



Wings of the World

Summative Evaluation Report

September 25, 2018

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Prepared for:

Cincinnati Zoo & Botanical Garden

This project was completed with support from IMLS (Grant # MA-10-15-0418-15)

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Background

With funding from the Institute of Museum and Library Services' (IMLS) Museums for America program, the Cincinnati Zoo & Botanical Garden (Zoo) undertook a process of improving the interpretive experience of its *Wings of the World* exhibit, which concluded in summer 2018. The updated exhibition sought to enhance families' connections to nature and inspire them to become better bird neighbors, in direct alignment with the Zoo's strategic planning.

In collaboration with the Zoo, the Lifelong Learning Group (LLG) conducted formative and summative evaluation in spring and summer 2018. The present document describes the summative study.

Evaluation Questions

The purpose of the summative evaluation was to examine program outcome effectiveness, quantify the portions of messages and activities that resonated across participants, and determine the degree to which the *Wings of the World* experience facilitated connections with and feelings of responsibility to nature. Once the reinstallation of *Wings of the World* was final, the Zoo team and LLG collaborated to refine and narrow the summative evaluation questions as follow:

Which interactives appeal to visitors, and how do visitors engage with them?

How does the experience of *Wings of the World* affect visitors' perceptions and level of engagement with Zoo messages?

To what extent does the experience of *Wings of the World* increase visitors' perceived connection to nature? To what extent does the experience of *Wings of the World* increase visitors' intention to become better bird neighbors?

Methods

For this study, data collection consisted of an unfacilitated paper-pencil questionnaire. The instrument invited visitors to indicate where they stopped in *Wings of the World*, to indicate what they did at stops involving interactive elements and how their groups interacted, and to rate their level of agreement with statements reflecting possible changes in knowledge, emotions, and attitudes related to the exhibit.

Data Collection and Sample Description

The data collected for this study reflect a convenience sample of intergenerational family groups (i.e., parties with at least one adult and at least one child not participating in a group program) who were present in or exiting the *Wings of the World* exhibit area on July 27-28 and August 2-3, 2018. In light of the target audience for written interpretation in *Wings of the World*, recruitment favored groups that included a child aged 8 years of age or older. Overall, the evaluation team, which included two members of the Zoo staff, collected data from 171 family groups as they exited on the boardwalk immediately outside the *Wings of the World* building.

Because this study examined intergenerational group learning, the data here are described in terms of visitor groups, rather than individual visitors; however, the demographic characteristics described below reflect the responses of a primary respondent for each group. Respondents to this study were most frequently between the ages of 30-49 years, non-Hispanic and white, female, and accompanied by children 5-12 years of age. For the most part, visitors reported coming to the Zoo at least 2 times per year and maybe in excess of 5 times per year. In addition, a strong majority of respondents were Zoo members. The full demographic breakdown can be found in Table 1.

Table 1. Profile of group sample

n = 171 completed forms	Frequencies
Number of groups with adults in each age group*	
18-20 years	11
20-29 years	35
30-39 years	79
40-49 years	48
50-59 years	31
60+ years	24
Number of groups with children in each age group*	
Infant-< 2 years	24
2-4 years	59
5-7 years	76
8-12 years	72
13-17 years	30
Gender	
Male	32
Female	130
Racial/ethnic identity	
African American/Black	4
Asian/Asian-American	4
Latino and/or Hispanic	8
White, Non-Hispanic	154
Zoo membership	
Yes	108
No	57
Frequency of visitation to the Zoo	
Today is my first visit	21
I haven't visited for many years	11
Once every few years	8
About once a year	15
2-4 times per year	42
5+ times per year	67
Did you plan which exhibits and programs you'd visit today using the Cincinnati Zoo's website?	
Yes	42
No	123

**These counts reflect the number of groups that contained members in these age ranges, not the number of individuals who belonged to the age ranges.*

Results

Visitor Engagement

Reasons for Visiting Wings of the World

When asked why they chose to visit *Wings of the World*, respondents most frequently reported that someone in the group had an interest in birds. In aggregate, secondary categories of response included always trying to see everything at the Zoo, having encountered the exhibit as they walked through the Zoo, or having planned to see it in particular. Among visitors who chose to provide an additional reason for visiting *Wings of the World*, interest in the penguins and interest in birds in general were listed most frequently.

Interestingly, members and those who visited the Zoo frequently might have differed somewhat (from non-members and infrequent visitors, respectively) in their reasons for visiting the exhibit. In a split analysis of the sample, Zoo members who visited *Wings of the World* most frequently attributed their stopping at the exhibit to a group member's interest in birding, while visitors who were not Zoo members most frequently reported that they always try to see everything when they visit the Zoo. Similarly, frequent visitors and those who had not visited the Zoo in many years also prominently cited an interest in birding, while those who visited the Zoo once a year or once every few years and those who were visiting for the first time primarily expressed interest in seeing the whole Zoo. **Taken together, these data suggest that specific interest in birds was an important driver for seeing *Wings of the World* for people who were already familiar with the Zoo or might not otherwise visit;** others simply considered *Wings of the World* one of many elements of the Zoo that they wanted to see.

Table 2. Frequency of visitors' reasons for stopping at *Wings of the World*

(n=171)	I/ someone in my group has an interest in birds/ birding.	It is a new exhibit to the Zoo.	It was the next exhibit we came to as we were going through the Zoo.	It was one of the exhibits we were planning on seeing today.	We always try to see everything when we come to the Zoo.	Other reason*
Overall – file not split	40%	7%	23%	23%	28%	8%
By membership status						
Member	46%	8%	20%	27%	26%	9%
Not a member	32%	5%	30%	16%	35%	7%
By visitation frequency						
First visit today	24%	5%	29%	24%	38%	10%
Not visited in many years	73%	0%	27%	0%	9%	0%
Once every few years	25%	0%	25%	25%	13%	0%
About 1 time/year	20%	13%	47%	20%	40%	0%
2-4 times/year	45%	2%	19%	19%	36%	17%
5+ times/year	46%	12%	19%	30%	24%	8%

*Other reasons given:

My children love penguins (non-member; first visit)

We have birds as pets (non-member; first visit)

Love penguins, puffins (member; visit 2-4 times per year)

Love the penguins! (non-member; visit 2-4 times per year)

The boys wanted to smell it! (member; visit 2-4 times per year)

There was an animal encounter scheduled for the time we're here (member; visit 2-4 times per year)

We always pass it up – today we decided to stop (member; visit 2-4 times per year)

We hadn't seen this before (non-member; visit 2-4 times per year)

We love birds (member; visit 2-4 times per year)

Children's interactive section (member; visit 5+ times per year)

I have a friend that's an ornithologist and wanted to see the new exhibit (member; visit 5+ times per year)

Indoor exhibit out of the sun (member; visit 5+ times per year)

Kid's request (member; visit 5+ times per year)

Visitor Engagement with Aviaries, Habitats, and Exhibit Interactives

In general, aviaries and habitats were very frequently visited stops within *Wings of the World* (Table 3). The Northern Oceans and the Southern Oceans habitats were the ones most cited by visitors as ones at which they stopped. This might be explained by looking at the reasons some visitors gave for visiting *Wings of the World*: a number of visitors mentioned penguins, which are found in the Southern Oceans habitat and puffins, found in the Northern Oceans habitat, as being one reason they chose to enter the exhibit area. Additionally, both habitats are easily noticed as one progresses through the exhibit area.

An important difference in conditions at various points during the study concerned the Australasian aviary. This aviary was open on the first weekend of data collection in July; however, during the following week, chicks were hatched in that aviary and the Zoo staff decided to close it to visitors in order to lessen any disturbances to the chicks or the mother bird. Because visitors were unable to actually “stop” and enter the Australasian Aviary, the table below only reflects the data collected during the first weekend of evaluation.

Table 3. Frequency of visitors’ stops at aviaries and habitats

(n=171)	Stopped	Saw but didn’t stop	Did not see
Southern Oceans	98%	2%	1%
Northern Oceans	94%	4%	2%
South American Aviary	90%	8%	2%
Australasian Aviary*	89%	9%	2%
Mexico Habitat	81%	13%	6%
Southeast Asia Habitat	80%	16%	4%
African Savannah Habitat	73%	20%	8%

**Data reflect the first weekend of data collection only (n=100)*

Visitors were also invited to share whether they stopped at interactive exhibit components, as well as any ways that they engaged with the interactive elements. **Data indicate that for all of the individual stops but the Join the Flock interactive, slightly over one-third of the visitors to *Wings of the World* chose to stop and engage** (Table 4). Of those who did not stop and engage with the interactives, most noticed the interactive but chose not to stop and engage with it, while the remainder actually did not notice the interactive. For the Join the Flock interactive, less than one-fourth of the visitors stopped to engage with the interactive.

For most of the interactives, over half the visitors that did choose to stop actively engaged with the exhibit element, and over one-third read the wall text that accompanied the interactive. Key exceptions seemed to include the Harper Mural, which offered limited interactivity, and the Guess Who? game, in which visitors reported reading labels less frequently. In the Migration Game area, where there is often a docent present to help visitors get involved with the game, a number of visitors did report interacting with a Zoo team member.

Table 4. Visitors' reported stops at and engagement with interactives

	Did not stop				Stopped and how interacted, if at all							
	Saw but didn't stop		Did not see		Stopped		Read wall text		Interacted with game or exhibit element		Interacted with a Zoo team member	
	n*	%	n*	%	n*	%	n**	%	n**	%	n**	%
Harper Mural	53	32%	47	29%	64	39%	29	45%	21	33%	2	3%
Birds are All Around Us!	60	37%	46	28%	58	35%	30	52%	23	40%	1	2%
Meet the Birds of Cincinnati: Guess Who? Game	66	40%	35	21%	63	38%	17	27%	34	54%	1	2%
Migration Game: Choose your bird	69	42%	27	16%	68	42%	24	35%	40	59%	13	19%
Migration Game: Watch Out for Windows	71	43%	30	18%	63	38%	27	43%	36	57%	12	19%
Migration Game: Spot the Predator	66	41%	35	22%	61	38%	26	43%	38	62%	10	16%
Migration Game: Bird-Friendly Backyard	71	42%	41	24%	57	34%	22	39%	27	47%	10	18%
Migration Game: Nest	69	41%	40	24%	58	35%	19	33%	35	60%	6	10%
Join the Flock	77	46%	49	29%	40	23%	19	48%	14	35%	0	0%

* n is based on all the visitors who came through Wings of the World exhibit

** n is based on the number of visitors who stopped at the interactive and how they engaged with it

Interestingly, although each individual element of the Migration Game was visited by only 34% to 42% of the sample, 64% of the sample (110 individuals) visited one or more of the Migration Game components, as shown in Table 5.

Table 5. Number of Migration Game stops reported by individual visitor groups

Number of Migration Game interactives reported as stops	Number of visitor groups	Percent of sample (n=171)
1 game interactive	36	21%
2 game interactives	15	9%
3 game interactives	11	6%
4 game interactives	17	10%
5 game interactives	31	18%

When asked about how their group dynamics in the exhibit, visitors most frequently reported that both adults and children joined together to engage with the interactives (Table 6). Occasionally a child in a visitor group engaged with the interactive independently, and, less frequently, an adult did so. These data suggest that the interactives supported a family learning experience for the majority of visitors who chose to engage with them.

Table 6. Frequency distribution for types of group interaction

Type of group interaction	Percent of sample (n=171)
Child(ren) and adult(s) started interacting about same time	38%
Child(ren) started interaction, adult(s) joined in	28%
Child(ren) only ones who interacted with exhibits	18%
Adult(s) started interaction, child(ren) joined in	11%
Adult(s) only ones who interacted with exhibits	6%

Exhibition Messaging

This study addressed outcomes related to exhibition messaging and visitor attitudes through a series of ratings items in which visitors were asked to indicate their level of agreement (on a scale where 1 meant “Totally disagree” and 7 meant “Totally agree”) with statements describing their perceptions after visiting *Wings of the World*.

Interest and Awareness Related to Birds

Visitors’ responses related to interest in and awareness of birds were analyzed first in aggregate, then in segments by membership status and frequency of visit (Table 7). Overall, visitors’ responses suggested that after leaving the exhibit area, they were more aware of bird life globally (reflected by a mean rating of \bar{x} =5.6). Meanwhile, the data suggested that visitors in general were only slightly more aware of bird life locally (\bar{x} =5.0) and that they experienced a slight increase in their interest in birds (\bar{x} =5.3). Analysis of the split sample suggested that respondents who had not visited the Zoo in many years expressed particularly strong agreement that they had become more aware of bird life both globally (\bar{x} =6.0) and locally (\bar{x} =5.7), and that their interest in birds had increased (\bar{x} =5.6). Respondents who visited the Zoo about once a year also expressed strong agreement they were more aware of bird life globally (\bar{x} =6.2) and moderate agreement that their interest in birds had increased (\bar{x} =5.7).

Table 7. Mean agreement ratings for interest and awareness related to birds (based on a 7-point scale where 1=Totally disagree and 7=Totally agree)

	I am more aware of bird life in the world.	I am more aware of bird life in the Cincinnati area.	My interest in birds has increased.
Overall - file not split	5.6	5.0	5.3
By membership status			
Member	5.5	4.9	5.1
Not a member	5.7	5.1	5.5
By visitation frequency			
First visit today	5.9	5.4	5.5
Not visited in many years	6.0	5.7	5.6
Once every few years	4.1	4.4	4.8
About 1 time/year	6.2	4.9	5.7
2-4 times/year	5.5	4.8	5.2
5+ times/year	5.5	4.9	5.1

The evaluation team also analyzed the data in order to identify any differences in the results among visitors who engage with the interactives in *Wings of the World* and those who did not (Table 8). With the exception of the Join the Flock interactive, data suggested that engaging with the Migration Game interactives might have had a relationship with visitors' reported awareness of global and local bird life and their reported interest in birds.

Table 8. Mean agreement ratings for interest and awareness related to birds, by engagement with interactives

	I am more aware of bird life in the world.		I am more aware of bird life in the Cincinnati area.		My interest in birds has increased.	
	Engaged with	Did not engage	Engaged with	Did not engage	Engaged with	Did not engage
Charley Harper Mural	5.8	5.5	5.4	4.7	5.5	5.1
Birds All Around Us	5.6	5.5	5.4	4.7	5.3	5.2
Guess Who? game	5.3	5.6	5.1	4.8	5.0	5.2
Migration Game: Choose your bird	5.5	5.5	5.2	4.7	5.2	5.1
Migration Game: Watch Out for Windows	5.4	5.6	5.1	4.7	5.1	5.2
Migration Game: Spot the Predator	5.5	5.6	5.3	4.7	5.3	5.1
Migration Game: Bird-Friendly Backyard	5.7	5.6	5.3	4.7	5.3	5.1
Migration Game: Nest	5.4	5.6	5.4	4.7	5.3	5.1
Join the Flock	5.3	5.5	5.4	4.8	4.9	5.2

Because there appeared to be differences between the responses of those people who engaged in some way with one or more of the interactives and those who did not, the evaluation team conducted a secondary analysis using independent samples *t*-tests to determine if any of the mean differences were statistically significant (Table 9). Results of these analyses suggested a few key areas of significant difference. First, **visitors who read the text found in the Harper Mural reported stronger agreement that they were more aware of the diversity of bird life in the world.** Interestingly, those who did not engage with the Migration Game’s Watch Out for Windows interactive were more aware of bird life globally than those who had done so; while the cause for this is not clear, this finding might reflect differential attention to specific exhibition elements and their respective messages. Meanwhile, **visitors who read the text found in the Birds Around Us, Migration Game: Choose Your Bird, Migration Game: Bird Friendly Backyard, and Join the Flock interactives reported stronger agreement that they were more aware of the diversity of bird life in the Cincinnati area** than those who did not read the text in those interactives. Furthermore, **visitors who read the text in the Guess Who? Game reported significantly stronger agreement that their interest in birds had increased** when compared with those who did not read the text.

Effect sizes, which can indicate the amount of change accounted for by reading the texts, ranged from a Cohen’s *d* of 0.4 (small effect) or 0.5 (moderate) for almost all the results for reading the interactive texts to one of 1.0 (very large effect) for reading the text of one interactive. The effect

sizes calculated for the Migration Game: Watch Out for Windows interactive resulted in a small negative effect size, which suggests that engaging with the interactive produced no change in respondents' awareness of and/or interest in birds.

An important caveat to these analyses is that although there was a visible increase in response scores of visitors who read the text connected to some interactives, the evaluation design reflects meaningful patterns of response but not sufficient evidence to establish a causal claim. Therefore, statistics should be interpreted with caution: while there was a reported increase in respondents' awareness of and interest in birds that correlated with particular forms of engagement, demonstrating a causal link between that increase and reading text or engaging with an interactive was not possible within the practical constraints of this project.

Another consideration for interpreting the results of this section pertains to other data: the main reason most of the visitors chose to visit *Wings of the World* was that one or more persons in the group had an interest in birds. Often, though not always, an interest in a topic can equate with knowledge of that topic. Therefore, many visitors may have already been aware of the diversity and distribution of bird species both within the Cincinnati area and throughout the world. This type of prior knowledge could have quite conceivably decreased how they rated their experience on the basis of gaining new awareness of or increasing their interest in birds. Even so, the ratings all indicated gaining at least some new awareness of birds and increasing the visitor's interest in birds after having visited *Wings of the World*.

Table 9. Independent samples *t*-test results for interest and awareness related to birds, by engagement with the exhibition

I am more aware of bird life in the world.						
	Mean	Std. Dev.	<i>t</i>	df	Sig. (2-tailed)	Effect size
Harper Mural – read text	6.0	.966	2.472	16	.02	0.4 small
Harper Mural – did not read text	5.5	1.249		6		
Migration Game: Watch Out for Windows – engaged with interactive	5.2	1.256	-1.978	16	.05	-0.4 small
Migration Game: Watch Out for Windows – did not engage with interactive	5.7	1.190		6		
I am more aware of bird life in the Cincinnati area.						
	Mean	Std. Dev.	<i>t</i>	df	Sig. (2-tailed)	Effect size
Birds Around Us – read text	5.6	1.500	2.421	16	.02	0.5 moderate
Birds Around Us – did not read text	4.9	1.571		6		
Migration Game: Choose Your Bird – read text	5.7	1.490	2.489	16	.01	0.5 moderate
Migration Game: Choose Your Bird – did not read text	4.9	1.568		6		
Migration Game: Bird-friendly Backyard – read text	5.7	1.122	2.427	16	.02	0.6 moderate
Migration Game: Bird-friendly Backyard – did not read text	4.9	1.617		6		
Join the Flock – read text	6.1	.973	4.819	38	.000	1.0 very large
Join the Flock – did not read text	4.8	1.595				
My interest in birds has increased.						
	Mean	Std. Dev.	<i>t</i>	df	Sig. (2-tailed)	Effect size
Guess Who? Game – read text	5.8	1.537	1.958	16	.05	0.4 small
Guess Who? Game – did not read text	5.2	1.376		5		

Connection to Birds and Conservation Action

The evaluation team conducted a parallel process of analysis with the remaining ratings items, which pertained to visitors' perceptions of connection to birds, nature, and conservation action. Findings from the aggregated data, as well as data segmented by membership status and frequency of visit, are reflected in Table 10. Overall, visitors slightly agreed that they had learned about ways to be a good bird neighbor (\bar{x} =5.2), that they were motivated to take action to be a good neighbor (\bar{x} =5.1). They agreed more strongly that they were inclined to pay closer attention to birds (\bar{x} =5.5) and that they felt more connected to the natural world (\bar{x} =5.5).

In analysis of the split sample, respondents who had not visited the Zoo in many years gave the strongest ratings of agreement (\bar{x} =5.6) that they had learned more about being good bird neighbors, while they and those who were visiting the Zoo for the first time agreed most strongly that they were motivated to take action toward being a better bird neighbor. Of all the demographic groups, respondents who were visiting the Zoo for the first time, along with those who visit 2-4 times per year, reported the strongest agreement that they were inspired to pay closer attention to the birds around them (\bar{x} =5.6). In addition, respondents who visited the Zoo about once a year expressed particularly strong agreement (\bar{x} =6.4) that they felt more connected to the natural world.

Table 10. Mean agreement ratings for connection to birds and conservation action (based on a 7-point scale where 1=Totally disagree and 7=Totally agree)

	I have learned more about things I can do to be a better bird neighbor.	I intend to take action to become a better bird neighbor.	I am inspired to pay closer attention to the birds around me.	I feel more connected to the natural world.
Overall – file not split	5.2	5.1	5.5	5.5
By membership status				
Member	5.2	5.0	5.4	5.4
Not a member	5.1	5.4	5.6	5.7
By visitation frequency				
First visit today	5.3	5.6	5.6	5.8
Not visited in many years	5.7	5.6	5.4	5.4
Once every few years	4.6	4.4	5.5	5.1
About 1 time/year	4.9	5.1	5.5	6.4
2-4 times/year	5.2	5.1	5.6	5.3
5+ times/year	5.2	5.0	5.1	5.4

As above, the evaluation team examined the data for potential differences in the results among visitors who engaged with the interactives in *Wings of the World* and those who did not (Table 11). On these items, data suggested that engaging with the Spot the Predator, Bird-Friendly Backyard, and Climb in the Nest elements of the Migration Game might have a relationship with visitors' perceptions of learning about how to be better bird neighbors, of their own motivation to take action to be good bird neighbors, of feeling inspired to pay closer attention to birds, and of feeling more connected to the natural world.

Table 11. Mean agreement ratings for connection to birds and conservation action, by engagement with interactives

	Learned more about being better bird neighbor		Take action to be better bird neighbor		Inspired to pay closer attention to birds around me		Feel more connected to the natural world	
	Engaged with	Did not engage	Engaged with	Did not engage	Engaged with	Did not engage	Engaged with	Did not engage
Charley Harper Mural	5.7	4.7	5.7	4.7	5.7	5.3	6.0	5.1
Birds All Around Us	5.5	4.9	5.4	5.0	5.5	5.5	5.8	5.3
Guess Who? game	5.4	4.9	5.2	5.0	5.4	5.4	5.3	5.4
Migration Game: Choose your bird	5.5	4.8	5.3	4.9	5.4	5.5	5.4	5.4
Migration Game: Watch Out for Windows	5.6	4.7	5.3	5.0	5.5	5.4	5.4	5.4
Migration Game: Spot the Predator	5.7	4.7	5.4	4.9	5.6	5.4	5.6	5.3
Migration Game: Bird-Friendly Backyard	5.7	4.8	5.5	4.9	5.5	5.4	5.4	5.4
Migration Game: Nest	5.6	4.8	5.4	4.9	5.5	5.4	5.5	5.4
Join the Flock	5.5	4.9	5.1	5.0	5.2	5.5	5.3	5.4

Data analysis again identified apparent differences in responses to questionnaire items between those who had engaged with interactives and those who had not. Therefore, the evaluation team again analyzed the data using an independent samples *t*-test to determine if any of the mean differences were statistically significant (Table 12).

As before, results of these analyses also suggested a few key areas of significant difference. **For the Migration Game’s Choose Your Bird, Spot the Predators, Bird-friendly Backyard, and Climb in the Nest interactives, as well as the Join the Flock interactive, respondents who read the associated text reported significantly stronger agreement that they had learned about being a better bird neighbor than respondents who did not read the text.** At the same time, **those who engaged with the Migration Game: Spot the Predator interactive also reported significantly stronger agreement that they had learned about being a better bird neighbor than respondents who did not engage with Spot the Predator.**

Meanwhile, **respondents who read the text found in Birds Around Us and in the Migration Game’s Choose Your Bird, Spot the Predator, Bird-friendly Backyard, and Climb in the Nest interactives reported greater strength of agreement that they intended to take action to become a better bird neighbor** than those who did not read the text in those areas. Finally, **those who read the text in the Migration Game: Spot the Predator interactive indicated stronger agreement that they felt inspired to pay more attention to the birds around them** than those who did not read the text.

Effect sizes, which can indicate the amount of change accounted for by reading the texts, ranged from a Cohen’s *d* of 0.4 (small effect) for one *t*-test result, to 0.5 or 0.6 (moderate effect) for three *t*-test results, to a 0.7, 0.8, or 0.9 (large effect size) for three *t*-test results regarding reading the texts in the various interactives. As before, the independent samples *t*-test results and effect size calculations should be interpreted cautiously: while there appears to have been a relationship between reading text or engaging with an interactive and an increase in respondents’ connection to birds and conservation actions, it is not possible to demonstrate a definitive causal link. Additionally, since again the main reason most visitors chose to visit *Wings of the World* was that one or more people in their group had an interest in birds, some respondents may have already held knowledge about ways to be a better bird neighbor, been inclined to pay close attention to birds, and/or feel connected to the natural world. Despite these interpretive limitations, **results all indicated visitors learning at least some ways of being a better bird neighbor and increased intention of taking action to be a better bird neighbor, as well as being inspired to pay more attention to the birds around them after having visited *Wings of the World*.**

Table 12. Independent samples t-test results for connection to birds and conservation action, by engagement with the exhibition

Learned more about being a better bird neighbor						
	Mean	Std. Dev.	t	df	Sig. (2-tailed)	Effect size
Migration Game: Choose Your Bird – read text	6.0	1.490	2.898	164	.004	0.7 large
Migration Game: Choose Your Bird – did not read text	5.0	1.585				
Migration Game: Spot the Predators – read text	5.8	1.354	2.293	164	.02	0.5 moderate
Migration Game: Spot the Predators – did not read text	5.0	1.595				
Migration Game: Spot the Predators – engaged with interactive	5.7	1.367	2.484	163	.01	0.5 moderate
Migration Game: Spot the Predators – did not engage with interactive	5.0	1.565				
Migration Game: Bird-friendly Backyard – read text	6.2	.989	5.287	46	.000	0.9 large
Migration Game: Bird-friendly Backyard – did not read text	5.0	1.584				
Migration Game: Climb in the Nest – read text	6.1	1.071	2.804	163	.01	0.8 large
Migration Game: Climb in the Nest – did not read text	5.0	1.602				
Join the Flock – read text	5.9	1.261	2.359	164	.02	0.6 moderate
Join the Flock – did not read text	5.1	1.591				
Intend to take action to become a better bird neighbor						
	Mean	Std. Dev.	t	df	Sig. (2-tailed)	Effect size
Birds Around Us – read text	5.7	1.351	2.151	164	.03	0.5 moderate
Birds Around Us – did not read text	5.0	1.567				
Migration Game: Choose Your Bird – read text	5.9	1.317	2.561	164	.01	0.6 moderate
Migration Game: Choose Your Bird – did not read text	5.0	1.555				
Migration Game: Spot the Predators – read text	5.8	1.177	2.526	164	.01	0.6 moderate
Migration Game: Spot the Predators – did not read text	5.0	1.583				

Intend to take action to become a better bird neighbor (continued)						
	Mean	Std. Dev.	t	df	Sig. (2-tailed)	Effect size
Migration Game: Bird-friendly Backyard – read text	6.1	.974	4.599	46	.000	0.8 large
Migration Game: Bird-friendly Backyard – did not read text	5.0	1.571				
Migration Game: Climb in the Nest – read text	5.8	1.261	1.988	163	.05	0.5 moderate
Migration Game: Climb in the Nest – did not read text	5.1	1.570				
Inspired to pay closer attention to birds around me						
	Mean	Std. Dev.	t	df	Sig. (2-tailed)	Effect size
Migration Game: Spot the Predators – read text	5.9	1.113	2.066	49	.04	0.4 small
Migration Game: Spot the Predators – did not read text	5.4	1.376				

Visitor Experiences of Wings of the World

In addition to the summative data described above, which reflect a larger sample of visitors, rich-response data from formative evaluation also suggested that after experiencing Wings of the World, visitors were able to list and explain several new concepts they gained during their engagement with the different habitat areas and interactives found in the exhibit. For example, respondents to the formative study who chose to engage with Guess Who? were able to list a number of bird species that were found on the game’s panels, and they often gave specific facts that appeared on the associated panels. Similarly, formative study respondents who engaged with one or more interactives in the Migration Game were able to list a number of specific, relevant actions that could protect birds during migration (e.g., decreasing the reflective quality of windows by putting tape on them or using blinds was a way to help birds during migration). Both groups also listed other ways to be good bird neighbors that reflected messages found in the Migration Game area. Along with summative data, these results support the finding that *Wings of the World* seems to have not only encouraged feelings of having learned new things, but also to have supported recall of specific exhibition messages.¹

¹ For more detail on visitors’ descriptions of the exhibition messages, see Hayde, D., Horr, E.E., Heimlich, J.E., Bray, S., and Werts, J. (2018). *Wings of the World: Formative Evaluation Report*. Technical report for the Cincinnati Zoo & Botanical Garden, Columbus, OH: Lifelong Learning Group.

Conclusions

Overall, summative evaluation seemed to reflect that family visitors to *Wings of the World* privileged the opportunity to interact with birds, and about a third of respondents engaged with interactive interpretation. Those who did use interactives and read labels associated with them also seemed to agree that they had learned about the main messages of the space and experienced positive change in their emotions and attitudes related to birds. Findings associated with each of the study questions are included below.

Which interactives appeal to visitors, and how do visitors engage with them?

- In general, aviaries and habitats were very frequently visited stops within *Wings of the World*, and this was particularly true for the Northern Oceans and the Southern Oceans habitats. Data also indicated that for all of the interactive stops but Join the Flock, slightly over one-third of the visitors to *Wings of the World* chose to stop and engage.
- For most of the interactives, over half the visitors that did choose to stop actively engaged with the exhibit element, and over one-third read the wall text that accompanied the interactive. Key exceptions seemed to include the Harper Mural, which offered limited interactivity, and the Guess Who? game, in which visitors reported reading labels less frequently. In the Migration Game area, where there is often a docent present to help visitors get involved with the game, a number of visitors did report interacting with a Zoo team member.
- The great majority of time both adults and children joined together to engage with the interactives. Occasionally a child in a visitor group engaged with the interactive independently, and, less frequently, an adult did so. These data suggest that the interactives supported a family learning experience for the majority of visitors who chose to engage with them.

How does the experience of *Wings of the World* affect visitors' perceptions and level of engagement with Zoo messages?

- Generally, results indicate that, with some exceptions, visitors felt that their experiences in *Wings of the World* supported their learning about the diversity and distribution of birds throughout the world and the diversity of birds in the Cincinnati area (to a slightly lesser degree). In addition, visitors expressed some agreement that their interest in birds increased after visiting *Wings of the World*.
- Visitors who read the text found in the Harper Mural reported stronger agreement that they were more aware of the diversity of bird life in the world.
- Visitors who read the text found in the Birds Around Us, Migration Game: Choose Your Bird, Migration Game: Bird Friendly Backyard, and Join the Flock interactives reported stronger agreement that they were more aware of the diversity of bird life in the Cincinnati area than those who did not read the text in those interactives.

- Visitors who read the text in the Guess Who? Game reported significantly stronger agreement that their interest in birds had increased than those who did not read the text.

To what extent does the experience of *Wings of the World* increase visitors' perceived connection to nature? To what extent does the experience of *Wings of the World* increase visitors' intention to become better bird neighbors?

- Overall, visitors slightly agreed that they had learned about ways to be a good bird neighbor and that they were motivated to take action to be a good neighbor. However, they agreed more strongly that they were inclined to pay closer attention to birds and that they felt more connected to the natural world.
- For the Migration Game's Choose Your Bird, Spot the Predators, Bird-friendly Backyard, and Climb in the Nest interactives, as well as the Join the Flock interactive, respondents who read the associated text reported significantly stronger agreement that they had learned about being a better bird neighbor than respondents who did not read the text. At the same time, those who engaged with the Migration Game: Spot the Predator interactive also reported significantly stronger agreement that they had learned about being a better bird neighbor than respondents who did not engage with Spot the Predator.
- Respondents who read the text found in Birds Around Us and in the Migration Game's Choose Your Bird, Spot the Predator, Bird-friendly Backyard, and Climb in the Nest interactives reported greater strength of agreement that they intended to take action to become a better bird neighbor than those who did not read the text in those areas. Those who read the text in the Migration Game: Spot the Predator interactive indicated stronger agreement that they felt inspired to pay more attention to the birds around them than those who did not read the text.



Share your Experiences!

Today, we're hoping to find out more about what visitors do in the Wings of the World exhibits and what they take away from this area of the Zoo.




Your participation in the survey is voluntary and your responses will be anonymous.





First, why did you come into the Wings of the World exhibit?

[check all that apply]

- I/someone in my group has an interest in birds/birding
- It is a new exhibit to the Zoo
- It was the next exhibit we came to as we were going through the Zoo
- It was one of the exhibits we were planning on seeing today
- We always try to see everything when we come to the Zoo
- Other reason:

For each of the following areas, please check whether you remember stopping there on your visit today.

Area of Wings of the World	Did you stop here?	
South American Aviary (ibis, tanager, sunbittern, etc.)	<input type="checkbox"/> Stopped here <input type="checkbox"/> Saw but did not stop here <input type="checkbox"/> Have not seen it today	
Australasian Aviary (fruit bat, lapwing, pigeons, etc.)	<input type="checkbox"/> Stopped here <input type="checkbox"/> Saw but did not stop here <input type="checkbox"/> Have not seen it today	
Mexico Habitat (thick-billed parrots)	<input type="checkbox"/> Stopped here <input type="checkbox"/> Saw but did not stop here <input type="checkbox"/> Have not seen it today	

Area of Wings of the World	Did you stop here?	
<p>African Savannah Habitat (coua, shrike, barbet, etc.)</p>	<p><input type="checkbox"/> Stopped here</p> <p><input type="checkbox"/> Saw but did not stop here</p> <p><input type="checkbox"/> Have not seen it today</p>	
<p>Southeast Asia Habitat (rhino hornbills)</p>	<p><input type="checkbox"/> Stopped here</p> <p><input type="checkbox"/> Saw but did not stop here</p> <p><input type="checkbox"/> Have not seen it today</p>	
<p>Northern Oceans (puffins)</p>	<p><input type="checkbox"/> Stopped here</p> <p><input type="checkbox"/> Saw but did not stop here</p> <p><input type="checkbox"/> Have not seen it today</p>	
<p>Southern Oceans (penguins)</p>	<p><input type="checkbox"/> Stopped here</p> <p><input type="checkbox"/> Saw but did not stop here</p> <p><input type="checkbox"/> Have not seen it today</p>	

For each of the following areas, please check whether you remember stopping there on your visit today. If you **DID** stop there, please also tell us what you did.



Harper Mural

Did you stop here?

- Stopped here
- Saw but did not stop here
- Have not seen it today

If you stopped, did you do any of the following?

- Read wall text
- Interacted with a game or exhibit element
- Interacted with a Zoo team member



Birds are All Around Us!

Did you stop here?

- Stopped here
- Saw but did not stop here
- Have not seen it today

If you stopped, did you do any of the following?

- Read wall text
- Interacted with a game or exhibit element
- Interacted with a Zoo team member



Meet the Birds of Cincinnati / Guess Who Game

Did you stop here?

- Stopped here
- Saw but did not stop here
- Have not seen it today

If you stopped, did you do any of the following?

- Read wall text
- Interacted with a game or exhibit element
- Interacted with a Zoo team member



**Migration Game:
Choose Your Bird**

Did you stop here?

- Stopped here
- Saw but did not stop here
- Have not seen it today

If you stopped, did you do any of the following?

- Read wall text
- Interacted with a game or exhibit element
- Interacted with a Zoo team member



**Migration Game:
Watch Out for Windows**

Did you stop here?

- Stopped here
- Saw but did not stop here
- Have not seen it today

If you stopped, did you do any of the following?

- Read wall text
- Interacted with a game or exhibit element
- Interacted with a Zoo team member



**Migration Game:
Spot the Predators**

Did you stop here?

- Stopped here
- Saw but did not stop here
- Have not seen it today

If you stopped, did you do any of the following?

- Read wall text
- Interacted with a game or exhibit element
- Interacted with a Zoo team member



**Migration Game:
Bird-Friendly Backyard**

Did you stop here?

- Stopped here
- Saw but did not stop here
- Have not seen it today

If you stopped, did you do any of the following?

- Read wall text
- Interacted with a game or exhibit element
- Interacted with a Zoo team member



**Migration Game:
Nest**

Did you stop here?

- Stopped here
- Saw but did not stop here
- Have not seen it today

If you stopped, did you do any of the following?

- Read wall text
- Interacted with a game or exhibit element
- Interacted with a Zoo team member



Join the Flock

Did you stop here?

- Stopped here
- Saw but did not stop here
- Have not seen it today

If you stopped, did you do any of the following?

- Read wall text
- Interacted with a game or exhibit element
- Interacted with a Zoo team member

Which of the statements below best describes how your group interacted with the various exhibits in Wings of the World?

- The child/children in our group were the only ones that interacted with the exhibits.
- The child/children in our group started the interaction, and one or more adults joined in.
- One or more of the adults in the group were the only ones that interacted with the exhibits.
- One or more of the adults in the group started the interaction and the child/children in the group joined in.

- Most of the time the child/children and the adults in the group started interacting with the exhibit about the same time.

Please rate how much you agree with each of the following statements.

After having visited Wings of the World...	Totally disagree							Totally agree						
I am more aware of the diversity of bird life in the world.	1	2	3	4	5	6	7	1	2	3	4	5	6	7
I am more aware of the diversity of bird life in the Cincinnati area.	1	2	3	4	5	6	7	1	2	3	4	5	6	7
I have learned more about things I can do to be a better bird neighbor.	1	2	3	4	5	6	7	1	2	3	4	5	6	7
I intend to take action to become a better bird neighbor.	1	2	3	4	5	6	7	1	2	3	4	5	6	7
My interest in birds has increased.	1	2	3	4	5	6	7	1	2	3	4	5	6	7
I am inspired to pay closer attention to the birds around me.	1	2	3	4	5	6	7	1	2	3	4	5	6	7
I feel more connected to the natural world.	1	2	3	4	5	6	7	1	2	3	4	5	6	7

Finally, please tell us a little about you.

Including yourself, how many people are in your group today?

adults (age 18+) _____
 # children and youth _____

What are the ages of the adults in your group?

[check all that apply]

- 18-20
- 21-29
- 30-39
- 40-49
- 50-59
- 60+

What are the ages of the children in your group (if any)?

[check all that apply]

- Infant – less than 2 years old
- 2 – 4 years old
- 5 – 7 years old
- 8 – 12 years old
- 13 – 17 years old

What is your race/ethnicity?

(check all that apply)

- African-American/Black
- American Indian/Native Alaskan
- Asian/Asian-American
- Latino/a/x or Hispanic
- Native Hawaiian/Pacific Islander
- White, Non-Hispanic
- Additional affiliation: _____

Are you:

- Male
- Female
- Nonbinary

About how often do you visit the Cincinnati Zoo & Botanical Garden?

- Today is my first visit
- I haven't visited for many years
- Once every few years
- About once a year
- 2-4 times per year
- 5+ times per year

Are you (or someone in your group) a member of the Cincinnati Zoo & Botanical Garden?

- Yes
- No

Did you plan which exhibits and programs you'd visit today using the Cincinnati Zoo's website?

- Yes
- No

Is there anything else you would like to share with the Zoo?

***Thank you for taking the time
to help us today!***

Please return this booklet to our Zoo data collector to receive a small token of our appreciation.