants wondered what the Audubon Center site looked like years ago and what it might look like in the future, given the impacts of climate change on landscapes. |
| Strand 4: Reflect on science | Participants discussed how birds are often lumped together and not thought of as unique species--just "birds." They reflected that this might not serve bird populations in the long run because people will not care as much with this perception. |

---

[2] National Research Council. 2009. *Learning Science in Informal Environments: People, Places, and Pursuits.* Washington, DC: The National Academies Press. https://doi.org/10.17226/12190.

| | |
|---|---|
| | Participants compared climate change to the moon landing and wondered why society blames the consumer for climate change. They noted that how you communicate climate change to people changes depending on where you are located and who your audience is. |
| Strand 5: Engage in scientific practice | Participants were highly engaged in learning how to use binoculars.<br><br>Participants reflected on the statistical significance of anecdotal evidence and observations they were making. |
| Strand 6: Develop a science identity | A participant was inspired by the data they were using during the GNE because it helps them picture a positive outcome.<br><br>Participants were glad to learn about organizations and individuals working to help birds, and they wanted to prioritize the participation of underrepresented communities. |

# Facilitator Preparedness

# Findings: Facilitator Preparedness

Facilitators (educators) from the participating Audubon Centers were invited to complete a survey and/or engage in a focus group discussion about how well prepared they felt they were to facilitate these new guided nature experiences (Table 5).

**Table 5: Facilitator Data Collection**

| Method | Sample Size | Timeline |
|---|---|---|
| Educator Survey | n = 20 (Representing 14 Centers) | April-May 2024 |
| Educator Focus Groups | n = 14 (Representing 11 Centers) | April-May 2024 |

The data collection was primarily focused on the question: *To what extent do facilitator workshops increase professionals' and paraprofessionals' comfort, confidence, and motivation to lead STEM-infused activities?* However, the educator perspective was also vital to understanding the effective design features and potential participant outcomes of the program. The following section describes what emerged from these data collection efforts as it relates to these core questions.

## Finding #1: Educators felt well-equipped to implement the new guided nature experiences.

Educators felt prepared to deliver the new programs to young adults, even if some of them had not previously engaged this audience in programming. In the survey, educators self-rated their interest in, enthusiasm for, and comfort to teach STEM and climate science topics both before the training and piloting of the program and after. As shown in Figure 7 and Figure 8, the mean ratings on a 5-point Likert-type scale improved from pre to post for all measures.

**Figure 7. Educators' interest and enthusiasm to teach STEM and climate science programs increased from pre to post training and implementation.** (n = 20)

I was/am excited to teach others about STEM through guided nature experiences at my Audubon Center.  — 3.8 → 4.4

I actively looked/look for new ways to teach about STEM at my Audubon Center. — 4.1 → 4.4

I was/am personally interested in learning about STEM. — 4.4 → 4.6

I was/am excited to teach others about climate change science through guided nature experiences at my Audubon Center. — 4.2 → 4.6

I actively looked/look for new ways to teach about climate science at my Audubon Center. — 4.6 → 4.7
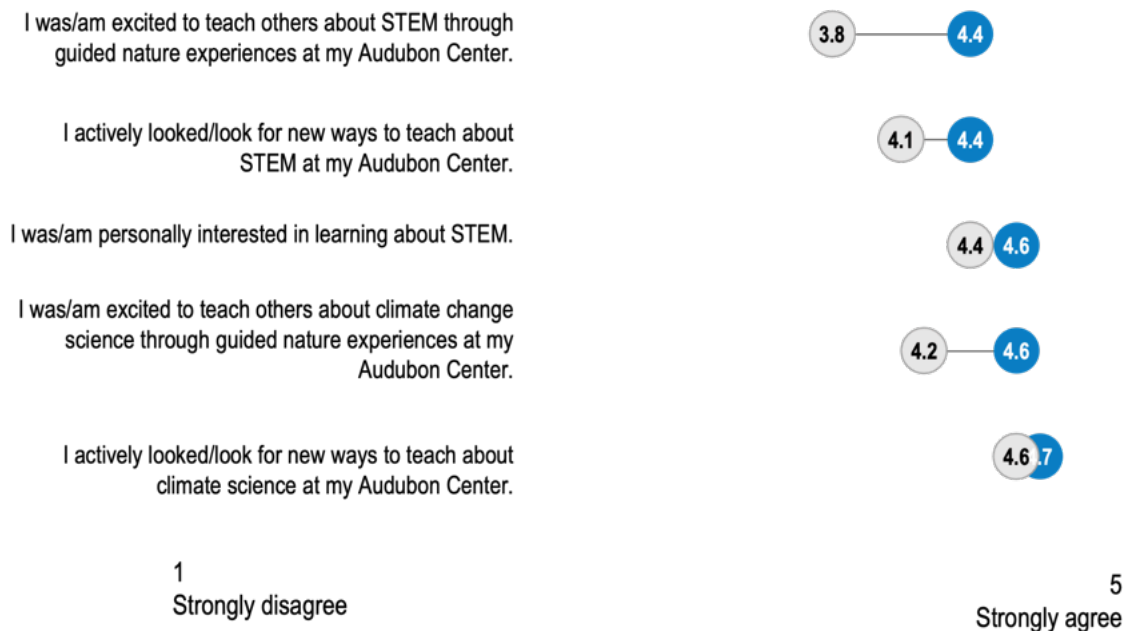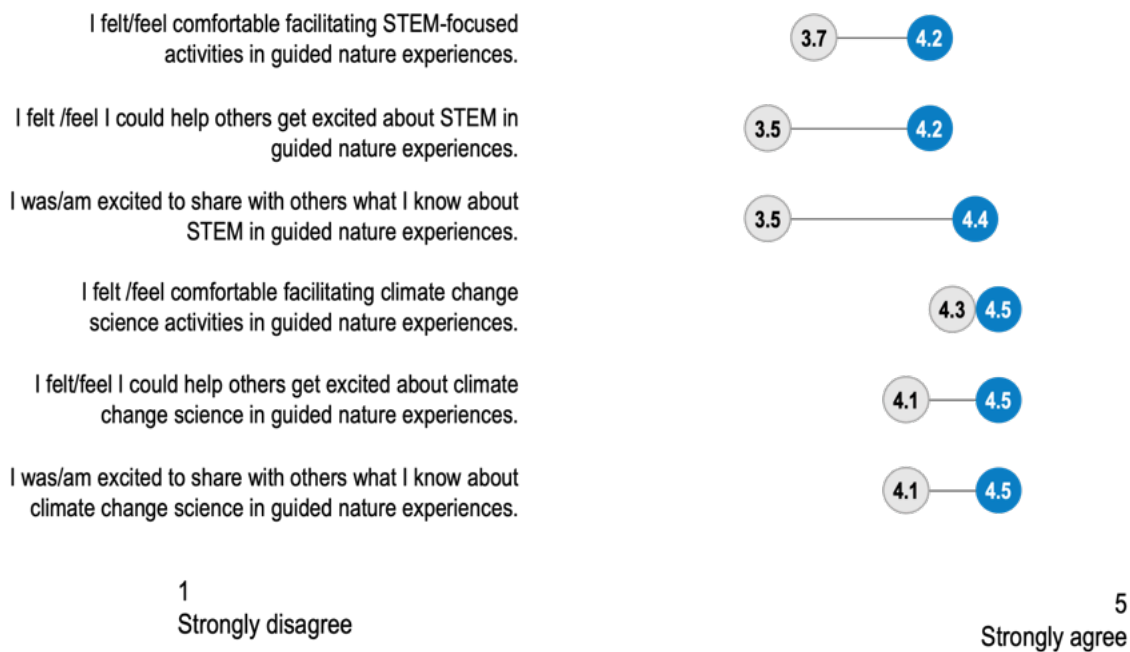
1 Strongly disagree — 5 Strongly agree

**Figure 8. Educators' comfort and confidence to teach STEM and climate science programs increased from pre to post training and implementation.** (n = 20)

I felt/feel comfortable facilitating STEM-focused activities in guided nature experiences. — 3.7 → 4.2

I felt /feel I could help others get excited about STEM in guided nature experiences. — 3.5 → 4.2

I was/am excited to share with others what I know about STEM in guided nature experiences. — 3.5 → 4.4

I felt /feel comfortable facilitating climate change science activities in guided nature experiences. — 4.3 → 4.5

I felt/feel I could help others get excited about climate change science in guided nature experiences. — 4.1 → 4.5

I was/am excited to share with others what I know about climate change science in guided nature experiences. — 4.1 → 4.5

1 Strongly disagree — 5 Strongly agree

Additionally, educators said the training sessions were beneficial in preparing them to facilitate the program and to teach STEM and climate science in general. In the survey, educators were asked what aspects of the training were most helpful in this regard. The experiential approach to the training was very effective for educators. For example, educators appreciated the opportunity to brainstorm with and learn from other educators (28%, n = 5). Lastly, educators referenced expanding their education toolkit (28%, n = 5), seeing the activities in action (22%, n = 4), and having opportunities to practice with feedback (17%, n = 3) as helpful. Only one educator noted that they struggled to identify the key elements and sections for the programs through the training.

> I am glad that I got the opportunity to see/do the lessons in a group setting prior to leading it for the public. It was great to hear the perspectives of other educators at Audubon. It provided the opportunity to ask questions and learn techniques from others.

> The training sessions helped open my eyes to new ideas and new ways to incorporate STEM. They also helped me to realize that I know more about STEM from my work and experiences than I had previously thought.

> I think the training, getting everybody together in person and learning the curriculum was super important... to get everybody on boarded to what the program is, and then also identify areas for improvement or things that we might want to make adjustments or accommodations to.

## Finding #2: Educators were generally more willing to integrate STEM and climate science in their programs in the future.

In the survey, educators were asked about the likelihood to integrate STEM and/or climate science in their programs. An overwhelming 100% of the educators (n = 20) indicated they were likely or highly likely to integrate STEM topics into their programs at an Audubon Center (Figure 9). Educators were given the opportunity to explain their ratings to this question. Close to half of the educators (42%, n = 8) indicated they already implement STEM-focused activities

and would continue to do so. Three educators (16%) indicated it was important that the activities "fit" with their existing programs and audiences. Only one of these educators expressed concern about fitting around existing programming. Some educators (n = 3, 16%) found the activities offered new or better tools that made it easier for them to implement STEM. For example, an educator stated "I thought the NSF Activities were easy to administer and left a great impact on their participants!" One educator appreciated connecting nature and STEM, which they noted are not often associated together.

**Figure 9. Educators were ready and eager to integrate more STEM activities in programs after facilitating a GNE.** (n = 20)
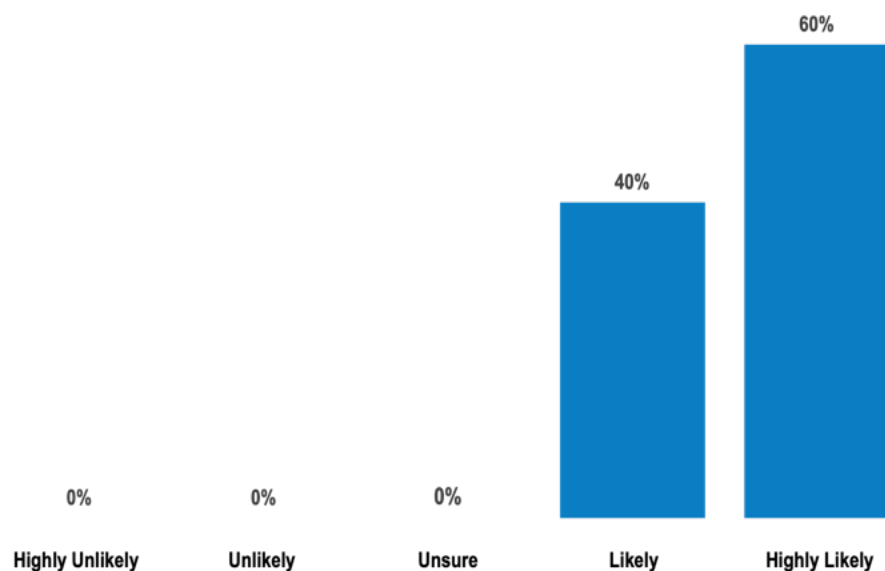


Educators, for the most part, shared similar enthusiasm for integrating climate science, though a few had reservations. In the survey, 75% (n = 15) indicated they were likely or highly likely to integrate climate science in future programs; 15% (n = 3) were unsure; and 10% (n = 2) were unlikely to do so (Figure 10). The reasons for these responses were somewhat mixed. Some educators (29%, n = 5) already included climate change science activities in guided nature experiences; 24% (n = 4) of educators said that including climate change activities would depend on their audience, with three of these four educators indicating that the audiences they mostly work with are too young. One educator said their Center is growing their efforts for climate change education based on the recently released Audubon climate science data.

**Figure 10. Three-quarters of Audubon educators were likely to implement more climate science activities in programs after facilitating a GNE.** (n = 20)
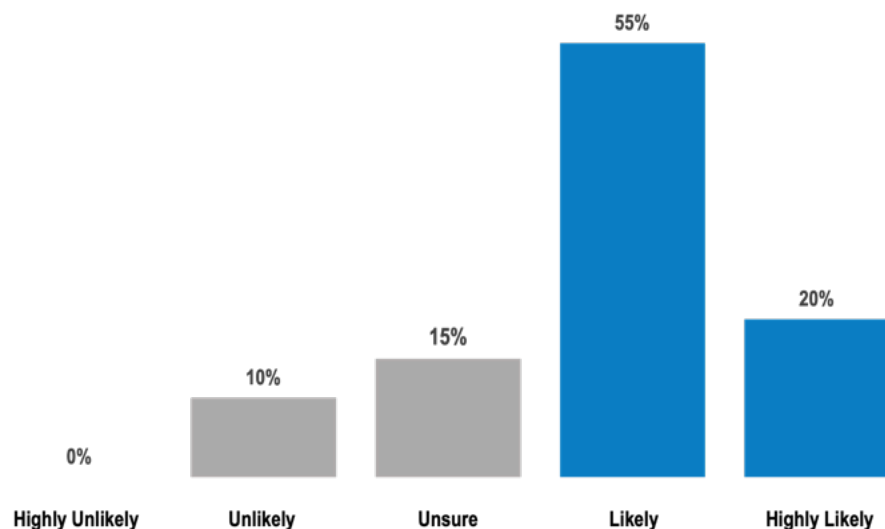


Focus group discussions also highlighted the shift in the educators' perspectives on teaching STEM and climate science. Educators noted that previously, audiences expressed some discomfort around discussing climate change. In the new guided nature experiences, some educators saw audiences visibly relieved upon realizing that the programs were not "doom and gloom" climate education. Educators also discussed how the programs challenged and expanded what is typically considered STEM. In particular, educators found it useful to begin with reflecting on what audiences see as STEM and preparing them to expand their ideas.

> I think the second activity where you get more into using Seek and iNaturalist probably gets more at the climate a little bit better. I feel like Hello Birds is a good introductory into we're going to start talking about climate a little bit more in depth. I could see these being in succession really well.

## Finding #3: Educators and young adults appreciated the multidisciplinary nature of some of the activities.

The art-based activities in the guided nature experiences were mentioned often as one of the most successful ways to generate discussions with and among the audience or the activities that educators wished they could have done.

> Where we really started to flourish was when we were making our own artwork... they really started coming out of their shell... the reason I chose the art program was because I felt that art transcended language. So even if they couldn't express language, art didn't need that.

> I do think the integration with technology is huge. Our generation that's coming up are very, very used to having technology entwined to everything we do, and it's a great chance to showcase some apps that they can continue to use and they've learned. So I love the technology integration.

> The art-focused one was definitely the most unexpectedly successful one for me.... I know a lot of them are studying integrated biology... they're real serious bird nerds... I thought that the art one wouldn't really resonate as much with them, but that one I think resonated the most... I think that they were also not expecting it. And I just think that the deeper we dug into the feelings and the emotions... you could tell that they released a lot of emotion with what they made."

## Finding #4: Educators found recruitment of young adults to be challenging.

Focus group discussions provided an opportunity for educators to reflect on what did or did not work well in the new guided nature experiences. Educators found the most challenging part to be getting this audience to come to the programs. They acknowledged that this age range is very busy and can be hard to gather in one place, especially for an extended amount of time.

> They have such rigid schedules sometimes, They have a short amount of time that they're at school. If I wanted to do Hello Birds during migration season, that's not even possible because they're all studying for finals and gone.

> Where we ran into a bit of difficulty was just finding a time that worked for everybody because most of them live on campus, and they had expressed that they wanted us to go to them, at their university.

Educators were more successful at recruitment if their Center had a pre-existing relationship with institutions serving this audience (typically this was Audubon Campus Chapters). Location of the Center was also a key factor in recruitment. Centers that were more centrally located to urban areas or with access to public transportation infrastructure did not have as much of an issue with getting participants to come to programs.

## Finding #5: Educators were enthusiastic about building relationships with the young adult audience.

Despite the challenges with recruitment, educators were eager to reach out to the young adult audience and foster relationships with them. In focus groups, educators highlighted the potential to scaffold the programs for repeated experiences with groups that would build trust for deeper discussion and greater autonomy for participants. Educators already began identifying ways to establish these relationships, such as working with Audubon on Campus Chapters or other young adult serving groups.

> I really saw the importance of hitting all of the different age ranges. Again, we have very young programming here, and this age range was one that I was not used to. And now I want to continue doing programs with that age range.

> Laying more groundwork around connecting with these communities earlier on. Audubon has a campus chapter program, and I don't think we were able to leverage it to the degree that we had hoped.

# Contextual Factors

# Findings: Contextual Factors

This section of findings responds to the research question: *What are the contextual factors that may influence successful implementation of the STEM-infused curriculum and facilitator workshops?* The data informing these findings came from the full range of sources employed in this study, and were derived from a synthesis of what was learned from the audience research study and the summative evaluation. Overall, four contextual factors emerged from the data:

1. Relationships
2. Capacity
3. Access
4. Perceptions.

Each factor is discussed further in the rest of this section.

## Contextual Factor #1: Engaging young adults in STEM experiences benefits from leveraging pre-existing **relationships**.

In this project, one of the biggest struggles for Audubon Centers was finding and recruiting young adults to participate in the new guided nature experiences. Centers who were most successful drew on their pre-existing relationships with local colleges, universities, or other young adult groups. Those who did not have these relationships experienced lower participation numbers or facilitated fewer programs overall. For any organization seeking to connect with a young adult audience, relationships will be the key to success. Young adult-focused projects will likely benefit from spending time early on or even before program development to strengthen (or perhaps build new) relationships with local young adult groups and other young adult-serving organizations.

## Contextual Factor #2: Developing a new audience base requires additional **capacity** that nature-based organizations may struggle to find.

Working with young adults was a new audience for many of the Centers, who traditionally focused programming on families, school groups, and other community groups. Understanding how best to engage young adults, how to recruit them, and how to prepare for these experiences takes time and potentially additional resources. Additionally, educators trained to work with younger or family audiences may need further professional development to understand how to best engagement young adult audiences. Educator capacity at any nature-based organization is often limited, and taking on a new audience can be daunting. Developing a new audience base such as young adults will require time and resources, and organizations must be ready and willing to commit both of these to the effort.

## Contextual Factor #3: Nature-based education settings are in a wide array of locations, some of which may be challenging for young adults to **access**.

In this project, the Audubon Centers who implemented the curriculum were in a variety of settings: urban and suburban (or rural), large facilities and small. The same can be said for most any nature-based education setting; where these organizations are physically located and the resources available to them differ widely across the United States. These factors mean that the ability of young adults to access these settings will also differ from place to place. For example, nature-based education settings that are in urban areas, such as Debs Park Audubon Center, have fewer transportation challenges for young adults, whereas a more remote site may be difficult for young adults to travel to. Some organizations are also in areas near one or more universities, making establishing relationships with young adult groups much easier to facilitate than those with no proximity to such institutions. Ultimately, access to nature-based education settings is an important factor to consider when developing programs that engage young adults.

## Contextual Factor #4: Shifting long-held **perceptions** of an organization takes time and intentional effort.

The audience research study findings highlighted a considerable challenge for Audubon: Young adults perceived Audubon (and the birding community as a whole) as being primarily for older, White, typically male audiences. Because of these perceptions, diverse young adults may not have seen themselves belonging in Audubon and may have been less likely to engage with Audubon Centers. Shifting these perceptions will take considerable time and effort. This project represented a positive step towards changing those perceptions, but it will take more consistent and sustained efforts to build relationships with young adults to truly turn a corner. Perceptions are likely an influential contextual factor for other nature-based education settings as well. If the young adult audience and STEM-based programming have not traditionally been part of an organization's core offerings, it is likely that young adults will not immediately feel connected to the organization and thus will not seek out opportunities for engagement. Organizations may benefit from formally taking stock of how audiences perceive them (e.g., through an audience research study) before delving into new audience development and subsequent programming.

# Design Considerations

# Findings: Design Considerations

The final section of this report is similar to the previous section about contextual factors in that it provides a synthesis of lessons learned about how best to design a STEM-focused guided nature experience for young adults. Specifically, this section responds to the research question: *How can a STEM-infused curriculum for guided nature experiences be best designed to increase engagement by 18- to 25-year-olds in Audubon activities?*

Over the course of the four years of this project, the following design considerations emerged from the data:

1. Co-create experiences with young adults.
2. Young adults want a "guide on the side" rather than a "sage on the stage."
3. Equip young adults to take action.
4. Leverage technology to pique young adult interest and make content relevant.
5. Make STEM experiences multidisciplinary.
6. Keep experiences small and social.

Each design consideration is discussed further in the rest of this section.

## Design Consideration #1: Co-create experiences with young adults.

An important takeaway from the audience research was that young adults wanted to be part of the program development process. Co-creation of experiences fosters greater buy-in from young adults and helps ensure that the activities and content resonate with the interests of young adults. The co-creation process utilized in this project was successful at elevating the young adult voice in the new curriculum and guided nature experiences. Any nature-based setting wanting to engage young adults should consider co-creation as an approach to program (and audience) development.

## Design Consideration #2: Be a "guide on the side" rather than a "sage on the stage."

Young adults prefer to be guided through an experience rather than led or lectured. In the audience research study, nearly half (46%, n = 85) of survey respondents said they wanted someone knowledgeable and with expertise to lead guided nature experiences—but they were looking for more of a facilitator rather than a lecturer. Focus group participants also echoed this finding and even suggested having graduate students be the leaders of guided nature experiences, as they maintain a balance of content expertise while still being approachable and more relatable to young adults. The project team took this feedback to heart when designing the new curriculum and training facilitators to guide rather than lecture. Organizers of other

nature-based experiences for young adults should keep this in mind when designing similar experiences, especially when deciding on who the facilitators may be.

## Design Consideration #3: Equip young adults to take action.

In both the audience research and summative evaluation components of this study, young adults indicated they wanted to take action on climate change issues. In the audience research survey, 81% of respondents (n = 212) said it was "extremely important" to take action to address issues related to climate change. Focus group participants and Audubon staff also recognized that young adults were ready and wanting to take action. The project team addressed this by incorporating "Calls to Action" in the curriculum. The "Calls to Action" focus on both individual and collective actions to mitigate or respond to climate change issues. Each activity in the curriculum affords opportunity for young adults to engage in conversation about these actions and to learn about how these actions have a positive impact. Other nature-based or climate change education programs for young adults should also leverage this audience's eagerness to take action and incorporate intentional strategies that enable young adults to do so.

## Design Consideration #4: Leverage technology to pique interest and make content relevant.

Technology has become a cornerstone of society and how we function. While some nature-based programs may be reluctant to rely on technology (e.g., positioning the nature-based experience as an opportunity to disengage from technology), the young adults in this study saw technological integration as an opportunity to make guided nature experience content more relevant and engaging. In the audience research survey, 74% (n = 175) of respondents said they used apps such as iNaturalist, e-Bird, or Merlin to help gather information or learn more about birds and the environment when they were out in nature. Throughout this process, young adults also shared suggestions for how to use technology to enhance—but not detract from—the experiences in nature. In the new guided nature experiences, young adults reacted positively to the use of apps. Overall, technology can be a promising design element to consider for young adult programs.

## Design Consideration #5: Make STEM experiences multidisciplinary.

Engaging in STEM may be appealing for some, but not all, young adults. A multidisciplinary approach may help broaden engagement in STEM experiences (e.g., the art-based guided nature experience created in this project). In the summative evaluation, young adult participants and facilitators spoke highly of the activities that went beyond STEM and included elements of art and culture. Participants were pleasantly surprised by how art and culture could facilitate deeper engagement with STEM. Providing multidisciplinary connections in nature-based and STEM experiences could be an important design consideration in the future.

## Design Consideration #6: Keep experiences small and social.

The audience research study results suggested that young adults prefer a small and social program experience. The literature scan carried out for this project also found the importance of emphasizing the social aspect of guided nature experiences, highlighting that socially embedded experiences have been shown to reinforce the uptake of STEM and environmental identities. Indeed, in the implementation of these new guided nature experiences, the average group size was about 12 individuals. Summative evaluation results also showed that to be social was a decent motivator (though not the primary motivator for all) for engagement in the experience. Nature-based experiences may be more appealing to young adults if they are more intimate in size, and provide time and space to connect and learn with peers.

# Discussion

# Discussion

The culmination of four years of audience research, curriculum development, training, and implementation suggest that this project successfully created a suite of climate change and STEM-focused experiences that young adults found engaging and informative. The data provide evidence that the guided nature experiences were associated with knowledge and engagement outcomes related to STEM interest and the impacts of climate change on bird populations.

For the broader field of nature-based organizations wishing to engage young adults, these results are promising and highlight the contextual factors and design considerations (detailed in the previous sections) to reflect upon when developing and implementing similar experiences for this audience. Relationships with young adults or young adult serving organizations are important for recruitment. The adage "if you build it, they will come" does not apply in this context. As the audience research portion of this evaluation found, simply building a program for young adults does not ensure participation. Many of the participants in this project were part of university classes that were participating in the activity as part of coursework. The challenge for organizations like Audubon is now to shift these experiences from being a single touch point with young adults to the foundation for meaningful and long-lasting engagement. Additional research needs to be done to understand the likelihood of young adults continuing to participate in guided nature experiences, STEM activities, or to engage in climate action—whether with Audubon or with other organizations.

Young adults need to be aware of and trust an organization before engaging. This relates closely to perceptions. Birding, in particular, is perceived to be an activity primarily for White, older populations. Young adults may not see themselves in nature-based activities and organizations. For some organizations, directly engaging young adults in nature-based experiences may be new and may require a shift in preparedness and resources. Lastly, nature-based organizations are situated in a diverse range of geographical locations, and young adults may not be able to easily access them. Navigating accessibility challenges should be considered carefully when developing young adult programs.

Young adults have particular interests and expectations for a nature-based experience, including being guided rather than led, and keeping the group experience small and social rather than lost in a larger crowd. Young adults are accustomed to using technology on a regular basis and using technology in a nature-based experience may enhance that experience for them. While the data showed that young adults do want to learn something new, they also want to be empowered and activated—not just sitting on the sidelines while climate change issues continue to mount. This project also showed that carefully designed programs can broaden young adults' understanding of STEM while infusing other disciplines into the curriculum.

These learnings are the basis of a number of recommendations for either future research or program development.

## Recommendation #1: With strong young adult participation, co-create a strategy for young adult engagement.

A strategy for young adult engagement would help nature-based organizations prioritize and plan for future activities. An essential aspect of this strategy development would be the active leadership of young adults in the process. Cultivating a young adult audience base will take time and intention, and young adults should be core to developing such a strategy. A young adult engagement strategy can provide a north star for organizations to be guided by and help focus resources. A strategy may also help identify opportunities for collaboration with young adult serving partners in the community.

## Recommendation #2: Enable young adult engagement by lowering barriers to participation.

As detailed in the audience research study, young adults identified a range of barriers to participating in guided nature experiences; these barriers should be mitigated whenever possible. For example, in this project, the guided nature experience participants and young adults in the audience research study noted that equipment access (e.g., binoculars) and transport to nature-based sites would limit their future participation in guided nature experiences. Further, we recommend that recruitment efforts be driven by young adults to increase relevance and appeal.

## Recommendation #3: Continue efforts to dispel perceptions that nature-based activities like birding are for older, White audiences.

The audience research portion of this project found that young adults wanted to participate in guided nature experiences, but they were also looking for leaders and other participants to reflect their communities. Audubon in particular was often perceived as an organization for older, White audiences. While the organization has made substantial effort to expand its audience and programming, this aspect of the work will need to continue to be prioritized in order for young adult engagement to be successful. This may also hold true for other nature-based organizations who have not traditionally engaged young adults.

## Recommendation #4: Discuss realistic expectations for educator capacity to lead young adult engagement.

The findings suggest that in this project, the educators are motivated and willing to try new STEM and climate change focused programs for young adults. However, organizational leaders will need to support and champion this work in order for it to be successful. This may include providing additional support in terms of educator staffing or resources, or conversely,

identifying other areas to de-prioritize in order to make room for young adult engagement efforts.

## Recommendation #5: Consider further research to investigate new questions raised by this project's findings.

Any evaluation or research project always surfaces new questions for future investigation. While this project resulted in findings related to STEM learning outcomes, design considerations, and contextual factors related to young adult engagement in STEM and climate change learning experiences, future research or evaluation could explore questions, including:

- What factors contribute to sustained, longer-term engagement by young adults with guided nature experiences or other STEM-learning opportunities?
- How can culturally responsive engagement approaches be best integrated into guided nature experiences or other STEM-learning opportunities for young adults?
- How do the four contextual factors identified in this study (i.e., relationships, capacity, access, perceptions) relate to, support, or limit one another in fostering young adult engagement?
- How can nature-based learning organizations best activate a young adult community through the co-design of a young adult engagement strategy?

# Appendices

# Appendix A: Data Collection Instruments

**Audubon Guided Nature Experience Participant Survey**

<u>SECTION 1: ABOUT YOU</u>

What guided nature experience did you participate in? Mark all that apply.
- Hello Birds
- Visualizing Our Climate Future
- Community Science
- I don't know the name of the experience I participated in.

With which Audubon Center did you take part in the guided nature experience?

How old are you?  _____

Are you a member of an Audubon on Campus Chapter?
- Yes
- No

If yes, which Audubon on Campus chapter do you belong to?

<u>SECTION 2: STEM Engagement</u>

The questions in this section ask about your engagement in activities that focus on STEM (science, technology, engineering, or math).

When given the opportunity, how often do you participate in STEM-focused activities?
- Never
- Rarely
- Sometimes
- Often
- Always

The following statements ask about your motivations for participating in STEM-focused activities. Please rate your agreement with the following statements. (Choose one answer per row.)

|  | Strongly Disagree | Disagree | Neither Agree nor Disagree | Agree | Strongly Agree |
|---|---|---|---|---|---|
| I participate in STEM activities to be social. |  |  |  |  |  |
| I participate in STEM activities to learn something new. |  |  |  |  |  |

| | | | | | |
|---|---|---|---|---|---|
| I participate in STEM activities to gain experience for my career. | | | | | |
| I participate in STEM activities because it is my hobby. | | | | | |

Please enter any other motivations for participating in STEM here.

Which image below best represents how you see yourself as a STEM person? (Please circle one image.)
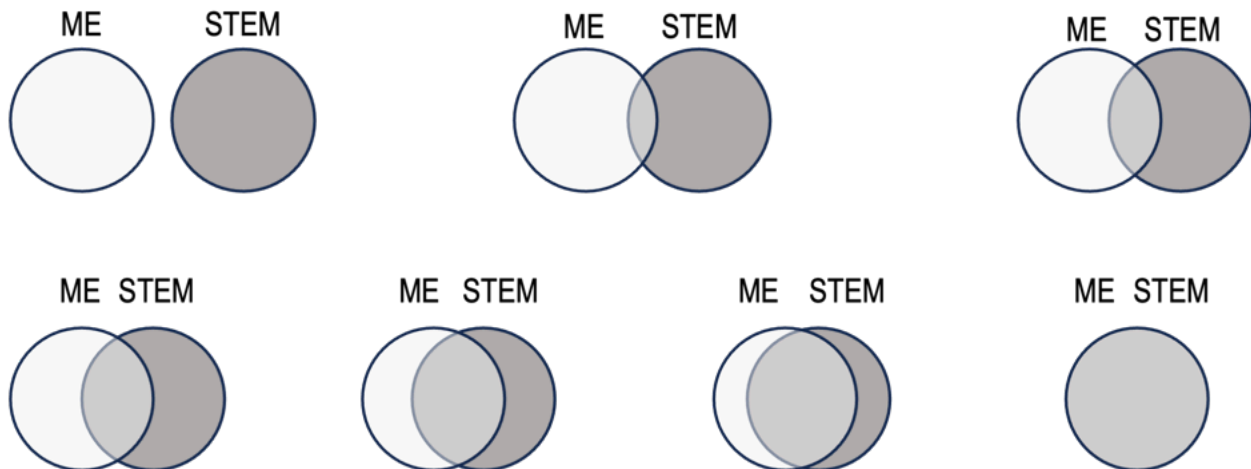


Have you ever previously participated in birding activities?
- Yes
- No
- Don't know

If yes, please describe your previous experience with birding activities.

After today's experience, how likely are you to engage in another birding activity?
- Very unlikely
- Unlikely
- Neither likely nor unlikely
- Likely
- Very likely

Why did you choose that answer?

## SECTION 3: STEM Interest

The following questions ask you to think back to your interest in STEM before participating in this experience and after participating in this experience. Please rate how much you agree/would have agreed with each of the following statements on a scale of 1 (strongly disagree) to 5 (strongly agree) before participating and after participating in this guided nature experience. Circle one response per row.

| "I am excited to learn about STEM subjects." | | | | | |
|---|---|---|---|---|---|
| | *Circle one answer per row.* | | | | |
| **Before** participating in the Guided Nature Experience | Strongly Disagree | Disagree | Neither Agree nor Disagree | Agree | Strongly Agree |
| **After** participating in the Guided Nature Experience | Strongly Disagree | Disagree | Neither Agree nor Disagree | Agree | Strongly Agree |

| "I seek out STEM activities on my own." | | | | | |
|---|---|---|---|---|---|
| | *Circle one answer per row.* | | | | |
| **Before** participating in the Guided Nature Experience | Strongly Disagree | Disagree | Neither Agree nor Disagree | Agree | Strongly Agree |
| **After** participating in the Guided Nature Experience | Strongly Disagree | Disagree | Neither Agree nor Disagree | Agree | Strongly Agree |

| "I want to share what I learn about STEM with others." | | | | | |
|---|---|---|---|---|---|
| | *Circle one answer per row.* | | | | |
| **Before** participating in the Guided Nature Experience | Strongly Disagree | Disagree | Neither Agree nor Disagree | Agree | Strongly Agree |
| **After** participating in the Guided Nature Experience | Strongly Disagree | Disagree | Neither Agree nor Disagree | Agree | Strongly Agree |

| "I want to read about STEM topics in the news and social media." | | | | | |
|---|---|---|---|---|---|
| | *Circle one answer per row.* | | | | |
| **Before** participating in the Guided Nature Experience | Strongly Disagree | Disagree | Neither Agree nor Disagree | Agree | Strongly Agree |
| **After** participating in the Guided Nature Experience | Strongly Disagree | Disagree | Neither Agree nor Disagree | Agree | Strongly Agree |

After this experience, how likely are you to seek out more STEM activities?
- Very unlikely
- Unlikely
- Neither likely nor unlikely
- Likely
- Very likely

How, if at all, did today's Guided Nature Experience change your interest to engage in more STEM activities?


**SECTION 4: STEM Understanding**

The following questions ask you to think back to your understanding of STEM before participating in this experience and after participating in this experience. Please rate how much you agree/would have agreed with each of the following statements on a scale of 1 (strongly disagree) to 5 (strongly agree) before participating and after participating in this guided nature experience.

| "I value the role of STEM in my everyday life." | | | | | |
|---|---|---|---|---|---|
| | *Circle one answer per row.* | | | | |
| **Before** participating in the Guided Nature Experience | Strongly Disagree | Disagree | Neither Agree nor Disagree | Agree | Strongly Agree |
| **After** participating in the Guided Nature Experience | Strongly Disagree | Disagree | Neither Agree nor Disagree | Agree | Strongly Agree |

| "I think STEM is primarily for people who work in the sciences." | | | | | |
|---|---|---|---|---|---|
| | *Circle one answer per row.* | | | | |
| **Before** participating in the Guided Nature Experience | Strongly Disagree | Disagree | Neither Agree nor | Agree | Strongly Agree |

| | | | Disagree | | |
|---|---|---|---|---|---|
| **After** participating in the Guided Nature Experience | Strongly Disagree | Disagree | Neither Agree nor Disagree | Agree | Strongly Agree |

| **"I think learning STEM is challenging for me."** | | | | | |
|---|---|---|---|---|---|
| | *Circle one answer per row.* | | | | |
| **Before** participating in the Guided Nature Experience | Strongly Disagree | Disagree | Neither Agree nor Disagree | Agree | Strongly Agree |
| **After** participating in the Guided Nature Experience | Strongly Disagree | Disagree | Neither Agree nor Disagree | Agree | Strongly Agree |

| **"I think nature is part of STEM."** | | | | | |
|---|---|---|---|---|---|
| | *Circle one answer per row.* | | | | |
| **Before** participating in the Guided Nature Experience | Strongly Disagree | Disagree | Neither Agree nor Disagree | Agree | Strongly Agree |
| **After** participating in the Guided Nature Experience | Strongly Disagree | Disagree | Neither Agree nor Disagree | Agree | Strongly Agree |

| **"I think STEM is useful to help me understand my surroundings."** | | | | | |
|---|---|---|---|---|---|
| | *Circle one answer per row.* | | | | |
| **Before** participating in the Guided Nature Experience | Strongly Disagree | Disagree | Neither Agree nor Disagree | Agree | Strongly Agree |
| **After** participating in the Guided Nature Experience | Strongly Disagree | Disagree | Neither Agree nor Disagree | Agree | Strongly Agree |

| **"I think learning STEM is boring."** | |
|---|---|
| | *Circle one answer per row.* |

| | | | | | |
|---|---|---|---|---|---|
| **<u>Before</u>** participating in the Guided Nature Experience | Strongly Disagree | Disagree | Neither Agree nor Disagree | Agree | Strongly Agree |
| **<u>After</u>** participating in the Guided Nature Experience | Strongly Disagree | Disagree | Neither Agree nor Disagree | Agree | Strongly Agree |

| **"I understand how birds and their habitat are being affected by climate change."** | | | | | |
|---|---|---|---|---|---|
| | *Circle one answer per row.* | | | | |
| **<u>Before</u>** participating in the Guided Nature Experience | Strongly Disagree | Disagree | Neither Agree nor Disagree | Agree | Strongly Agree |
| **<u>After</u>** participating in the Guided Nature Experience | Strongly Disagree | Disagree | Neither Agree nor Disagree | Agree | Strongly Agree |

How, if at all, has participating in this Guided Nature Experience changed your thinking about STEM?


Is there anything else you would like to share about the Guided Nature Experience you participated in today?

**Audubon Guided Nature Experience Participant Focus Group**

**Instructions:**
- *THANKS for your time!*
- *I'm with an external evaluation company called Inform Evaluation & Research. We are working with the National Audubon Society on a project to create guided nature experiences with a focus on climate change. Audubon is interested in learning more about your experience participating in some of these activities.*
- *We'll be covering a range of questions in the focus group, and the questions may jump around a bit.*
- *This focus group conversation will take 45 minutes to an hour. I will ask you a series of prompting questions.*
- *We're interested in your open and honest feedback and perspective because that is where some of the most useful learning comes from. All reports based on this focus group will maintain the confidentiality of individuals in the groups. Only group data will be reported and no participant names will be used. Since this is a group process, all members of the group will be privy to the discussions that occur during the session; therefore, we cannot ensure that group members will hold this information confidential.*
- *Audubon may share findings and themes that emerge from this focus group in future planning and communication.*
- *Please participate as you wish and do not feel pressure to respond to every question. Also try to leave space for others to answer if you find that you've been talking a lot.*
- *Your participation is entirely voluntary. You can stop at any time (including now).*
- *I'll be recording the focus group. Afterward, the recording will be transcribed, and then the recording will be destroyed. Is there anyone who is not comfortable with the focus group being recorded?*
- *Questions or concerns?*

**Questions:**

1. What interests you about science, technology, engineering and math?
    a. Why are you interested in those things?
    b. How do those interests relate to your engagement with Audubon?
2. How often do you participate in STEM-focused activities?
    a. What kinds of activities do you participate in?
    b. Why do you participate in those activities?
3. What attracted you to participate in today's guided nature experience?
4. What was your guided nature experience like today?
    a. What did you like about it?
    b. What would you have changed?
5. How has today's guided nature experience influenced your thinking about STEM, if at all?
6. How has today's guided nature experience influenced your thinking about climate change, if at all?
7. Would you participate in another guided nature experience with Audubon in the future?
    a. Why or why not?
    b. What would make you more likely to participate again in the future?
8. Is there anything else you'd like to share about your experience today?

**Audubon Guided Nature Experience Observation Tool and Instructions**

*BEFORE THE GUIDED NATURE EXPERIENCE*
Watch this overview video to learn more about why and what we are asking you to observe a guided nature experience. Familiarize yourself with the strands of informal science learning described in the next section. The six strands describe what people "do cognitively, socially, developmentally, and emotionally" when they are participating in an informal science learning experience. We also recommend that you review the guided nature experience curriculum prior to the observation to become familiar with the activities that will take place. Finally, print out the "notes worksheet" (pages 3-6) to take with you to the guided nature experience.

*DURING THE GUIDED NATURE EXPERIENCE*
Quietly observe the participants throughout the guided nature experience, keeping an eye out for actions (what people do) or verbalizations (what people say) that are reflective of science engagement as laid out in the science learning strands. Use the notes sheets in this instrument to keep track of your observations, including specific guided nature experience activities that were taking place when the behavior was observed. You should also keep notes about how frequently (general observations–not specific counts are fine) you observe repeated actions or verbalizations, and how many individual participants engage in these actions or verbalizations. Do not record the names or any identifying characteristics of the individuals you have observed. Finally, is it important to note that you might not see the same amount of activity related to every science learning strand–that is ok!

*AFTER THE GUIDED NATURE EXPERIENCE*
Immediately after the guided nature experience, use the summary sheet to reflect on and summarize what you saw during the guided nature experience related to each of the six strands. Include any other observations or information that you think are relevant in the "other" section. Don't worry about providing too much detail or information! The more information, the better. Additionally, don't worry about making sure everything you observed fits in the "right" strand. Do your best to categorize what you observed, but also know that sharing your detailed observations is more important than strand alignment.

When finished, please summarize your observations and enter your summary into this electronic form: https://www.surveymonkey.com/r/HTQ8K8H. Additionally, please scan and email your notes sheets to brian@informeval.com.

**THE SIX STRANDS OF INFORMAL SCIENCE LEARNING**

Excerpted from *Learning Science in Informal Environments: People, Places, and Pursuits* (2009). Available at http://nap.nationalacademies.org/12190. If you would like more information about the science learning strands, we recommend you read this blog post.

Strands of Informal Science Learning
Learners who engage with science in informal environments . . .

*Strand 1: Develop Interest in Science*
Strand 1 addresses motivation to learn science, emotional engagement with it, curiosity, and willingness to persevere over time despite encountering challenging scientific ideas and procedures over time.

*Strand 2: Understand Science Knowledge*
Strand 2 addresses learning about concepts, explanations, arguments, models, and facts that are the knowledge products of scientific inquiry.

*Strand 3: Engage in Scientific Reasoning*
Strand 3 addressing asking and answering questions, and evaluating evidence, as part of the scientific process and navigating through life (e.g., understanding the impact of individual and collective decisions related to the environment).

*Strand 4: Reflect on Science*
Strand 4 focuses on learners' understanding of science as a way of knowing—as a social enterprise that advances scientific understanding over time.

*Strand 5: Engage in Scientific Practice*
Strand 5 focuses on appreciating how scientists communicate in the context of their work as well as building learners' own mastery of the language, tools, and norms of science as they participate in science-related inquiry.

*Strand 6: Develop a Science Identity*
Strand 6 focuses on developing identities as science learners and, in some cases, as scientists. It is an important goal that all members of society identify themselves as being comfortable with, knowledgeable about, or interested in science.

**NOTES WORKSHEET**
**(TO BE USED DURING THE GUIDED NATURE EXPERIENCE)**

Center Name:
Date:
Observer:
Guided Nature Experience Name:
# of participants:

| STRAND | WHAT DID YOU HEAR PEOPLE SAYING? | WHAT DID YOU OBSERVE PEOPLE DOING? |
|---|---|---|
| Strand 1: Develop interest in science | | |
| Strand 2: Understand science knowledge | | |
| Strand 3: Engage in scientific reasoning | | |
| Strand 4: Reflect on science | | |
| Strand 5: Engage in scientific practice | | |
| Strand 6: Develop a science identity | | |

**SUMMARY SHEET**
**(THIS IS WHAT YOU WILL ENTER INTO THE ELECTRONIC FORM AFTER THE GUIDED NATURE EXPERIENCE)**

Please click on this link to summarize your observations related to each strand:
https://www.surveymonkey.com/r/HTQ8K8H

You can also use the sheet below to prepare/organize your thoughts before entering your summaries into the electronic form.

| STRAND | SUMMARIZE WHAT YOU OBSERVED IN RELATION TO THIS STRAND. HOW OR WHY DO YOU THINK WHAT YOU OBSERVED SUPPORTS THE SCIENCE LEARNING STRAND? |
|---|---|
| Strand 1: Develop interest in science | |
| Strand 2: Understand science knowledge | |
| Strand 3: Engage in scientific reasoning | |
| Strand 4: Reflect on science | |
| Strand 5: Engage in scientific practice | |
| Strand 6: Develop a science identity | |

**Audubon Guided Nature Experience Educator Survey**

[Demographics]
1. Which Audubon Center do you currently work at?
2. What is your position?
3. How long have you been with Audubon?
   a. Less than 1 year
   b. 1-3 years
   c. 4-6 years

> d. 7+ years

[Motivation]

4. The following questions ask you to think back to your interest in leading guided nature experiences with a focus on STEM and climate change science *before* participating in this project and *after* (now). Please rate your level of agreement with the following statements on a scale of 1(strongly disagree) to 5 (strongly agree):
   a. (Before) I was excited to teach others about STEM through guided nature experiences at my Audubon Center.
   b. (After) I am excited to teach others about STEM through guided nature experiences at my Audubon Center.
   c. (Before) I actively looked for new ways to teach about STEM at my Audubon Center.
   d. (After) I actively look for new ways to teach about STEM at my Audubon Center.
   e. (Before) I was personally interested in learning about STEM.
   f. (After) I am personally interested in learning about STEM.
   g. (Before) I was excited to teach others about climate change science through guided nature experiences at my Audubon Center.
   h. (After) I am excited to teach others about climate change science through guided nature experiences at my Audubon Center.
   i. (Before) I actively looked for new ways to teach about climate science at my Audubon Center.
   j. (After) I actively look for new ways to teach about climate science at my Audubon Center.
   k. (Before) I was personally interested in learning about climate change science.
   l. (After) I am personally interested in learning about climate change science.

[Comfort and Confidence]
5. The following questions ask you to think back to your comfort and confidence in leading guided nature experiences with a focus on STEM and climate change science *before* participating in this project and *after* (now). Please rate your level of agreement with the following statements on a scale of 1(strongly disagree) to 5 (strongly agree):
   a. (Before) I felt comfortable facilitating STEM-focused activities in guided nature experiences.
   b. (After) I feel comfortable facilitating STEM-focused activities in guided nature experiences.
   c. (Before) I felt I could help others get excited about STEM in guided nature experiences.
   d. (After) I feel I can help others get excited about STEM in guided nature experiences.
   e. (Before) I was excited to share with others what I know about STEM in guided nature experiences.
   f. (After) I am excited to share with others what I know about STEM in guided nature experiences.
   g. (Before) I felt comfortable facilitating climate change science activities in guided nature experiences.
   h. (After) I feel comfortable facilitating climate change science activities in guided nature experiences.
   i. (Before) I felt I could help others get excited about climate change science in guided nature experiences.
   j. (After) I feel I can help others get excited about climate change science in guided nature experiences.

k.  (Before) I was excited to share with others what I know about climate change science in guided nature experiences.

l.  (After) I am excited to share with others what I know about climate change science in guided nature experiences.

6.  How likely are you to include STEM-focused activities in guided nature experiences in your work at your Audubon Center?

      i.  Highly unlikely

     ii.  Unlikely

   iii.  Unsure

   iv.  Likely

    v.  Highly likely

7.  Why did you choose that rating?

8.  How likely are you to include climate change science activities in guided nature experiences in your work at your Audubon Center?

      i.  Highly unlikely

     ii.  Unlikely

   iii.  Unsure

   iv.  Likely

    v.  Highly likely

9.  Why did you choose that rating?

[Training and Support]

10.  How, if at all, did the training sessions that were part of this project help you become more comfortable and confident to lead STEM and climate change science activities in guided nature experiences?

11.  What parts of the training sessions were most useful to you and why?

[GNE Feedback]

12.  What feedback do you have about the guided nature experience curriculum (e.g., what worked well, what was challenging, what would you change)?

13.  Is there anything else you'd like to share?

**Audubon Guided Nature Experience Educator Focus Group**

<u>Introductory Remarks</u>
- *THANKS for your time!*
- *We are conducting this focus group to learn more about your reflections on leading guided nature experiences as part of the Beyond Birds Project.*
- *We'll be covering a range of questions in the focus group, and the questions may jump around a bit.*
- *This focus group conversation will take about one hour. I will ask you a series of prompting questions.*
- *We're interested in your open and honest feedback and perspective because that is where some of the most useful learning comes from. We may use quotes in our reports and articles, but we will only do so in an anonymous way that cannot be connected to specific individuals.*
- *Please participate as you wish and do not feel pressure to respond to every question. Also try to leave space for others to answer if you find that you've been talking a lot.*
- *Your participation is entirely voluntary. You can stop at any time (including now).*
- *I'll be recording the focus group. Afterward, the recording will be transcribed and then the recording will be destroyed. Is there anyone who is not comfortable with the focus group being recorded?*
- *Questions or concerns?*

<u>Questions</u>
1. Tell me about your overall experience leading the guided nature experiences that were developed through this project.
    a. What worked well?
    b. What could have been improved?
2. The guided nature experiences were designed to have a specific focus on STEM and climate change science.
    a. How effective were the guided nature experiences in engaging participants in STEM topics and activities?
    b. How effective were the guided nature experiences in engaging participants in climate change science topics and activities?
    c. What evidence or examples do you have to support this?
3. The guided nature experiences were specifically designed to reach young adults (18-25 years old). How effective were the guided nature experiences in reaching this audience?
    a. What might be done differently to better reach this audience?
4. What was most challenging for you, as an educator, in leading these guided nature experiences?
    a. How comfortable were you leading the STEM and climate change science activities?
    b. How motivated were you to lead the STEM and climate change science activities?
5. How likely are you and/or your Center to continue offering these guided nature experiences in the future?
    a. Why or why not?
6. What is a small or large "aha" moment, insight, or question you had related to this project?
7. What is one thing you will do differently in your work as an Audubon educator as a result of participating in this project?
8. Is there anything else you want to share with me about the guided nature experiences or your participation in this project?

**Audubon Guided Nature Experience Staff Interview**

**Introduction:**

- My name is _____, and I'm an evaluator with Inform Evaluation & Research. We're working with Audubon to help them monitor the implementation of the *Beyond Birds* project.
- We're talking to key stakeholders who have been involved with the *Beyond Birds* project to understand how the activities are being implemented, successes and/or challenges in implementation, and reflections on the overall project progress.
- This interview should take about 20-30 minutes. Your participation is completely voluntary, and you can quit at any time.
- Your responses are confidential and will only be used by us for reporting purposes. Any responses will be kept anonymous as well.
- There are no explicit risks or benefits to engaging in the interview.
- I would like to record this interview. Afterward, the interview will be transcribed and the recording will be destroyed. Is it okay if I record this interview?
- Any questions?
- Are you okay to proceed?

**RECORD**

**Guiding Questions:**

1. What do you feel have been significant accomplishments in the *Beyond Birds* project thus far?
2. What, if any, challenges has the project encountered to date?
    a. What was done to overcome those challenges?
3. What, if any, challenges do you anticipate the project may face in the next year?
4. What do you believe are factors inhibiting or contributing to the overall success of the project?
5. How will you know when the project has been a success?
6. What are you looking forward to in the upcoming months?

Year 2 Specific Topics
1. Given the co-design direction of the project, how do you feel that's been going?
    a. What has worked well?
    b. What, if anything, is still a struggle with the co-design aspect of the project? How do you think you all can overcome those challenges in this next year of the project?
    c. Does anything else need to be done to better involve/represent the voices of the target audience in the project?
2. What were your impressions of the design charettes?
    a. How did they help or hinder progress?
    b. How well did the charettes work to help incorporate perspectives of Audubon educators and the target audience?
3. How are you feeling about the timeline of work accomplished thus far and what lies ahead?
4. A concern or area of improvement from last year focused on project management and providing better definition of roles, communication about progress, etc. How do you think project management this past year has compared with the previous year?
    a. What has worked well?
    b. What could use some more attention?

# Appendix B: Participant Survey Demographics

**Figure 11: Most participants participated in "Hello Birds" and/or "Visualizing Our Climate Future."** (n=100)
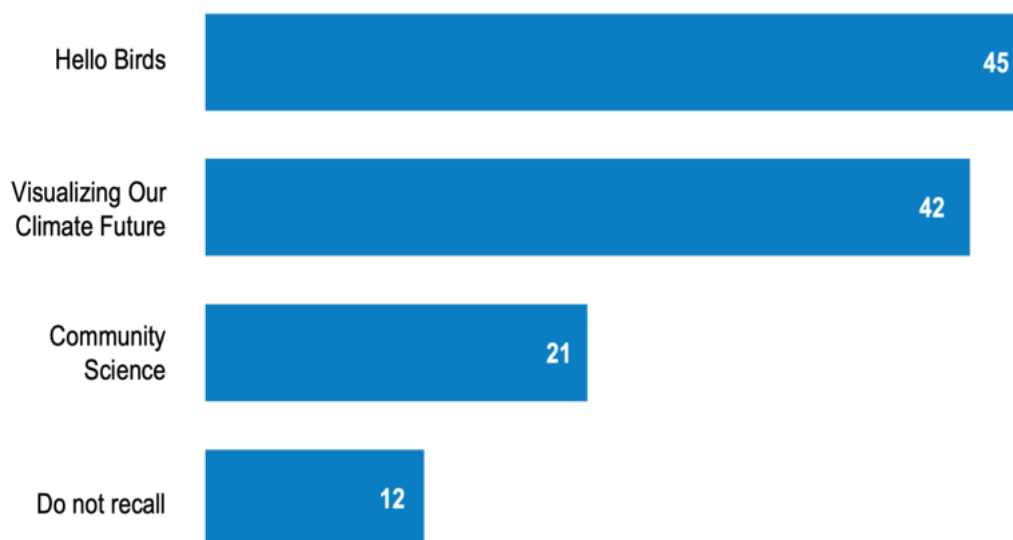


**Figure 12: Most participants were 19-23 years old.** (n=100)

**Figure 13: Most participants were not part of the Audubon on Campus program.** (n=99)



15%
were members of
Audubon on Campus