

IMPACT PLANNING • EVALUATION • AUDIENCE RESEARCH



SUMMATIVE EVALUATION:

COAST TO CACTUS IN SOUTHERN CALIFORNIA EXHIBITION

Prepared for the
San Diego Natural History Museum
San Diego, CA

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DASHBOARD

STUDY DESCRIPTION

The objectives of the evaluation study are to explore:

- ◆ How visitors are using the exhibition;
- ◆ Meaning made from the exhibition;
- ◆ The effectiveness of the bilingual interpretation;
- ◆ Use and meaning-making at new types of spaces/components.

Three methodologies were employed:

- ◆ 100 timing and tracking observations of visitors 10 years and older;
- ◆ 40 interviews with visitors after their visit (individual and group interviews);
- ◆ Focused observations and interviews with visitors in seven spaces/components.

VISITORS' USE OF THE EXHIBITION SPACE

Overall visitation

- ◆ Median time spent: 13 min. 9 sec.
- ◆ Median stops: 12 components

Exhibition sections

- ◆ Desert: high attraction & engagement
- ◆ Attic: low attraction & high engagement

Components

- ◆ Chaparral & Desert at Night: high attraction & engagement

Behaviors

- ◆ Frequent social behaviors
- ◆ Use of benches boosted dwell time

VISITORS' MEANING-MAKING FROM THE EXPERIENCE OVERALL

Overall enjoyment of interactive/immersive spaces, animals, and content; many new ideas and messages are gleaned.

High achievement:

Visitors realize that southern California is unique in its biodiversity and ecosystems.

Moderate achievement:

Visitors come to a deeper sense of the region by personally connecting to the place.

Moderate achievement:

Visitors recognize that southern California has changed over time because of humans and the built environment.

EFFECTIVENESS OF THE VARIOUS BILINGUAL INTERPRETATION

Positive reaction to

presence of bilingual interpretation among most (both those who do and do not speak Spanish).

Side-by-side presentation:

Preferred delivery for many because one can (1) check authenticity of translation and (2) move between the two depending on comfort.

Toggle languages:

Preferred delivery for native Spanish-speakers who are most comfortable in Spanish.

Spanglish:

Preferred delivery by San Diego residents, but not native Spanish-speakers.

VISITORS' USE AND MEANING-MAKING IN THE NEW TYPES OF SPACES/EXPERIENCES

Water Interactive:

Strong content-conveyor even though visitors continually turned knob.

Chaparral:

Some get it, some do not, but the space is enjoyed by many, particularly children.

Understanding Change:

The stories resonate; a lot of content was taken away from this section.

The Attic:

Some perceive it's for children, but meaningful experiences had by those who visit.

Where are We?

Wetlands Kiosk: Effective at showing change but maps were challenging to interpret.

Valentien:

Popular with children and lots of group engagement; but people think it is more interactive (painting).

Desert at Night:

Clever visuals & narration make it a favorite; strong, positive emotional response to Spanglish.

SUMMARY AND DISCUSSION

The San Diego Natural History Museum (theNAT) contracted Randi Korn & Associates, Inc. (RK&A), with the advisement of Amparo Leyman-Pino for bilingual interpretation, to conduct a summative evaluation of the exhibition *Coast to Cactus*. RK&A used three methodologies: timing and tracking observations, exit interviews, and focused observations with short-answer interviews at seven new types of spaces or components. The following summary and discussion is organized by the study objectives.

VISITORS' USE OF THE EXHIBITION SPACE

Visitors' use of the exhibition space is comparative to other exhibition spaces—dwell time and thoroughness of use is average. The median time spent in the exhibition is 13 minutes 9 seconds, which initially appears low given the size of the exhibition. However, the location and positioning of the exhibition space bears significant weight on the time spent in the exhibition. That is, visitors may have stopped at one *Coast to Cactus* exhibit while orienting themselves after entering the Museum or upon exiting King Tut with the intent to “visit” *Coast to Cactus* later in their visit to theNAT. However, if you remove from the sample visitors who only stopped at the Introduction section, the median time increases to 15 minutes 40 seconds and is more in line with median time spent in other similar exhibitions.¹ In terms of the number of stops made or thoroughness of use, the median number of components stopped at is 12 of 72 components, which is also typically low.² See the next page for a heat map of the exhibition identifying hot and cold spots based on attraction (how many visitors stop) and engagement (how long visitors stay/dwell time):³

HOT SPOT

- ◆ The Desert section, particularly the Desert at Night theater and Airstream Trailer, had both high attraction (the section with the highest percent of visitors to stop) and engagement (the section with the second highest median time spent).

WARM SPOT

- ◆ The Attic had low attraction, likely due to its location as well as an underlying perception that it is a space for children, but high engagement (the section with the highest median time by a large margin).

COLD SPOT

- ◆ The Introduction had the lowest dwell time, as might be expected, but had the second highest percent of visitors to stop (owing to it being at the beginning of the exhibition).
- ◆ The Coastal Wetlands section also had a low dwell time (the second lowest). Like the Introduction, it had high attraction (third highest), likely owing to its location at the front of the exhibition.

¹ For comparison, the median time spent in the National Museum of Natural History's *Q?rius* is 15 minutes 35 seconds.

² For comparison, the median stops at California Academy of Sciences' *Earthquake* is 5 out of 32 (dwell time in this exhibition was low outside of the Shake House component). For Oakland Museum of California's History Gallery, the median stops 23 of 100. Note that the comparison of stops across is very arbitrary since it depends largely on how the exhibition is broken down into exhibit components (if an exhibition is broken down into many components it normally leads to smaller proportion of exhibits visited).

³ Classifications are not based on a formula; but rather, they take into account all the data we have collected. Overall, dwell time (engagement) is privileged over percent of stops (attraction).

VISITORS' MEANING-MAKING FROM THEIR EXHIBITION EXPERIENCE OVERALL

Visitors' meaning-making in the exhibition is commendable, particularly related to the intended outcomes for the exhibition. The figure below describes the results, including the evidence and implications.

OVERALL MEANING-MAKING	HIGH
EVIDENCE: All understood that the exhibition is about the plants, animals, and habitats of southern California, a seemingly simple take-away but foundational to achieving any of the intended outcomes. Further, many take-aways were rich and touched on some of the intended outcomes without the evaluator's prompting.	
IMPLICATIONS: While visitors' use of the exhibition is on par with other exhibitions, the meaning-making is high. Messaging in the exhibition is strong and reinforced by the exhibition design.	
VISITORS REALIZE THAT SOUTHERN CALIFORNIA IS UNIQUE IN ITS BIODIVERSITY AND ECOSYSTEMS.	HIGH
EVIDENCE: More than one-half clearly realized the unique biodiversity and ecosystems of southern California (demonstrated by recognition of the exhibition's progression through different environments and the many species represented), and another one-third had a moderate realization (generally saying they saw "different" or "unique" animals, plants, and environments but without providing a concrete example).	
IMPLICATIONS: The design of the exhibition, from layout of the exhibition by environments to the selection of species, was extremely supportive of and contributed to the success of visitors' achievement of this outcome.	
VISITORS COME TO A DEEPER SENSE OF THE REGION BY PERSONALLY CONNECTING TO THE PLACE.	MODERATE
EVIDENCE: Most named a personal story or memory that came to mind in the exhibition, but stories/memories ranged from very specific and explicitly linked to the natural history of the place to superficial and not related to the natural history of the region.	
IMPLICATIONS: TheNAT offers a variety of environments, animals, and plants, which increases the chances that visitors will make a personal connection to the place. However, the Attic is the only section where there was a concerted prompt for visitors to make personal connections. Other reflection strategies will need to be integrated throughout the exhibition to increase achievement (e.g., questions, "does this remind you...?").	
VISITORS RECOGNIZE THAT SOUTHERN CALIFORNIA HAS CHANGED OVER TIME BECAUSE OF HUMANS AND THE BUILT ENVIRONMENT.	MODERATE
EVIDENCE: Most described how the exhibition showed change over time in southern California, but fewer interviewees linked the change to humans and the built environment.	
IMPLICATIONS: The ideas related to this outcome came across most strongly and unquestionably from the Understanding Change section. In other places, the idea of change came across but the relationship to humans and the built environment was more understated and would need to be more explicit to enhance achievement.	

THE EFFECTIVENESS OF THE VARIOUS KINDS OF BILINGUAL INTERPRETATION

While our sample size is small, overall preferences for bilingual interpretation favor a side-by-side presentation; however, there is a smaller but very vocal group of visitors who felt very strongly connected to the Spanglish interpretative approach offered in the Desert at Night theater. These findings align with those from the NSF-funded study Bilingual Exhibits Research Initiative (BERI) report:⁴

- ◆ **Side-by-side interpretation.** In our study, we found that visitors liked the ability to compare the Spanish and English translations to determine the one that they or someone in their group felt more comfortable reading. Visitors' preference for side-by-side presentation of bilingual interpretation is supported by findings of the BERI study that "many used both languages, and some expressed how they compared words between the two languages" (page 6). The option to see the languages side-by-side seems to be important if all bilingual speakers are to be comfortable, regardless of their language proficiency. For instance, in our study comparing text was important, potentially given that respondents likely varied in Spanish proficiency⁵, and as noted in the BERI report, some are inclined to code-switch, using both Spanish and English during their visit⁶. Additionally, the side-by-side presentation was valued for its "equalness" to use the word of one visitor; although, the resulting amount of text in the exhibition became distracting for a few.
- ◆ **Toggle back and forth.** The toggle-back-and-forth interpretation was more aesthetically pleasing to a few since it meant less text was visible. However, this approach seemed most appealing to visitors who are more proficient in Spanish or more accustomed to hearing only Spanish. For instance, one interviewee noted the generational difference in preferences between herself and her children (side-by-side) versus her mother (toggle). Further, data from this study and the BERI report discourage the toggle-back-and-forth interpretation overall given that visitors in groups who choose the bilingual interpretation vary in language proficiency and the toggle requires visitors to choose one. Whereas, as noted above, side-by-side presentation is friendlier to visitors of all proficiencies. Visitors can compare translations to determine which they are most comfortable using or use parts they find easiest to understand. Furthermore, the toggle-back-and-forth approach does not support language learning.
- ◆ **Spanglish.** TheNAT chose to use Spanglish in Desert at Night since it is a regional way of speaking that provided the opportunity to use just one script (versus separate English and Spanish scripts). Hearing Spanglish in the Desert at Night resonated as very "San Diego" to several visitors (and not just bilingual speakers); these visitors felt a strong emotional connection to the Spanglish.⁷ A couple of visitors disliked the Spanglish, which appears to be a sentiment held by native-Spanish speakers or those with a strong connection to countries where Spanish is the national language. Notably, however, Spanglish is not the preferred method of bilingual interpretation; that is, the way theNAT uses Spanglish in this exhibition is perfect for the audience as it is only at one exhibit. TheNAT should use a similar approach in other exhibitions—using Spanglish as an accent in the exhibition versus a consistent and pervasive form of interpretation.

As for the Spanish translation, visitors were very satisfied overall with one visitor calling it "fluid." Few had specific comments on the translation, which suggests the translation worked well for most visitors.

⁴Yalowitz, S., Garibay, C., Renner, N., & Plaza, C. (2013). Bilingual Exhibits Research Initiative: Institutional and Intergenerational Experiences with Bilingual Exhibitions. National Science Foundation: Washington, DC.

⁵ A limitation of the study is that we did not ask visitors to rate their Spanish-language proficiency; however, some self-reported their proficiency as context for their preferences and opinions, and from self-report data, we know that few respondents used Spanish regularly in their home.

⁶ For the BERI study, visitor groups were "recruited ahead of time in order to ensure that they met a number of specific criteria, especially around language use at home" (page 18). By contrast, we recruited a random selection of visitors who commented on the Spanish translation if they reported using it.

⁷ The BERI report cited the emotional reaction of visitors seeing Spanish in the exhibition. Notably, it is the Spanglish, and not the Spanish on its own, that incited the strongest emotional response in this exhibition as it resonated with this area. Some emotional reactions occurred to Spanish itself but not as powerful and frequent as those to the Spanglish.

VISITORS' USE AND MEANING-MAKING IN NEW TYPES OF SPACES / COMPONENTS

SPACE / COMPONENT	SUCCESES	WEAKNESSES	RECOMMENDATIONS
Water interactive	<ul style="list-style-type: none"> Visuals are simple and powerful Message builds on familiarity of water crisis with new info about how far water originates and the resulting impacts there 	<ul style="list-style-type: none"> Continuous turning of knob Visitors don't wait until the end of the visual 	<ul style="list-style-type: none"> Change knob to a tap to prevent continuous turning Consider changing the timing so that the visual starts more quickly and gaps in visual are reduced; a timer can also be displayed to indicate the "show" time
Chaparral	<ul style="list-style-type: none"> Enjoyable for children; they like the atmosphere and touchable aspects Conveying the "naturalness" of fires 	<ul style="list-style-type: none"> Some never get the story concept Many are not leaving with deep ideas about humans/land development and fires 	<ul style="list-style-type: none"> Consider repositioning or integrating land development content into the immersive environment
Understanding Change section	<ul style="list-style-type: none"> Very popular among some (largely adults) Strong take-aways about changes in southern California Positive feelings about role humans can take (versus helpless) 	<ul style="list-style-type: none"> Less attractive to children Some confusion about bat interactive (e.g., sounds detected by technology) 	<ul style="list-style-type: none"> Alter messaging at bat interactive to emphasize that technology makes bat noises audible Consider whether the NAT is satisfied with this being an adult-oriented space (that is successful at messaging to that one audience)
The Attic section	<ul style="list-style-type: none"> Digital Scrapbook and photos in general are very popular and show change Some very thoughtful reflections happening 	<ul style="list-style-type: none"> Perceived as a space for children Low visitation 	<ul style="list-style-type: none"> Consider clearly identifying the space as "The Attic" or otherwise clearly indicate the section's purposes Expand Digital Scrapbook content
Where are We? Wetlands Kiosk	<ul style="list-style-type: none"> Shows change at basic level (but often not beyond that) Raises awareness of places (wetlands) 	<ul style="list-style-type: none"> Maps are difficult to interpret (particularly finding the location) Less awareness of why changes happen 	<ul style="list-style-type: none"> Revisit the maps, thinking primarily about visitors' orientation to the location Consider consolidating or eliminating information
Valentien	<ul style="list-style-type: none"> Enjoyable for families, lots of conversation 	<ul style="list-style-type: none"> Perception and desire for it to be more interactive (e.g., children able to paint) 	<ul style="list-style-type: none"> Remove the color palette Consider how to better align visitors' expectations with their actual experience
Desert at Night	<ul style="list-style-type: none"> Enjoyable and effective visuals and narration Spurs nostalgia and interest in the desert 	<ul style="list-style-type: none"> A few found Spanglish distracting or initially confusing 	<ul style="list-style-type: none"> Keep the exhibit as is

CONCLUSION

Coast to Cactus was very successful as an exhibition overall, and there are several lessons that theNAT may apply to their future work. Of significant note is that the majority of visitors realized the exhibition's big ideas and outcomes. While the exhibition has a lot of content, the exhibition team ensured the content focused on and supported the big ideas—something that is difficult to execute when moving through the exhibition development process. The results suggest that the exhibition team exercised discipline throughout the process. Additionally, some of the new types of spaces designed for the exhibition were largely successful. The Desert at Night theater visuals were very strong and effective and promoted nostalgia for camping and being out in nature. The Chaparral was highly engaging although some of the messaging was missed by some visitors, particularly those with young children. The Attic was an engaging space for those who made it there—attraction was its weakest link. Additionally, the Understanding Change section was highly successful at conveying content about changes in southern California but in a more positive tone than we have seen in other exhibitions with similar goals.

The bilingual interpretation used in the exhibition was also well-received. Given the findings from this study and those from the BERI report, theNAT should consider using the side-by-side interpretation technique as a model for exhibitions in the future as well as Spanglish interpretation, as an accent when appropriate. While the data from this study indicate high satisfaction with the translated text, staff had discussed needing a more systematic and formalized process for bilingual interpretation. For efficiency sake, we recommend following through with formalizing an approach using data from this study along with the following other resources:

- ◆ The NISE (Nanoscale Informal Science Education) Network Translation Process Guide—The guide outlines a specific model to follow “that will help to ensure that your translations maintain an appropriate interpretive tone and a high level of scientific accuracy.”
http://nisenet.org/catalog/tools_guides/translation_process_guide
- ◆ Multilingual Interpretation in Science Centers and Museums—This study conducted by the Association of Science-Technology Centers, Inc. (ASTC) and the Exploratorium provides best practices and lessons learned by other institutions for theNAT to keep in mind.
http://www.astc.org/resource/equity/Multilingualism%20Report_Final.pdf
- ◆ BERI report—The report has been previously cited in this report and provides useful information about how bilingual visitors visit museums. [http://informalscience.org/projects/ic-000-000-001-774/Bilingual_Exhibits_Research_Initiative_\(BERI\)](http://informalscience.org/projects/ic-000-000-001-774/Bilingual_Exhibits_Research_Initiative_(BERI))

STUDY BACKGROUND

INTRODUCTION

The San Diego Natural History Museum (theNAT) contracted Randi Korn & Associates, Inc. (RK&A), with the advisement of Amparo Leyman-Pino for bilingual interpretation, to conduct a comprehensive summative evaluation of the exhibition *Coast to Cactus*, which opened in January 2015. The blue box below outlines the content for *Coast to Cactus*. The green box adjacent outlines the evaluation framework. The two are shown side by side to demonstrate alignment between the exhibition content and the evaluation framework.

EXHIBITION CONTENT FRAMEWORK (SDNHM)

Exhibition Messaging

Big Idea

A uniquely varied environment makes the southern California region a place of extraordinary biodiversity that we all should treasure.

Exhibition Main Messages

Main messages are explicit communication goals that we hope all or most visitors take away.

- ◆ Southern California is made up of different ecosystems.
- ◆ Plants and animals in southern California are extraordinarily diverse.
- ◆ Humans have had a dramatic impact on southern California's natural habitats.
- ◆ There are many ways people can make a difference to southern California's built and natural environments.

Exhibition Goals

- ◆ To generate awareness of southern California's unique biodiversity and ecosystems.
- ◆ To foster caring and stewardship of southern California's natural places.
- ◆ To inspire and deepen visitors' sense of place for this region.
- ◆ To help create an environmentally literate citizenry.

EVALUATION FRAMEWORK (RK&A)

Evaluation Objectives

- ◆ Identify how visitors are using the exhibition space; study all components, time spent in space overall and at individual components, and behaviors
- ◆ Explore what meaning visitors make from their exhibition experience overall, and particularly to what extent visitors meaning making aligns with the intended outcomes (identified below).
- ◆ Explore the effectiveness of the various kinds of bilingual interpretation in the exhibition.
- ◆ Understand how visitors use and what meaning they create from six new types of spaces/components.

Intended Outcomes to Explore in Evaluation

- ◆ Visitors will realize that southern California is unique in its biodiversity and ecosystems.
- ◆ Visitors, both from southern California and elsewhere, will come to a deeper sense of the region by making a personal connection to the place.
- ◆ Visitors recognize that southern California has changed over time because of humans and the built environment.

TIMING AND TRACKING OBSERVATIONS

Timing and tracking observations provide an objective and quantitative account of how visitors experience *Coast to Cactus*, including which components visitors use, for how long, and how they behave. Timing and tracking observations document visitor behaviors in a standardized manner that we have analyzed statistically.

METHODOLOGY

Timing and tracking observations were collected over almost three weeks in March and April. Observations are unobtrusive, so visitors were not asked to participate but selected randomly upon entering the exhibition. To select visitors, the observer imagined a line just at the exhibition's entrance and selected the first visitor age 10 years and older to cross this imaginary line. Once the visitor crossed the line, the observer started a stopwatch and unobtrusively observed the movements of the selected visitor through the space, recording the components used, time spent, and behaviors (see Appendix A for the timing and tracking form). When the visitor exited the exhibition, the observer returned to the entrance to await the next eligible visitor to cross the imaginary line. RK&A collected 100 timing and tracking observations of visitors 10 years and older.

Observation data were analyzed using IBM SPSS Statistics Version 20. Analyses conducted include:

- ◆ Frequency distributions (e.g., percent of visitors to stop at an exhibit)
- ◆ Summary statistics (e.g., median time spent at an exhibit)
- ◆ Inferential statistics⁸ to examine the relationship among variables, including:
 - Cross-tabulations to show the joint frequency distribution of the variables, and the chi-square statistic (X^2) to test the significance of the relationship (e.g., “stop” [yes or no] was tested against “gender” to determine whether components were attractive to a particular gender).
 - The Kruskal-Wallis (K-W) test, which is a nonparametric test for differences in the medians of two or more groups⁹ (e.g., “total time in the exhibition” was compared by “gender” to determine whether time spent in the exhibition differed by gender).

The following section highlights important trends in the timing and tracking data. However, timing and tracking data are very rich, so please see Appendix B for specifics about the number of visitors who stopped at each exhibit, did each behavior, etc.

⁸ A 0.05 level of significance (p) was employed to preclude findings of little practical significance. When the level of significance is set to $p = 0.05$, any finding that exists at a probability (p -value) ≤ 0.05 is “significant.” When a finding (such as a relationship between two variables) has a p -value of 0.05, there is a 95 percent probability that the finding exists; that is, in 95 out of 100 cases, the finding is correct. Conversely, there is a 5 percent probability that the finding would not exist; in other words, in 5 out of 100 cases, the finding appears by chance.

⁹ The Kruskal-Wallis (K-W) test is a nonparametric statistical method for testing the equality of population medians of two or more groups. Nonparametric statistical methods do not assume that the underlying distribution of a variable is “normal” with a symmetric bell-shape, so they are appropriate for testing variables with asymmetric distributions such as “total time in the exhibition.” The K-W test is analogous to a One-way Analysis of Variance, with the scores replaced by their ranks. The K-W test statistic H has approximately a chi-square distribution.

CONTEXTUAL INFORMATION

WHEN OBSERVATIONS WERE CONDUCTED

Observations were conducted between 12:00 and 5:00 P.M. from March 27 to April 12, which is when some schools were on spring break. About one-half of observations were conducted on weekdays (53 percent), and the other one-half on weekend days (47 percent). The level of crowding in the exhibition was generally moderate (46 percent of observations), but sometimes lower (32 percent) or higher (22 percent).

During most of the data collection (78 percent of observations), the exhibition had all of its components—nothing was missing or unavailable. However, during two days (22 percent of observations), the snake on display in the Mountains section was not on display, and during just two observations, parts of the activity cart were missing.

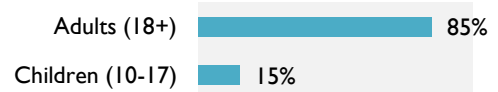
WHO WAS OBSERVED

Observations were unobtrusive but data collectors noted some general characteristics of observed visitors. Of the 100 visitors observed, most were adults (85 percent), and a few were children between 10 and 17 years old (15 percent). Observed adults were largely between 18 and 44 years (65 percent of adults). Approximately one-half of visitors were female and one-half were male (53 percent versus 47 percent).

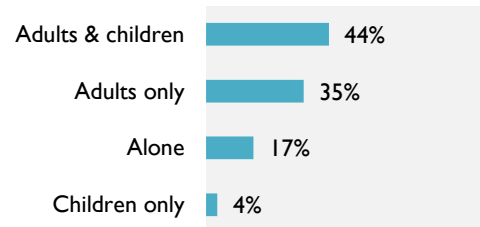
Most observed visitors were in a social group (83 percent), while a few were alone (17 percent). Less than one-half of visitors were with children 17 years and younger (44 percent of observed visitors were in groups of adults and children), and another 4 percent were only observed in groups of children (all of the “children only” groups contained just children 14-17 years who did not seem to visit with an adult while in the exhibition).

When possible, the data collector noted the language of visitors and their visit group. Several observed visitors were in groups that spoke Spanish (17 percent), and a few others were in groups that spoke a language other than English (3 percent). Most visitors in Spanish-speaking groups were with children.

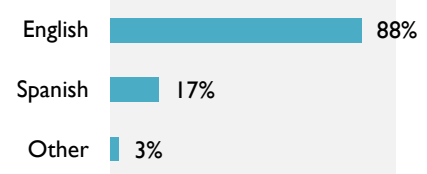
AGE OF OBSERVED VISITOR



GROUP COMPOSITION



LANGUAGES OVERHEARD



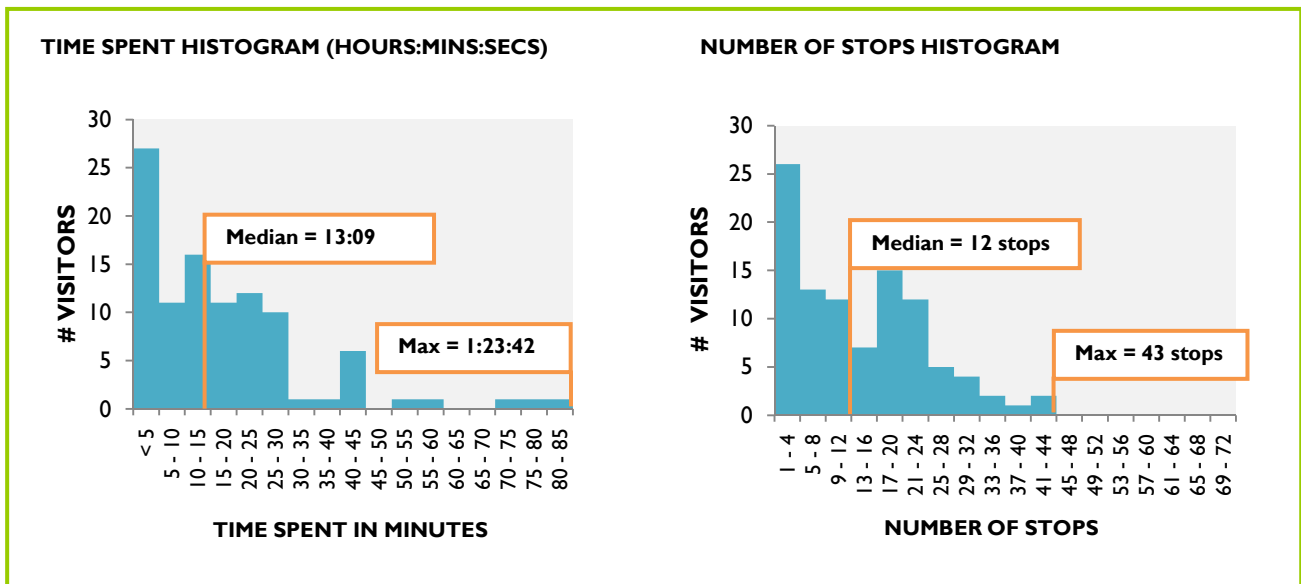
TIME SPENT AND TOTAL NUMBER OF STOPS

TIME SPENT

The *Coast to Cactus* exhibition is a large exhibition at approximately 7,500 square feet. Observed visitors spent a moderate amount of time in the exhibition, spending between 35 seconds (0:35) and 1 hour 23 minutes 42 seconds (1:23:42). As is typical, time spent does not follow a normal distribution. That is, as shown in the histogram below, many visitors spent a short amount of time in the exhibition (e.g., 27 percent of visitors spent less than 5 minutes in the exhibition). The median¹⁰ time spent in the exhibition is 13 minutes 9 seconds (13:09).¹¹ There is one variable affecting time spent in the exhibition—visitors in groups with children are likely to spend more time in the exhibition than visitors who are not with children (median time of 17 minutes 8 seconds (17:08) for visitors with children versus median of 10 minutes 21 seconds (10:21) for visitors without children).

STOPS

RK&A and theNAT identified 72 components in the exhibition (see the identified components on the timing and tracking form in Appendix A). Components were selected because they are distinct and observable sections in the exhibition. Components vary in size; some are small (e.g., singular text panel or touchscreen) and some are large (e.g., Desert at Night theater and Chaparral immersive environment). Of the 72 components, observed visitors stopped at between one and 43 components. Like time, the number of stops does not follow a normal distribution (see the histogram below), with many visitors stopping at few components (e.g., 29 percent of visitors stopped at four components or less). The median number of components stopped at is 12.



¹⁰ Medians (versus means) are reported because, as is typical, the number of exhibits used and the time spent by visitors are distributed unevenly across the range. When the distribution of scores is extremely asymmetrical (i.e., “lopsided”), the mean is affected by the extreme scores and, consequently, falls further away from the distribution’s central area. In such cases, the median is a better indicator of the distribution’s central area because it is not sensitive to the values of scores above and below it.

¹¹ For comparison, the median time spent in the National Museum of Natural History’s *Q?rius* is 15 minutes 35 seconds. Additionally, the median time spent at California Academy of Science’s *Earthquake* exhibition is 16 minutes 18 seconds, but the time is greatly enhanced by the time spent waiting in line and visiting the Shake House and Dome Theater (median time drops to 4 minutes 15 seconds when the Shake House and Dome Theater time is removed).

STOPS AND TIME SPENT BY SECTIONS

STOPS

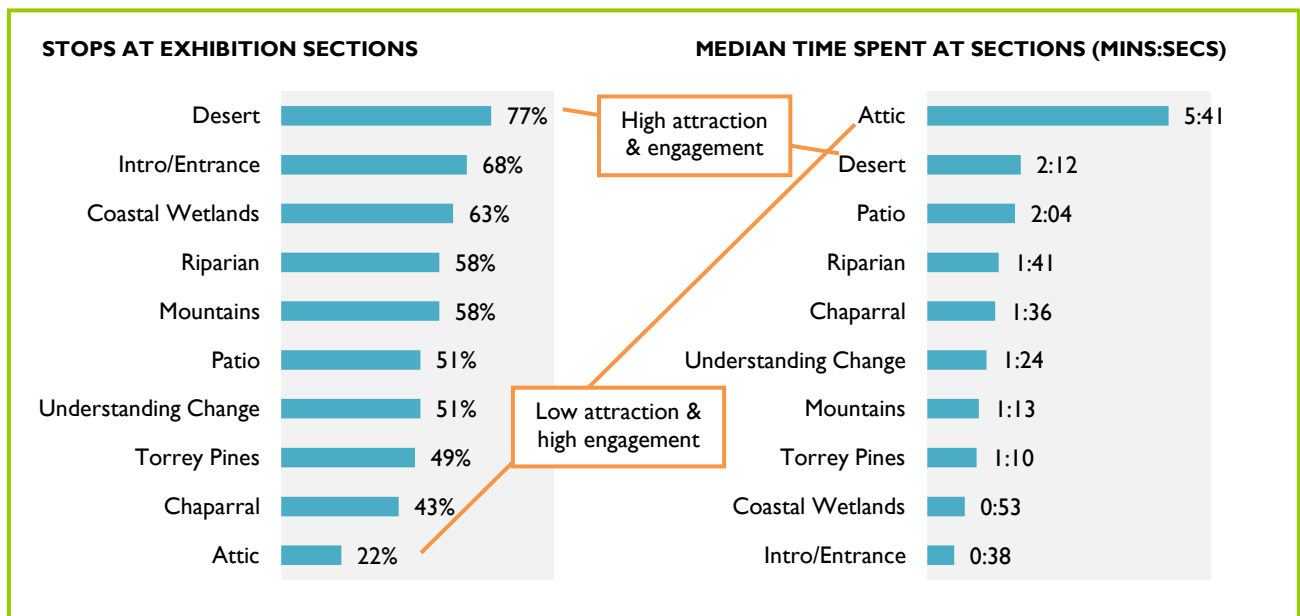
There are 10 sections in the exhibition, and the median number of sections visited is just over one-half at six.¹² As is expected, the most stopped at sections are the three that visitors first encounter as they enter the exhibition space: Desert (77 percent stopped), Intro / Entrance (68 percent), and Coastal Wetlands (63 percent). By contrast, the least stopped at sections are Chaparral (43 percent) and the Attic (22 percent); these two sections each had unique designs, with the Chaparral being a closed-in space with changing lighting, and the Attic being positioned in a second floor loft area but visible from the ground floor.

There are two variables that have a statistical relationship to section visitation:

- ◆ Visitors in groups with children are more likely to visit the Chaparral and the Attic (versus visitors who are alone or in adult-only groups).
- ◆ Females, whether alone or in groups, are more likely to visit the Understanding Change section (versus males).

TIME SPENT

While the percent of visitors stopping at a section indicates attraction, time spent (dwell time) shows engagement. For *Coast to Cactus*, the relationship between stops and time spent in a section is often inverted; that is, some of the most-visited sections have the lowest dwell time, while some of the least-visited sections have the highest dwell times. This inversion is clearly demonstrated by the Attic, which was stopped at the least but has the longest median dwell time—5 minutes 41 seconds (5:41). The Desert is an exception to the inverse model; it is one of the most stopped at sections AND has the second longest dwell time—2 minutes 12 seconds (2:12).



¹² Notably, 13 percent of visitors only visited the Intro/Entrance (visiting one or more components there); this 13 percent of visitors brought down the average overall time spent in the exhibition (the median time for visitors who only visited the Intro/Entrances is 1 minute 12 seconds versus 15 minutes 40 seconds for other visitors).

STOPS AND TIME SPENT AT COMPONENTS

STOPS

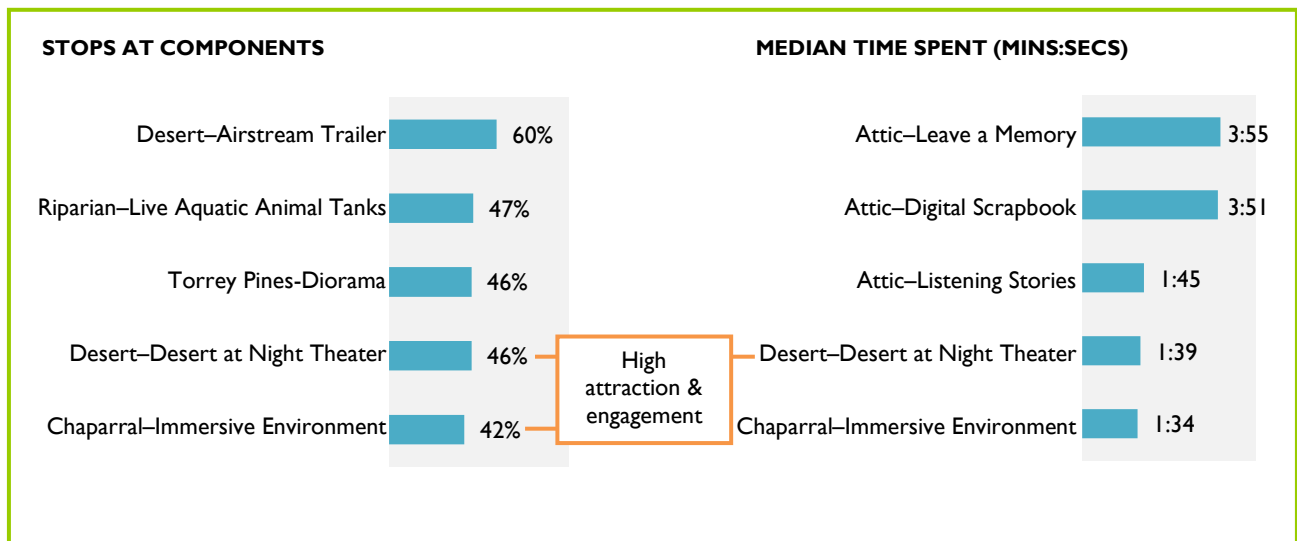
In looking at individual components, the five most stopped at components are from various sections and include several different types of components. The Airstream Trailer in the Desert section was most stopped at (60 percent of visitors stopped), with many of these visitors going into the Trailer. The other most visited components are the Live Aquatic Animal Tanks in the Riparian section (47 percent), the Diorama in the Torrey Pines section (46 percent), the Desert at Night theater (46 percent), and the Chaparral Immersive Environment¹³ (42 percent). These top stopped at components include traditional exhibitry (e.g., live animal displays and dioramas), and innovative new spaces (e.g., the theater and immersive environment), as well as nostalgia (e.g., Airstream Trailer).

There are two variables that have a statistical relationship to component stops:

- ◆ Visitors in groups with children are more likely to visit the Airstream Trailer and the Chaparral Immersive Environment (versus visitors who are alone or in adult-only groups).
- ◆ Visitors in groups with Spanish-speakers are less likely to visit the Live Aquatic Animal Tanks (versus visitors who were not with Spanish-speakers).

TIME SPENT

Two of the most stopped at components were also among the components with the highest dwell times: the Desert at Night theater (median time = 1 minute 39 seconds, 1:39) and the Chaparral Immersive Environment (median time = 1 minute 34 seconds, 1:34). However, the top three dwell times were for components in the Attic; the Leave a Memory component and Digital Scrapbook each had median dwell times of nearly 4 minutes, while Listening Stories had a shorter but still high dwell time at 1 minute 45 seconds (1:45).



¹³ The text panels in the Chaparral are considered a separate stop.

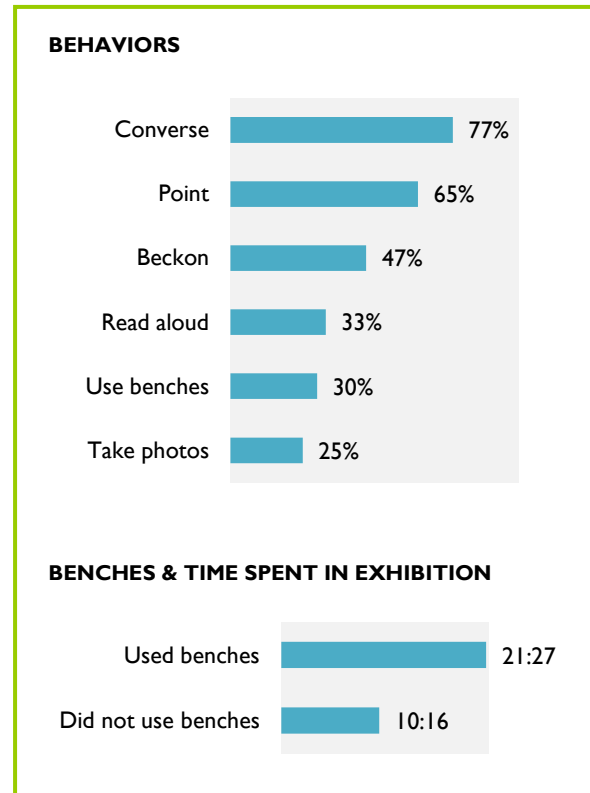
BEHAVIORS

During the observations, data collectors looked for several pre-determined behaviors. Four social behaviors (converse, point, beckon, and read aloud) and two general behaviors (use of benches and taking photos) were observed across the exhibition.¹⁴

Social behaviors occurred most often: 77 percent of visitors were observed conversing with others in their group or another group; 65 percent were observed pointing out something in the exhibition to another visitor; 47 percent were observed beckoning another visitor to join him/her at a component; and, 33 percent were observed reading exhibit materials aloud for another visitor.¹⁵ All of these behaviors—converse, point, beckon, and read aloud—were more likely to be done by visitors in groups with children (versus visitors in groups without children). However, adults and children were observed doing these behaviors equally (e.g., beckoning was not done more by than adults than children).

Use of benches occurred less often. Benches were used by 30 percent of visitors. Notably, visitors who use benches spent twice as much time in the exhibition as visitors who did not (median time of 21 minutes 27 seconds versus 10 minutes 16 seconds). Benches and stools were often used at the Live Aquatic Animal Tanks, the Snake, Riparian Plants and Native Baskets, and Then and Now Digital Scrapbook, and the Chaparral Immersive Environment.

Photos were taken by 25 percent of visitors. Popular photo locations include the Grizzly Bear on the beach (10 visitors took a photo); Kids Mudflat Burrow (8 visitors took a photo); the Conifer Tree (5 visitors took a photo); and live animal exhibits, such as the aquatic animals and snake. Photos were more likely to be taken by female visitors (versus males).



¹⁴ See Appendix B for the complete behavior data, including component-specific behaviors.

¹⁵ Since the observations are unobtrusive, “read aloud” is a difficult behavior to capture as the data collector has to be in close proximity to the observed visitor. Therefore, we can assume it happened more often than is reported in this data collection method.

EXIT INTERVIEWS

Interviews are open-ended and encourage interviewees to express their opinions, understandings, and the meaning they construct. They are valuable because they allow visitors to express themselves using language and words of their choosing (as opposed to the language of the evaluator or researcher). Additionally, the interviewer is able to ask probing or clarifying questions to better understand visitors' experiences.

METHODOLOGY

RK&A conducted 40 interviews with visitors who had just finished their visit to *Coast to Cactus*. The interviewer used a random selection method to recruit visitors to participate. Visitors were asked a series of questions about their experiences in the exhibition and the meaning they made from their experience (see the interview guide in Appendix C); visitors were also asked questions about the bilingual interpretation in the exhibition. All interviews were audio recorded with visitors' permission and transcribed to facilitate analysis. As a token of appreciation for their time, theNAT provided thank-you gifts for each participant. The response rate is 56 percent.

The interviews produced descriptive data that were analyzed qualitatively, meaning that the evaluator studied the data for meaningful patterns and, as patterns and trends emerged, grouped similar responses. Where possible, participants' verbatim language (edited for clarity) is included to exemplify trends. Within quotations, the evaluator's comments appear in parentheses.

BILINGUAL FOCUS

Since theNAT sought feedback on the bilingual interpretation in the exhibition, a bilingual data collector conducted all the interviews—interviewing visitors in English or Spanish as applicable. All visitors were asked about the bilingual interpretation and Spanish-speakers were asked a few additional questions about the Spanish-language translation.

BACKGROUND INFORMATION

RK&A interviewed 40 groups of visitors consisting of 75 individuals. Of the 75 individual interviewees:

- ◆ Two-thirds are adults; they range in age from 18 to 78 years, and their median age is 39 years.
- ◆ One-third are children; they range in age from 3 to 14 years, and the median age is 8 years.
- ◆ Almost two-thirds are female, and one-third male.

Of the 40 groups of visitors:

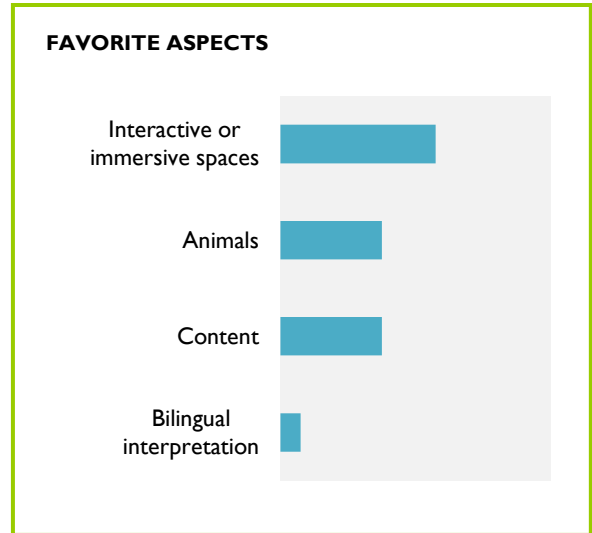
- ◆ About one-half are visiting theNAT for the first time, while the other one-half have visited previously.
- ◆ More than one-half live in San Diego County. Most of the remaining visitors live in California, including Los Angeles County, Orange County, Riverside County, San Bernardino County, Sacramento County, Placer County. Additionally, one visitor group is from Mexico and another from Florida.

OPINIONS OF AND EXPERIENCES IN *COAST TO CACTUS*

FAVORITE ASPECTS

When asked about what they liked most about the exhibition, interviewees often named a combination of qualities, including the interactive or immersive spaces, animals, and content.

1. **Interactive or immersive spaces**—More than one-half of interviewees mentioned an interactive or immersive space that they enjoyed or commented on the hands-on aspects of the exhibition generally. The Desert at Night theater was mentioned most often with interviewees enjoying everything about the space. The Chaparral was mentioned often, too, with visitors enjoying the presentation of the story and the lighting. The Attic, Mudflat burrow and log, and scavenger hunt cards for the diorama, and Valentien were also mentioned.
2. **Animals**—One-third of interviewees named animals, with the majority specifically mentioning live animals; for example, the aquarium animals were mentioned often as was the snake.
3. **Content**—One-third of interviewees mentioned something that they learned or the content explored in the exhibition. Some liked that it showed the plants and animals in the area and that it covered the diverse landscapes in the area from the coast to the mountains. A few specifically enjoyed the Native or Not? exhibit, and few others the Understanding Change section. Additionally, the Water Interactive, Sky Islands, Chaparral and the Attic were also mentioned.
4. **Bilingual interpretation**—Three interviewees said the bilingual interpretation was their favorite part of the exhibition.



CHALLENGING ASPECTS

Few interviewees described something they did not like or that they found confusing about the exhibition. Additionally, each of these few interviewees named something different, indicating the exhibition does not present any major challenges to interviewees (e.g., individualized issues). For example, some of the miscellaneous items that arose are:

- ◆ Wants more past and present comparisons across the exhibition, like those in the Attic
- ◆ Dislikes digital exhibits but love dioramas
- ◆ Curious if children thought the Mudflat Burrow was actually that size
- ◆ Did not understand the Chaparral space
- ◆ The Attic was “just informational” in a negative way

OPINIONS OF BILINGUAL INTERPRETATION

All interviewees, regardless of their use of the bilingual interpretation, were asked their opinion about including bilingual interpretation in English and Spanish. Most interviewees spoke positively about the bilingual interpretation. These interviewees said they are used to seeing bilingual content or that it “made sense” since they are in San Diego; other positive remarks include appreciation for the “equalness” of the language and “glad to see it there.” By comparison, a few interviewees (English-speakers only) said the Spanish was “distracting”; these interviewees commented that there seemed to be “more of it [Spanish than English]” and that they are not accustomed to seeing both languages.

INTERPRETATION PREFERENCE

The six interviewees who said they used the bilingual content were asked about their preferences for the three interpretation types: side-by-side, toggle back and forth, and Spanglish. Interviewees may not have seen all of the interpretation styles (e.g., the toggle and Spanglish were each available at only one exhibit so visitors responses are based on the interviewer’s explanation of the delivery and photographs).

Side-by-side presentation—The side-by-side presentation was most preferred. Interviewees liked that they could compare the Spanish and English translations, so that they could choose the translation that they or someone in their group felt most comfortable reading. Also, one interviewee liked that he could compare the versions to gauge the accuracy of the translation (which he thought was very good).

Toggle back and forth—The toggle back and forth was the next most preferred method because there was less text to look at. Additionally, one interviewee noted a generational difference (likely owing to the varying inherent comfort of the generations with the two languages)—her mother prefers reading the Spanish only whereas she and her children prefer having both languages side-by-side.

Spanglish—None of the exit interviewees said they preferred Spanglish interpretation. One interviewee, who lives in San Diego but self-identified as Colombian and did not see the Desert at Night theater, said she discourages the use of Spanglish because it is not proper. Keep in mind that some of these interviewees commented on Spanglish delivery without having seen the Desert at Night theater—but the concept was described and a picture showing the mix of Spanish and English was used to demonstrate the use of Spanglish. From other methodologies, we know that the Spanglish was received extremely warmly by some visitors (see the focused observation with short-answer interview for the Desert at Night theater).

PREFERENCE FOR SIDE-BY-SIDE

“I think it’s important to have both, because of the convenience to read one or the other, whichever is easier for you to understand at a given time. The translation is very fluid, it seems like it wasn’t taken lightly. It’s a very good translation.”

- 40-year-old man from Mexico

TRANSLATION OVERALL

Visitors were very satisfied with the translation with one visitor calling it “fluid” and a few others generally noting that it was done well but not making any specific comments on the words chosen. One visitor mentioned that some of the words were different than she was accustomed to but noted that she was Colombian and recognized some of the words as being Mexican, which she said was expected for the area.

MEANING MAKING IN THE EXHIBITION

When visitors were asked what the exhibition showed or told them—using an open-ended question to explore the meaning they made in the exhibition—all interviewees said the exhibition was about southern California—the plants, animals, and habitats. Positively, many responses extended beyond simply saying the exhibition “informs us of our surroundings” and “educates” visitors about San Diego to a deeper meaning. For example, one-half noted changes in the environment and the need to protect the plants, animals, and environment, using words and phrases including “protect,” “preserve,” “conserve,” “care for,” “respect,” “not hurt,” and “stand up for.” Some of these interviewees described the “fragility of the environment” and the changes over time. Ideas about protecting the environment came from all over the exhibition but interviewees most often cited the Water interactive, aquarium, the Sky Islands interactive, and the Understanding Change section. Additionally, some described the tremendous diversity of the environment, with responses ranging across the continuum from basic acknowledgement of the “progression from coast to cactus” to a deeper understanding of the “valuable biomes.”

DESIRE TO PRESERVE

“I think it was drawing awareness to everything that's been going on in southern California. I felt a lot of it was about prevention and then also protection.”

- 26-year-old man & 29-year-old woman

“Pay attention to our local wildlife and how we interact with it. Since we live here, we have to coexist. They're just as much our neighbors as we are theirs.”

- 41-year-old man

NEW INFORMATION

Many visitors said they learned something new from the exhibition, while new information spanned a range of topics some of the most-mentioned topics include:

- ◆ **Native and non-native species**—Several said they learned about native and non-native species; for example, a few were surprised to find out that the palm trees in the area are largely non-native. Examples were provided both from the Native or Not? exhibit in the Patio and the content at the Live Aquatic Animals tank in the Riparian section.
- ◆ **Water**—Several others said they learned where San Diego’s water comes from, noting surprise at the distance and implications of bringing in water from so far away.
- ◆ **Animals**—Some named animals that they did not know were in the area (flying squirrels were often mentioned), or specific stories about how animals had been endangered and were now recovering (such as the California condor).

ACHIEVEMENT OF OUTCOMES

This study explored three intended outcomes of the exhibition. Achievement of each is described below.

OUTCOME	ACHIEVEMENT
Visitors realize that southern California is unique in its biodiversity and ecosystems.	High
Visitors come to a deeper sense of the region by making a personal connection to the place.	Moderate
Visitors recognize that southern California has changed over time because of humans and the built environment.	Moderate

UNIQUENESS OF SOUTHERN CALIFORNIA'S BIODIVERSITY AND ECOSYSTEMS

Achievement of this outcome is high. More than one-half of interviewees clearly realized the unique biodiversity and ecosystems of southern California. The majority of these interviewees said that the progression of the exhibition through the different environments (e.g., wetlands to mountains) showed them the diversity of ecosystems in southern California. A few others said the different species represented showed them the biodiversity of the area, particularly pointing to the various animals shown in the dioramas, animals and plants they learned about in the Understanding Change section, and the different plants shown on the Valentien interactive. Additionally, a few mentioned the Native or Not? exhibit.

Another one-third demonstrated a moderate realization of the unique biodiversity and ecosystems of southern California. These interviewees generally described seeing “different” or “unique” animals, plants, and environments but did not provide examples that clearly linked to biodiversity and unique ecosystems.

At the bottom of the spectrum, a few said they did not think about the unique diversity of southern California at all while in the exhibition.

DEEPER SENSE OF THE REGION THROUGH PERSONAL CONNECTIONS

Achievement of this outcome is moderate because while most named some sort of personal story or memory that came to mind in the exhibition, responses ran the continuum from very specific and explicitly linked to the environment to more superficial and unspecific.

Nearly one-half of interviewees talked about how the exhibition made them think about being out in nature. Camping was mentioned most often; these interviewees said the Desert at Night theater and the Trailer reminded them of times they had been camping, often saying they did it as “a child” or that seeing the theater made them “flashback” to another time, indicating it was something they used to do but do not do now. A few mentioned other examples such as going to the canyons and hiking in Torrey Pines. Overall, these responses were mostly brief and did not demonstrate a deep sense of the region.

About one-third described how the vegetation, animals, and experiences are representative of the area and their experiences. Fires were cited most; these interviewees said visiting the Chaparral reminded them of the fires they had experienced in their lifetime. Others provided various other examples, such as the diversity of landscape along a two-hour drive through the area, the rat in the Patio that they experience at home, flowers they recognize from their neighborhood, or the environmental changes they have witnessed in their lifetime.

A few said the exhibition did not make them think about any personal stories. About one-half of these interviewees said they reside in San Diego County, while one explained he is from Florida and another just moved to the area.

REMINDED OF PAST EXPERIENCES IN NATURE

“The camping area was a flashback to when I was a kid.”

- 38-year-old woman

“My granddaughter [8-year-old] had to listen to all my talk about when we used to go camping or when I was her age. [Laughter]”

- 65-year-old woman

HUMAN-INDUCED CHANGES IN SOUTHERN CALIFORNIA

Achievement of this outcome was moderate, because while most interviewees described how the exhibition showed change over time in southern California, fewer interviewees linked the change to humans and the environment. When describing how the exhibition showed them change over time, interviewees recalled seven areas of the exhibition, listed in order from most-frequently mentioned to least-frequently mentioned:

1. **Understanding Change section**—One-quarter of interviewees described how one of the stories in this section shows change over time. The majority of the interviewees linked the change to humans and the built environment, naming the egg exhibit and military-base sandpiper. Additionally, a few noted how this section showed how humans can create positive change by protecting animals and habitats.
2. **Chaparral**—One-fifth of interviewees described how this section shows change over time. It was unclear exactly how many of these interviewees linked the change to human impact. For instance, a few people named “climate change” and the frequency of burns but never explicitly indicate the human role in these things. Additionally, there were a few responses that described overdevelopment and building in burn areas, suggesting they were thinking about the impact of fire on humans versus the relationship between humans and fire.
3. **Sky Islands**—Several interviewees mentioned this interactive. As with the Chaparral, interviewees mentioned climate change but not specifically the human role in it so it is unclear how many of these interviewees truly understand the connection.
4. **Water interactive**—Several interviewees mentioned the water interactive. A few of these interviewees clearly understood the human impact on change, indicating that the need for water in the San Diego area has caused the rivers to dry in other areas (pointing to the photo). However, a few others seemed to be thinking primarily about the effect of the lack of water on personal livelihood.
5. **The Attic and photos in general**—A few interviewees mentioned the photos in the Attic (on the walls) in the Digital Scrapbook as well as a few other photos shown in the exhibition, such as one in the Understanding Change section and one showing urban sprawl in the Patio area. These interviewees all described the built environment leading to habitat loss.
6. **Native or Not? exhibit and related information at Aquariums**—A few interviewees named the Native or Not? exhibit as well as other content related to non-native species entering the area. For example, interviewees mentioned the introduction of non-native Mexican San Palm and aquatic animals into the rivers and streams.
7. **Where are We? Wetlands kiosk**—A few interviewees described how the maps in the kiosk show the changes in the region but did not describe the human impact on these changes.

FOCUSED OBSERVATIONS WITH INTERVIEWS

Focused observations with short-answer interviews are a naturalistic data collection method that allows the evaluator to construct a holistic understanding of the successes and shortcomings of a specific exhibit or section. Focused observations with short-answer interviews were conducted at seven locations in the exhibition. The locations were selected because they are new types of components or sections that theNAT has questions about.

The seven exhibits or sections are:

- ◆ Water interactive
- ◆ Chaparral section
- ◆ Understanding Change section
- ◆ Attic section, and Digital Scrapbook interactive in particular
- ◆ Where are We? Wetlands Kiosk
- ◆ Valentien interactive
- ◆ Desert at Night theater

METHODOLOGY

The evaluator and a trained data collector conducted all of the focused observations with short-answer interviews. The evaluator spent approximately three hours observing each of the exhibits or sections—taking general notes about what visitors did and said while using the exhibit or section. Observations were focused on the specific questions that theNAT has about individual exhibits or sections but also include other relevant data that speak to the success or shortcomings through the eyes of the evaluator. Some observations were cued, meaning RK&A or the data collector asked a visitor to use the section or component.

In addition to observing visitors, the evaluator interviewed approximately 10 groups of visitors about their experiences with a particular exhibit or section. The evaluator used an interview guide but also probed as necessary to understand how visitors made meaning in the space and what about the space helped them make meaning. Interviews were conducted at the exhibit or section so visitors could literally show the evaluator what informed their responses. The evaluator took handwritten notes during the interviews.

BILINGUAL FOCUS

For three of the exhibits or components, the bilingual interpretive strategies were of particular interest since they demonstrate three different ways that theNAT provided bilingual content in the Museum. These are:

- ◆ Where are We? Wetlands Kiosk uses side-by-side English and Spanish interpretation.
- ◆ Valentien interactive allows visitors to toggle back and forth between English and Spanish.
- ◆ Desert at Night theater uses Spanglish throughout the presentation.

As such, a bilingual English and Spanish data collector observed and interviewed visitors about these sections so as to capture feedback.

WATER INTERACTIVE

The Water interactive is located in the Coastal Sage - Riparian section. It shows where San Diego's water comes from and how diverting rivers affects other places. The objectives of the focused observation and interviews for this component are to explore:

- ◆ Whether visitors are reading the text;
- ◆ Whether visitors are turning the knob continuously without paying attention to the visual;
- ◆ Whether visitors watch the visual all the way through;
- ◆ What messages visitors take away; and
- ◆ Whether visitors notice how far away some of the water comes from and if they experience any feelings of surprise, guilt, or desire to conserve water as a result.

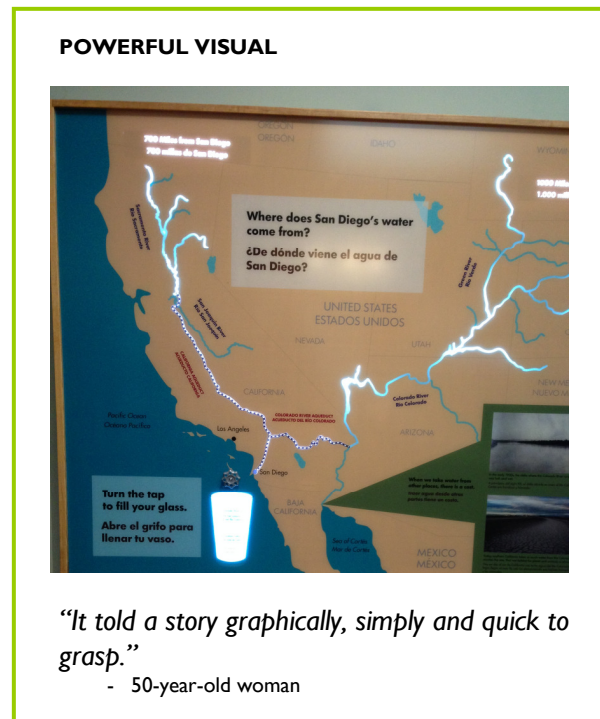
ATTRACTION AND USE

Of observed visitors, about one-half were in adult-only groups or alone, and one-half were in groups that included children. As might be expected, children and adults were attracted to different parts of the interactive. Children were attracted to the knob and were often observed rushing over to it and spinning it fast and continuously. While doing so, children often looked straight forward at the cup—not at the map or text. Few children engaged with other aspects of the interactive, and those who did were often accompanied by an adult who pointed out the flow of water. For example, one woman said, “See what’s happening, water is coming down, down, down” to her 6-year-old girl who was spinning the knob continuously. Similarly, a dad walked up to his 5-year-old girl spinning the knob and explained “Pipes bring water from all the way over here, because San Diego is a desert.”

By comparison, adults were attracted to the map and text. Among adults, one-half looked at the map but did not turn the knob. Some others read the text in the green box or looked at the map for a while *before* turning the knob. However, like children, most adults turned the knob continuously until the cup was filled. At that point, adults stood back to watch the lit up water flow through rivers and aqueducts. Few visitors stayed until the end of the interactive—some watched until the water reached San Diego from the north, and others watched until the water reached San Diego from the east, leaving before the lights flashed through the cycle again. There is no evidence to suggest that visitors who watched until the end took away more than others, but the sample is small.

Interviewed visitors liked what they described as “simple” yet “powerful” visuals. When describing what they liked about the visuals, about one-half referred to the water routes; visitors pointed specifically to the black aqueducts, the changing shade of blue as water moves down the rivers, and how routes are shown in stages. Another one-half liked the before and after photos of the delta—“Just staring at it, it impacts me,” said one man about the photos.

Visitors’ responses to the interactive were largely positive. The only responses to what did not work well for visitors pertained to the knob. For instance, a 70-



year-old woman said she did not like having to spin the handle so much (she turned it continuously) because it was tiresome on her wrist. Additionally, a 50-year-old man complained that it took too long after you first turn the handle before anything happens on the map; he explained that when he first looked up, there was no indication of movement on the map, so he continued to turn the handle.

MEANING MAKING

When asked about what the exhibition showed them, most interviewed visitors talked about the preciousness of water. Interestingly, this topic was often discussed in relationship to price. For example, “Water is a precious commodity; the farther it comes from, the more expensive it is” explained one woman. “Water comes from different places. It is expensive and we should not waste it,” explained another man. This emphasis on price may be surprising since the interactive does not point to the financial costs but rather ecological impact of diverting water. It is possible that visitors misinterpreted the inset title “water comes at a cost.”

Some visitors described the impact of San Diego’s need for water on other places. The majority of these visitors indicated that the text and picture in the green box showed them this. “We are tapping the Colorado River, so Mexico doesn’t get any. They are getting the short end of the stick” explained one man. Additionally, one woman who did not turn the knob (did not use the interactive feature) gleaned the impact of San Diego’s water crisis on others simply from the green box: “We’re running out of water and taking it away from others.”

MEANING MAKING AROUND THREE IDEAS:

(1) PRECIOUSNESS OF WATER, (2) IMPACT ON OTHERS & (3) CONSERVATION

“We don’t have much local water source. We must get it from somewhere else, and there is a cost to do so—both in terms of money and effort”

- 30-year-old man

“We have to be conserving our water because there is not much.”

- 40-year-old man

Some visitors said the exhibition showed the importance of water conservation, with a few stating broadly that “People need to use resources wisely.” In fact, one visitor thought the interactive should convey the message more directly: “It doesn’t do enough to convey the problem; it must have been created before the current water crisis,” he states.

SURPRISE

The majority of visitors said they were a little surprised by the information conveyed in the Water interactive. What was most surprising to visitors was the distance from the Colorado River and the precise percentages from different sources. “I knew we got our water from the Colorado River, but I was surprised by how far away it is,” said one man. Another man said, “I knew we got water from northern California and Colorado, but not exactly how much we got.” Visitors appeared most surprised by the fact that 63 percent of San Diego’s water comes from the Colorado River. When adults spoke out loud to each other about the interactive, it was most commonly about the 63 percent.

By contrast, some visitors said they were not surprised by the information in the exhibition. A woman visiting from Ohio said it was “not surprising because I knew California has an issue, but this is a nice visual of exactly where it comes from and [from] how far away.”

CHAPARRAL

The Chaparral immersive environment is located in the center of the exhibition just beyond the entrance. The immersive environment depicts the dramatic, natural cycle of the chaparral that includes a fire or burn that is necessary for some plants to regenerate. The objectives of the focused observations and interviews for this section explore:

- ◆ How visitors experience the space (follow the story from start to finish, read parts);
- ◆ Enjoyment of the space;
- ◆ Take-aways from their experience; and
- ◆ The extent to which visitors think about the development of land in relation to fires and how they feel about it as a result of their experience in the Chaparral.

RK&A observed the space for approximately 3 hours and interviewed 10 visitor groups, which included mostly groups of adults and children between 2 and 12 years as well as some adult-only groups.

ATTRACTION AND USE

Several visitors to *Coast to Cactus* visited the Chaparral section but at different points in their visit. The space was extremely attractive to children. Families with children were often occupying the space, and there were times when the evaluator observed children pointing to the space from outside and telling their parents they wanted to go in there.

Families with children 6 years and younger visited the space much differently than families with older children or adult-only visitors. For instance, children under 6 years were very active in the space, visiting the cave, touching the plants and animals in the environment, and watching the videos; in these groups the children's movement dictated the path of adults but they rarely experienced the exhibit as a group (e.g., looking and talking together about aspects of the environment). In contrast, families with older children or adult-only groups tended to view the space from a stationary place at the center or near the entrance, or walked slowly around the outside—rarely touching. Some adults were observed pointing out aspects of the immersive environment to others, such as a bluebird or another plant or animal.

There were a few children who were hesitant to explore independently. A few children were timid about entering the cave. For instance, one boy called his 6-year-old sister a “scaredy-cat” for not going in; another boy said he did not want to go in when his father encouraged him to look inside. Additionally, one 3-year-old girl seemed afraid of the fire; her father reassured her, “It is supposed to show fire, but it isn’t real fire.”

ENJOYMENT: CHILDREN PLAYING IN CAVE



ENGAGEMENT: BOYS WATCHING VIDEO



SPOTLIGHT ON RIGHT TO LEFT MOVEMENT

Many visitors to the space often moved past the labels on the entry wall and experienced the environment first. Some of these visitors, particularly those in adult-only groups read the labels before exiting the space or in the middle of their visit. Once further into the space, the majority of visitors moved from the left side (Chapter 1) of the story to the right side (Chapter 4). Visitors with children under 6 years, however, tended to view the story hapazardly since they followed their children into the space, and the children often went to the cave first.

SPOTLIGHT ON AWARENESS OF CHAPTER FORMAT

Most interviewees said they were aware that the exhibit was setup as a story with chapters, and the couple of interviewees who did not notice were a large family with children of various ages and a pair of 20-year-old adults. Many interviewees said the chapter format and order was clear, pointing out that we read left to right or saying that the chapter headings were obvious.

MEANING MAKING

When asked what the exhibit showed them, most mentioned something about fire. The majority mentioned that fire is “natural,” although only a couple of these interviewees said that fire “should happen” or is “needed” (the others just described fires as a fact of life). A couple other interviewees said the exhibit is about how animals survive fires (both were families with children approximately 10 to 12 years old). Still another couple of interviewees had miscellaneous ideas about what this exhibit showed visitors, including one man who said it showed the influence of Mexico on the area since “everything in there is in Spanish” (referring to the bilingual text).

MEANING-MAKING QUOTABLES

“That’s a cool fact: above ground plants burn but below ground they survive to regrow.”

- 12-year-old boy to another boy

“You have to get rid of old stuff for the new to come in.”

- 70-year old woman to 8-year-old boy

When interviewees were probed further about what the exhibit showed about the relationship between fire and the land, the majority of interviewees were unable to describe deeper relationships between fire and the land. For instance, some talked about developing homes in areas where fires occur, but they talked very matter-of-factly about it (versus feeling concerned about the trend and increasing number of fires). Additionally, a few interviewees’ responses revealed misconceptions, such as one woman who was concerned about how to protect animals from fire and another man said the message was about not starting fires. By contrast, a few visitors had concerns about the human relationship to fires, such as one visitor who was concerned about the continuing land development in California because people are taking over land that should burn and another visitor who was concerned about how climate change is affecting the frequency of burns. Additionally, one of these interviewees was surprised that the climate-change messaging was not stronger in this area and guessed that theNAT tried to take a subtler approach due to climate-change deniers.

Not so surprisingly, interviewees who took away messages that were off point or vague tended to be families with children under 6 years. These families said they looked generally at the space, but did not spend much concerted time reading or looking at the videos; they also approached the space erratically, sometimes viewing left to right but also from right to left and randomly. By comparison, interviewees who took away some of the key messaging tended to be families with children 10 years and older or in adult-only groups. These interviewees all viewed the exhibit from left to right and were aware of the chapter setup; they also read the introductory labels and viewed the entire exhibit.

UNDERSTANDING CHANGE

The Understanding Change section of the exhibition is located towards the back of the exhibition past the Mountains section. The section shows how people are working to understand southern California's changing habitats. The objectives of the focused observations and interviews for this section are to explore:

- ◆ How engaging this section is for visitors (hearing about research, conservations, science processes);
- ◆ Whether visitors connect this area to the habitat sections, and if so, how;
- ◆ Whether visitors think about the change in the environment over time (Do they feel positive or bad as a result? Do they see different ways of affecting positive change?);
- ◆ At the bat interactive, whether people realize the concept that they can't hear bat sounds and that new technologies help distinguish bats by their calls (technology and research reveals things that weren't recognized before); and
- ◆ Whether visitors understand that they must look through the slots on the zoetrope versus over top.

RK&A observed the space for approximately three hours and interviewed 12 visitor groups, which included groups of adults and groups of adults with children between 6 and 14 years.

ATTRACTION AND USE

The majority of visitors to *Coast to Cactus* visited the Understanding Change section. Many visitors entered the space from the left side of the exhibition near the bat component, while some entered from the right side by the California condor. Visitors' use of this section falls into two categories; about one-half of visitors (particularly those with children under 10 years) moved through the space fairly quickly and randomly, while another one-half (particularly those in adult groups) went through the space rather slowly and methodically from one component to the next.

The animals in this section are the attraction point. In interviews, when asked what they liked most about this section of the exhibition, most interviewees talked about what they found interesting about one or more of the animals featured. The majority of these interviewees liked learning about animals that were once endangered and how they are rebounding, such as the El Segundo Blue Butterfly and the Burrowing Owls, and one said he was most interested to find that Flying Squirrels are in southern California. Additionally, a couple of interviewees said they most liked the bat interactive and zoetropes because they offered hands-on opportunities.

MEANING MAKING

Without being prompted specifically, many visitors talked about how this section showed change in the environment that has resulted in endangered species. The majority of these interviewees did not explicitly identify environmental changes as a result of humans; rather they simply described "habitat loss" or said that "animals don't have what they need" without suggesting the cause. By contrast, a few interviewees' responses were very direct and explicit in describing change as a result of humans, such as one interviewee who said this section showed the reintroduction of species after the "loss of habitats by humans" or another who said "we have an impact" by what we plant or remove.

COAST BUCKWHEAT



"We should plant that at our house."

- 40-year-old woman to 8-year-old girl
about the Coast Buckwheat

In fact, when interviewees talked about the relationship between humans and the species, the majority talked about how humans are working to reintroduce or protect species (versus their role in endangerment). For instance, one interviewee described (and was surprised by) the many protected areas established in southern California, and another noted the picture of people cleaning the beaches as showing progress. One interviewee who self-identified as a scientist specifically mentioned the importance of the research being conducted, saying that “study leads to understanding and moving forward.” Given that interviewees described the relationship between humans and species primarily about the reintroduction of species, it is not so surprising that when asked specifically about how they felt as a result of this section, most visitors said this section of the exhibition made them feel informed—neither positive nor negative—but simply informed.

Additionally, several interviewees said they learned something new about animals. For instance, one woman sees California Least Terns around the Naval base where she works out and was surprised to learn they nest in the sand.

SPOTLIGHT ON BAT INTERACTIVE

Many interviewees used the Bat interactive without being cued, while a couple of interviewees were asked to use it. Most visitors spent one minute or less using the interactive. If children were present, they often took the lead in using this interactive. The majority of interviewees understood that the sounds from the bat interactive were only audible through technology: a few indicated that the text informed them, one said they assumed based on seeing the frequency distribution, and one said she is familiar with bats. By comparison, several did not understand that the bat sounds are not what a bat would sound like if encountered in the wild; the majority of these interviewees were visiting with children and said they were focused on monitoring their children versus the content, while one interviewee who was cued said she had not read the text.

SPOTLIGHT ON ZOETROPE

Most interviewees used at least one zoetrope. While using the zoetropes, several visitors exclaimed “Cool” or “Wow,” and some called over other group members to see them. The vast majority used it correctly by looking through the slots versus into the top; however, a few of these visitors looked into the top either before or after using it correctly. A few children only spun the zoetrope without looking through the slots. Most visitors spent less than one minute with the zoetropes.

OTHER QUOTABLES

“They cleared this vegetation. The natural habitat was destroyed”

- 30-year-old man to 10-year-old boy about Learning from the Past photos

“It says in 1982 there were only 22 condors; there are hundreds now.”

- 20-year-old woman to 20-year-old man

“We participated in this survey. There are 18 species of bats on this mountain.”

- 70-year old man to another woman and man in his group

ZOETROPES



“It’s cool! Makes like a movie.”

- 10-year-old girl to 12-year-old boy

THE ATTIC

The Attic section of the exhibition is located upstairs above the Understanding Change section. The section is an area for visitors to reflect upon their memories and impressions about southern California and how it has changed through seeing images of southern California over time, hearing people's stories about southern California, and reading and/or sharing a memory of southern California. The objectives of the focused observations and interviews for this section are to explore:

- ◆ Whether visitors think about the diversity of plants and animals in southern California and how time has affected this place;
- ◆ What personal connections visitors make;
- ◆ Local and non-local sense of southern California; and
- ◆ At Digital Scrapbook, whether visitors realize the pictures are from this place over time and noting the conversations that happen there.

RK&A observed the space for approximately three hours and interviewed 10 visitor groups, which included groups of adults, groups of adults with children between 2 and 12 years, and one visitor not in a group.

ATTRACTION AND USE

Some visitors to *Coast to Cactus* visited the Attic. A few others walked partway up the stairs and peeked into the area before returning to the ground level; one of these visitors was heard reporting to her visitor group that “this is for coloring,” suggesting she perceived it as a children’s space. Several other comments overheard by visitors in the space and in interviews suggest that they perceived this area as a space for children, such as one interviewee who said he was attracted to the space because it was a place for children and “is not meant for adults.”

There was no one typical way that visitors used the Attic. Visitors seemed to browse the space and focus in on the various activities that attracted them. Sometimes visitors moved with their visit group around the space, but other times the visit group split up to explore their interests. Most visitors appeared very comfortable in the space with children and adults moving around freely.

All parts of the space were used, including the children’s book area, and all components received favorable reactions from at least a few visitors. Many visitors said they most enjoyed looking at the old photographs either at the Digital Scrapbook or those hung on the wall (the family with women in long-sleeved dresses from the 1800s was most popular). The photos seemed to spark conversation, and the evaluator heard more personal stories shared in this area of the exhibition than any other.

MEANING MAKING

Many said this section showed them how southern California has changed over time, without being prompted specifically. Photographs were the clearest indication of change to visitors, and a few wanted to see more photographs and greater orientation to the photographs, such as identifying who is in the

PHOTOS SHOW CHANGE OVER TIME



“It is connecting past to present, showing the same area in different times. Very cool, I just noticed those photos. I think that is the same place, so it definitely shows change.”

- 30-year-old man about the two panorama photos

picture, where it was taken, and when it was taken as well as a current-day picture for perspective. Some visitors said they thought about the diversity of southern California while in the Attic, but it was generally because they had been prompted to think about diversity in other areas of the *Coast to Cactus* exhibition and those thoughts lingered as they visited the Attic (e.g., there wasn't something specific in the Attic that made them think about the diversity of habitats).

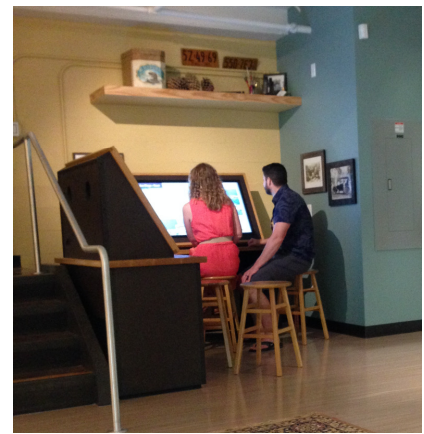
SPOTLIGHT ON DIGITAL SCRAPBOOK INTERACTIVE

Some interviewees used the Digital Scrapbook interactive without being cued, while a couple of interviewees were asked to use it. Many visitors spent one minute or less using the interactive, but a few used it for five minutes or more. The interactive was mostly used by adults in groups and sometimes by adults and children 5 years and older. The two touchscreens were rarely both in use except when a single visitor group spread across two of them (e.g., family of four sitting in pairs at the touchscreens). Almost all used the stools at the interactive.

Visitors in groups were often observed talking quietly to each other about the photos, and several visitors were observed trying to orient themselves to the pictures in Digital Scrapbook. For instance, one man said to a woman in his visitor group, "This is Mission Bay" and pointed to a spot in the picture, while another was observed pointing to the map, saying "we are here." Additionally, some were overheard commenting on the beauty of the pictures or expressing surprise at some aspect of the photo.

Most interviewees found the Digital Scrapbook easy to use. However, one interviewee reported trouble selecting photos (e.g., selected photo A when he meant to select B), and one interviewee mentioned his inclination was to swipe through the pictures at the bottom but that he quickly corrected himself. Additionally, a few interviewees said that certain areas of the Digital Scrapbook felt incomplete because an area has few photographs. Also, one interviewee who was cued to use the interactive initially overlooked it when in the screensaver mode and went straight to the photographs on the wall; he said he would have been more attracted to the interactive if the screen showing the map and photos had been visible.

DIGITAL SCRAPBOOK



"I love the pictures pre-1908. For some of the older photos, I'd like an overlay, particularly for non-locals, to show the change over time."

- 30-year-old woman

SPOTLIGHT ON LEAVE A MEMORY

Despite visitors noting that the Leave a Memory exhibit is one of the reasons the Attic seems like a space for children, visitors of all ages were observed writing, posting, and reading responses. Visitors did not seem to have any problems using the exhibit, although one woman tried to write her response directly on the table versus on paper.

Additionally, some coloring pages (larger pages with *Coast to Cactus* pictures) were posted on the hangers in addition to the intended comment and drawing cards. Some responses were very reflective and natural history-based, such as one that included writing and a drawing about "catching spiders in our new backyard"; others were more generic, such as one that read "I love science!"

VISITORS OF ALL AGES AT LEAVE A RESPONSE



WHERE ARE WE? WETLANDS KIOSK

The Where are We? Wetlands Kiosk in the Wetlands is located at the entrance of the exhibition and intends to communicate two messages to visitors: inspiration to visit the wetlands and illustration of change over time. The objectives of the focused observations and interviews are to explore:

- ◆ The effectiveness of the maps at communicating messages to visitors;
- ◆ How likely visitors are to go to one of these places; and
- ◆ The effectiveness of the bilingual delivery.

RK&A observed the space for approximately three hours. This write-up is based on observation of 31 visitor groups and interviews with 10 visitor groups. The researcher cued eight of the 10 interviews; only two were uncued.

ATTRACTION AND USE

The Wetlands kiosk was not a popular component of the exhibition. Most visitors walked by the kiosk without interacting with it. Of those who stopped to look at the kiosk, many walked away after less than one minute. During three hours of observation, only five groups stayed for over a minute without being prompted to do so. One visitor explained, “It didn’t jump out that these are buttons to touch. I might have just looked at the map and walked on if you hadn’t prompted us to use it.”

Children were more attracted to the kiosk than adults. The majority of all users (including those who touched briefly and moved on) were children; the majority of users who stayed for over one minute were also children. Some adults followed their children to the kiosk, looking over them and reading aloud the information, while some other adults stood nearby but engaged with other features of the exhibit, such as the diorama. Additionally, several adults were observed redirecting their children away from the kiosk to see more of the exhibition. For example, “Let’s go look at another one; we don’t want to sit here all day,” urged one woman to a 5-year-old boy.

GOOGLE ANALYTICS

Pages in order from most to least viewed:

- Explore
- Where is It?
- Our Wetlands
- Then and Now
- The Pacific Flyway
- Science Spotlight

CONFUSING ASPECTS

Visitors were asked about any aspects of the kiosk that were confusing or undesirable. Many named aspects of the various maps that could be improved. Orientation was one of the major challenges. Some said they could not determine where they were on the map in relationship to places identified. For instance, one man desired labeled landmarks, such as roads: “I assume that is the 56 freeway, but if we weren’t from here, we’d have no idea where Los Peñasquitos is.”

Several had usability issues, particularly knowing what to tap or slide. For instance, several tried to tap the red marker of the Los Peñasquitos wetland, thinking it was a link to more information about the lagoon. A few others tried to expand the map with their fingers to zoom in. A few did not realize that the numbers on the Our Wetlands and Pacific Flyway maps were links to more information. Overall, the usability issues were overcome with persistence.

A few visitors said there was too much clicking required and that information could be better organized (as well as consolidated or eliminated). For instance, one woman thought there were too many tabs and would prefer more of a logical progression from one page to the next. Another man who clicked on the numbers on the Our Wetlands maps, expected more information than just the name for each wetlands, such as a picture or even link to the detailed information included in the “Explore” tab, given the multiple clicks required.

SPOTLIGHT ON THEN & NOW

On the Then & Now page, the majority of users slid the line back and forth to see the historical and present map of wetland coverage. However, several users did not realize (at least initially) that the vertical line was a slide, and instead tapped to the left and right side of the slide. Several suggested modifications to the slide, such as one visitor who suggested darkening the arrow so it is more obvious, and another who suggested removing the slide and placing the two maps side-by-side instead.

Several visitors, including those who understood the slide concept from the start, were underwhelmed by the visual impact. For instance, one visitor remarked sarcastically, “Oh, less gray...” Another commented, “It says 90 percent but it doesn’t look like 90 percent; it only looks like a slight change.” Some visitors suggested zooming in the Then & Now map so that the changes were more obvious.

Despite these challenges, visitors understood that the Then & Now page was showing change in habitats. Many focused on the loss of habitat and the direness of the situation. For instance, one woman said, “There is less of everything, everything is dying. It is just so sad!”; and another girl said, “We’ve lost a lot of wetlands, and they’re probably going to disappear since we’ve already lost 90%.” A few had deeper understandings of the habitat loss as linked to the loss of biodiversity and the result of climate change, but there was still some question, such as one man who asked the interviewer, “This is a result of global warming, right?”

INSPIRATION TO VISIT THESE PLACES

The majority of interviewed visitors responded that they were interested in visiting the wetlands after using the kiosk. Several were inspired by their new-found awareness. One visitor, who moved to San Diego two years ago, said, “It is interesting for me to see I have more places to visit. I didn’t know the wetlands were here.” Another visitor learned that the Los Peñasquitos lagoon is near her house, and now she wants to see it. Another woman visiting from Florida said she is interested in incorporating the wetlands into her next trip, but she would have liked a brochure to pick up and save for later, or even a barcode to scan with her iPhone.

By comparison, a few said the exhibit did not inspire them to visit these places. Frustrated by the lack of landmarks on the maps, one man responded, “No, because we don’t know where they are.” Alternatively, another local woman said she is more cautious about visiting the wetlands because of potential impact on the habitat as a result of the exhibit: “I guess, but then you are impacting the space. But I guess we should visit it before it goes away.”

BILINGUAL TEXT

All interviewees responded positively to providing bilingual text, including those who only spoke English. Of the Spanish-speaking visitors, all responded positively to the bilingual text overall. All prefer side-by-side text because it is “good for everyone” and “quicker that way.” One woman was very happy about the side-by-side text because she is interested to see the English translation of words she knows in Spanish, and said she learned that “estuario” is “estuary” in English. One woman was also excited to see which language her girl would read the text in: “My daughter is bilingual. We speak Spanish at home and she learns English at school, so I never know if she’ll start reading the English or Spanish text.”

VALENTIEN INTERACTIVE

The Valentien component is located in the Torrey Pines Coastal Sage section of the exhibition. The Valentien intends to spread awareness of local plants and how they were represented by painter A. R. Valentien. The objectives of the focused observations and interviews are to explore:

- ◆ How is the Valentien being used; and
- ◆ The effectiveness of the bilingual delivery.

RK&A observed the space for approximately three hours and interviewed ten visitor groups. Six interviewed groups were uncued, two were cued by the researcher, and two had looked at the screen briefly and walked away before being cued by the researcher to use the Valentien screen more.

ATTRACTION AND USE

The exhibit was very attractive to children. Of the groups who used the Valentien unprompted, the majority included children. Often, children approached the exhibit and sat down on the stool while an adult stood behind. The child operated the mouse and button, but the adult often paid attention and directed the child on what to click next. For example, one woman instructed her 6-year-old girl to push the specimen view. Another woman, standing behind her 5-year-old boy, pointed to a flower thumbnail on the screen and said, “How about this one? It’s pretty, huh?”

Of those who engaged with the Valentien, most used all three views of the plants (painting, specimen, and photo), and several used the zoom function. Some read aloud information about the plants to their groups; for example, one woman told another adult and child in her group: “This only blooms once its whole life. Seven years to grow, then it dies. That’s so sad!” The nopal cactus and poison oak were the two plants most commonly discussed. Visitors commented on the nopal cactus’ edibility: “You can eat those, how cool!”; and “Yummy, prickly pear, we eat that!” By comparison, visitors talked about being cautious with the poison oak: “When we go camping, don’t touch that. If you touch that, you get sick, it’s poisonous”; and “You get an unpleasant rash if you touch it, so don’t touch it if you ever see it.”

One-half of the interviewed visitors reported that what they liked best about the Valentien screen was looking at all three views of the plant: “as a real life photo, a painting, and pressed down.” Several commented that they like the zoom function because they can “look closely” and it is “more interactive that way.”

USABILITY

The part of the exhibit that was most confusing was the color palette in the specimen view since several visitors tried to click on or use it to paint, which they perceived to be an option. For instance, one woman immediately reported that she “couldn’t figure out how to paint.” The misconception seems to occur due to families with young children looking for hands-on opportunities.

Additionally, reaction to the ball mouse was mixed. Some visitors wished it was a touchscreen; for example, one woman complained that the ball takes a lot of time and effort to move. By comparison, a few visitors liked the ball mouse. One man was excited about the ball mouse because it was the first time his child had ever used one, and another woman referred to the ball mouse as a “throwback” and liked that it allowed her 10-year-old girl to practice a different technology, other than touchscreens.

COLOR PALETTE MISCONCEPTION

“The paint boxes did not work. They look like you can do something with them, but you can’t.”

- 30-year-old woman with 5-year-old girl

“Sería bonito que si podría pintar porque los niños les gusta [It would be good if you could paint because kids like to do that].”

- 30-year woman with 6-year-old boy

Some visitors wished they could toggle easier between plants, expressing no need to return to the home page first. One woman explained that it takes too long to go back through home each time. Another man was frustrated when he could not figure out how to look at another flower so he walked away; he was confused by the home icon although he referred to himself as an “old folk” acknowledging that others might be familiar with it.

MEANING MAKING

In response to what the exhibit shows or tells visitors, the majority of users connected it to local plants. For example, one man responded: “It shows that these are local plants that can be found in Torrey Pines State Reserve. If you wanted to visit them you could.” Another man connected the images to what he has seen in his neighborhood: “Look, those are the red berries we see. We have those by our house, huh!” Another woman exclaimed to her 5-year-old girl: “Look, poppies! Like at grandma’s house!”

Uncommon, yet noteworthy responses about the meaning of the exhibit include nostalgia and the relationship between science and art. One visitor noted that it reminded her of her childhood: “It reminds me of what we saw growing up—we would go to the field, pick a flower, and press it ourselves.” Another woman shared her insight that “To me, what it represents, is allowing me to connect science and art together. I don’t otherwise have the opportunity to make that comparison.”

BILINGUAL INTERPRETATION

One-half of the interviewed visitors were Spanish speakers, but all used the English text. In fact, some visitors did not realize there was a Spanish language option, including three out of five of the Spanish-speaking users. These visitors indicated that had they known, they would have chosen Spanish. They suggested that there needs to be a more prominent button to switch the language to Spanish. By comparison, two out of five Spanish-speakers realized the option, but chose to use English—in one case, to improve her English and in another case because she could not get her son (who was operating the mouse) to switch languages.

DESERT AT NIGHT

The Desert at Night object theater is located at the front of the exhibition, on the left side of the entrance. Its goal is to increase awareness of the animals that live in the desert and inspire interest in exploring the desert. The objectives of the focused observations and interviews for this section are to explore:

- ◆ Whether visitors stay for the entire presentation;
- ◆ The effectiveness of the bilingual delivery;
- ◆ Visitors' reactions to hearing Spanglish;
- ◆ Whether the visuals remove barriers presented by the language and help visitors create meaning; and
- ◆ How visitors think about the desert as a result of the theater.

A bilingual data collector observed the space for approximately three hours, observing 35 visitor groups and interviewing 10 of them. Observed visitors included individual adults, groups of adults, and groups of adults with children ranging from toddlers to teenagers. Interviews were conducted in both English and Spanish per visitor preference; one-half of interviewees spoke Spanish.

ATTRACTION AND USE

About one-half of visitors visited the Desert at Night object theater. The visuals and sounds can be seen and heard from outside the theater, thereby attracting the attention of both children and adults to peer inside. The majority of visitors who approached the theater entered it and sat down, but several other groups stood and watched from the doorway. Of those who stood and watched from the doorway, none stayed until the end of the video (whereas the majority of those who sat down in the theater stayed until the end). The most common time to get up and leave was during the sun spider drawing. The second most common time was right after that, when the voice of tía says, "It is time for sleep."

The majority of visitors entered the theater during the presentation. Of those who walked in during the middle and stayed to the end, only a few restarted the video from the beginning. A few of these visitors told the interviewer or were heard saying that they had seen the entire presentation before, either that day or on other occasions; each of these families had children under ten years.

REACTION TO SPANGLISH

Most visitors had positive reactions to hearing Spanglish in the theater. Spanish-speakers from the area were highly complimentary of the narration. For instance, one woman said "we are living this." A couple of Spanish-speaking visitors appreciated that the presentation represented the diversity of the area. For instance, one man perceived the family as Mexican because of the Spanglish and valued seeing this representation.

Of visitors who did not speak Spanish, most said the narration did not impede their experience and enjoyment, noting that words were repeated in both languages and there were supporting visuals. In fact, some liked the opportunity to practice Spanish, and a few were observed repeating the words aloud in Spanish during the presentation. Only one visitor group was distracted by the Spanglish; they watched the video with captions and said it may have been less distracting without captions or that English audio with Spanish subtitles might be better.

COMFORT WITH SPANGLISH

"I thought the Spanglish was great! That's how I speak with my son! It's a real thing that's happening, because we are at the border. My husband and I are Mexican, but he [points to her son] is American. We are living this."

- 40-year-old woman

"It is very important that the Museum offers a bilingual experience. It is important that it gets acknowledged."

- 40-year-old man

"I knew enough Spanish words to know they were repeating it or showing images, so I could understand."

- 50-year-old man

VISUALS

The visual effects in Desert at Night were extremely well-received, with the majority of visitors pointing, laughing and smiling throughout the presentation. Most interviewees said they enjoyed the combination of sounds and visuals popping up in various locations because, in the words of one visitor, it is “more fun and interactive that way.” One Spanish speaker described it as a “película en vivo [live movie].”

The drawings received some of the strongest observed reactions, with the ringtail drawing—the first of three drawing sequences—receiving the most notable reactions. Several visitors laughed aloud heartily when the drawing had big ears and eyes. In interviews, visitors frequently described how they enjoyed seeing the drawings of what the boy imagined, and then the resulting adjustments.

The projections of live animals were also very popular. During interviews, visitors reported the most memorable visual to be the bat eating the scorpion; this visual was often pointed out during the presentation. Additionally, the face of the ringtail illuminated on the tent frequently evoked an exclamation of “Awwww!”

While the visuals specifically mentioned above were among the most popular, all the visuals drew reactions. For instance, a 6-year-old boy exclaimed to his dad, “It’s over there, papá!” pointing at the owl. Also, some children ran up to the front to touch the green wolf spiders when they appeared.

VISUALS PROMPTED POINTING, LAUGHING, AND TALKING AMONG VISITOR GROUPS



The only complaint mentioned was that the images reflected on the tent were not bright enough. When the curtain on the right side is left open, light enters the theater and dilutes the reflections on the tent. However, when the curtain is closed all the way, the images on the tent are vivid.

MEANING MAKING

The messages that visitors took away from the Desert at Night exhibit centered around animals and camping. The desert, as an independent topic, hardly came up when discussing the point of the exhibit. Rather, visitors talked more broadly about “nature.”

Most visitors said the theater increased their awareness of different animals, and particularly those out at night. Moreover, some talked about learning something new that encouraged their children not to be afraid of animals. For example, one Spanish-speaking mom learned that coyotes “solo persiguen animales pequeños, no gente [only pursue small animals, not people]”; she noted that this is good to know so that children are not afraid of coyotes. Nevertheless, some children who visited the theater were afraid of the animals they saw and heard, and the adult had to explain that they should not be afraid; for instance, one little boy asked in a shaky voice, “Mom, do we have that spider near us? Or a rattlesnake? Can they come up to our house? Can they pinch us? Do they bite us?”

In addition to animals, several said Desert at Night inspires families and children to go camping. For example, one Spanish-speaking man said it shows that “we can go camping with the kids at night and interact with nature as a family.” These families generally commented that they do not go out in nature enough, and a few reminisced about times they have been camping—such as a 60-year-old man who recalled a camping trip with boy scouts on which he had to shake scorpions out of his shoe.

APPENDIX

APPENDIX A: TIMING AND TRACKING RAW DATA

INTRO / ENTRANCE – Stops = 68, 68%; Time Spent: Median = 0:38; Min = 0:03, Max = 3:36

	Component	Number (n) and % Stopped	Time (mins : secs)	General Behaviors – Number to do Behavior, % of Stopped to do Behavior	Social Behaviors – Number to do Behavior, % of Stopped to do Behavior
1	3D Relief Map	n = 39, 39%	Median = 0:39 Min = 0:03 Max = 3:30	Read = 19, 49% Touch map = 22, 56% Take photo = 1, 1%	Point = 13, 33% Beckon = 5, 13% Read aloud = 6, 15% Converse = 21, 54%
2	Grizzly Bears on Beach	n = 38, 38%	Median = 0:19 Min = 0:03 Max = 2:42	Read = 14, 37% Take photo = 10, 26%	Point = 5, 13% Beckon = 0, 0% Read aloud = 1, 3% Converse = 13, 34%
3	Intro Text	n = 14, 14%	Median = 0:05 Min = 0:03 Max = 0:40	Read = 6, 43% Take photo = 0, 0%	Point = 1, 7% Beckon = 1, 7% Read aloud = 0, 0% Converse = 1, 7%
4	Biodiversity Monitors	n = 8, 8%	Median = 0:05 Min = 0:03 Max = 0:19	Take photo = 0, 0%	Point = 1, 13% Beckon = 0, 0% Converse = 2, 25%
5	Habitat Monitor	n = 15, 15%	Median = 0:06 Min = 0:03 Max = 0:44	Read = 4, 27% Touch monitor = 2, 13% Take photo = 1, 7%	Point = 1, 7% Beckon = 0, 0% Read aloud = 0, 0% Converse = 1, 7%
6	Habitat Directional Sign	n = 6, 6%	Median = 0:06 Min = 0:03 Max = 0:20	Read = 2, 33% Take photo = 0, 0%	Point = 1, 17% Beckon = 0, 0% Read aloud = 0, 0% Converse = 0, 0%

COASTAL WETLANDS – Stops = 63, 63%; Time Spent: Median = 0:53, Min = 0:04, Max = 5:07

	Component	Number (n) and % Stopped	Time (mins : secs)	General Behaviors – Number to do Behavior, % of Stopped to do Behavior	Social Behaviors – Number to do Behavior, % of Stopped to do Behavior
7	Wetlands Diorama Overall	n = 35, 35%	Median = 0:16 Min = 0:03 Max = 0:58	Read adv. org. = 7, 20% Scavenger cards = 1, 3% Read water collide = 0, 0% Take photo = 4, 11% Use benches or stools = 0, 0%	Point = 4, 11% Beckon = 3, 9% Read aloud = 1, 3% Converse = 9, 26%
8	California Coast + Where Are We?	n = 10, 10%	Median = 0:20 Min = 0:04 Max = 2:28	Read = 7, 70% Touch kiosk = 3, 30% Take photo = 0, 0% Use benches or stools = 1, 10%	Point = 0, 0% Beckon = 0, 0% Read aloud = 0, 0% Converse = 2, 20%
9	It's Tough Living at the Shore	n = 11, 11%	Median = 0:17 Min = 0:03 Max = 1:41	Read = 7, 64% Video = 7, 64% Flipcard = 4, 36% Take photo = 0, 0% Use benches or stools = 1, 9%	Point = 2, 18% Beckon = 0, 0% Read aloud = 3, 27% Converse = 3, 27%
10	Different Beaks for Different Needs	n = 21, 21%	Median = 0:36	Read = 11, 52% Touch beaks = 19, 91%	Point = 2, 10% Beckon = 2, 10%

			Min = 0:05 Max = 2:03	Use beaks = 10, 48% Other = 0, 0% Take photo = 0, 0% Use benches or stools = 0, 0%	Read aloud = 1, 5% Converse = 10, 48%
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COASTAL WETLANDS - CONTINUED

	Component	Number (n) and % Stopped	Time (mins : secs)	General Behaviors – Number to do Behavior, % of Stopped to do Behavior	Social Behaviors – Number to do Behavior, % of Stopped to do Behavior
11	A place to eat, rest, and nest	n = 17, 17%	Median = 0:30 Min = 0:03 Max = 3:10	Read = 12, 71% Flipcard = 8, 47% Touch model = 5, 29% Take photo = 0, 0% Use benches or stools = 0, 0%	Point = 2, 12% Beckon = 0, 0% Read aloud = 1, 6% Converse = 6, 35%
12	Kids Mudflat Burrow	n = 40, 40%	Median = 0:28 Min = 0:03 Max = 5:07	Crawl = 3, 8% Manipulate crab = 1, 3% Touch exterior = 16, 40% Take photo = 8, 20% Use benches or stools = 2, 5%	Point = 12, 30% Beckon = 9, 23% Converse = 21, 53%
13	Bench with critter cards	n = 0, 0%	0	Read critter cards = 0, 0% Take photo = 0, 0% Use benches or stools = 0, 0%	Point = 0, 0% Beckon = 0, 0% Read aloud = 0, 0% Converse = 0, 0%
14	Surviving in the mudflats wall	n = 5, 5%	Median = 0:14 Min = 0:07 Max = 0:58	Read = 5, 100% Take photo = 1, 20% Use benches or stools = 0, 0%	Point = 0, 0% Beckon = 0, 0% Read aloud = 0, 0% Converse = 3, 60%

COASTAL SAGE – TORREY PINES – Stops = 49, 49%; Time Spent: Median = 1:10, Min = 0:06, Max = 11:58

	Component	Number (n) and % Stopped	Time (mins : secs)	General Behaviors – Number to do Behavior, % of Stopped to do Behavior	Social Behaviors – Number to do Behavior, % of Stopped to do Behavior
15	Torrey Pines Diorama Overall	n = 46, 46%	Median = 1:00 Min = 0:03 Max = 6:16	Read adv. org. = 13, 28% Read earlier Californians = 0, 0% Scavenger cards = 7, 15% Look closely = 31, 67% Turn spider = 13, 28% Take photo = 2, 43% Use benches or stools = 1, 2%	Point = 20, 44% Beckon = 17, 37% Read aloud = 8, 17% Converse = 21, 46%
16	Coastal Plants Need Spring's Gray Days	n = 18, 18%	Median = 0:12 Min = 0:03 Max = 5:41	Read = 7, 39% Flipcard = 9, 50% Look closely = 4, 22% Take photo = 1, 6% Use benches or stools = 0, 0%	Point = 1, 6% Beckon = 1, 6% Read aloud = 1, 6% Converse = 2, 11%
17	This is a Rare Place + Where are We?	n = 8, 8%	Median = 0:20 Min = 0:03 Max = 0:54	Read = 2, 25% Touch = 6, 75% Take photo = 0, 0% Use benches or stools = 1, 13%	Point = 1, 13% Beckon = 0, 0% Read aloud = 1, 13% Converse = 1, 13%
18	Native Plant Apothecary	n = 25, 25%	Median = 0:28 Min = 0:04 Max = 2:31	Read = 7, 28% Open drawer(s) = 8, 32% Loose objects = 76, 28% Look closely = 9, 36% Look paintings = 12, 48% Take photo = 1, 4% Use benches or stools = 0, 0%	Point = 1, 4% Beckon = 2, 8% Read aloud = 0, 0% Converse = 7, 28%
19	Valentien	n = 12, 12%	Median = 0:47	Painting = 6, 50%	Point = 1, 8%

	touchscreen		Min = 0:05 Max = 3:51	Photo = 6, 50% Specimen = 7, 58% Take photo = 0, 0% Use benches or stools = 1, 8%	Beckon = 1, 8% Read aloud = 1, 8% Converse = 5, 42%
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COASTAL SAGE – PATIO – Stops = 51, 51%; Time Spent: Median = 2:04, Min = 0:12, Max = 11:21

	Component	Number (n) and % Stopped	Time (mins : secs)	General Behaviors – Number to do Behavior, % of Stopped to do Behavior	Social Behaviors – Number to do Behavior, % of Stopped to do Behavior
20	This is Urban San Diego Mural	n = 13, 13%	Median = 0:24 Min = 0:03 Max = 2:15	Read = 6, 46% Take photo = 0, 0% Use benches or stools = 0, 0%	Point = 1, 8% Beckon = 0, 0% Read aloud = 0, 0% Converse = 4, 31%
21	Where Are We? Kiosk	n = 2, 2%	Median = 0:08 Min = 0:06 Max = 0:10	Read = 0, 0% Touch = 1, 50% Take photo = 0, 0% Use benches or stools = 0, 0%	Point = 0, 0% Beckon = 0, 0% Read aloud = 0, 0% Converse = 0, 0%
22	Lizard	n = 21, 21%	Median = 0:16 Min = 0:04 Max = 2:13	Read = 6, 29% Look closely = 12, 57% Open drawer = 4, 19% Take photo = 0, 0% Use benches or stools = 0, 0%	Point = 5, 24% Beckon = 3, 14% Read aloud = 1, 5% Converse = 9, 43%
23	Meet Your Neighbors	n = 13, 13%	Median = 1:11 Min = 0:03 Max = 3:11	Read = 7, 54% Spin = 8, 62% Touch models = 4, 31% Take photo = 0, 0% Use benches or stools = 0, 0%	Point = 1, 8% Beckon = 0, 0% Read aloud = 2, 15% Converse = 5, 39%
24	Urban Canyons Diorama Overall + Native or Not?	n = 46, 46%	Median = 1:02 Min = 0:05 Max = 5:30	Read adv. org = 13, 28% Read native or not = 23, 50% Scavenger cards = 1, 2% Flipcard = 28, 61% Look closely = 10, 22% Take photo = 1, 2% Use benches or stools = 2, 4%	Point = 17, 37% Beckon = 10, 22% Read aloud = 10, 22% Converse = 32, 70%
25	What's That Bug	n = 22, 22%	Median = 0:29 Min = 0:04 Max = 3:44	Read = 15, 68% Look closely = 9, 41% Take photo = 0, 0% Use benches or stools = 0, 0%	Point = 12, 55% Beckon = 5, 23% Read aloud = 4, 18% Converse = 14, 64%
26	Rat	n = 17, 17%	Median = 0:07 Min = 0:03 Max = 0:29	Take photo = 0, 0% Use benches or stools = 0, 0%	Point = 9, 47% Beckon = 6, 35% Read aloud = 0, 0% Converse = 14, 82%

COASTAL SAGE – RIPARIAN – Stops = 58, 58%; Time Spent: Median = 1:41, Min = 0:03, Max = 18:11

	Component	Number (n) and % Stopped	Time (mins : secs)	General Behaviors – Number to do Behavior, % of Stopped to do Behavior	Social Behaviors – Number to do Behavior, % of Stopped to do Behavior
27	Riparian Mural (It is summer by the stream...)	n = 26, 26%	Median = 0:21 Min = 0:03 Max = 1:27	Read adv. org = 7, 27% Read = 7, 27% Video snake = 7, 27% Fish spinner = 3, 12% Touch models = 0, 0% Video raccoon = 15, 58% Touch fur = 7, 27% Look closely = 7, 27% Take photo = 0, 0%	Point = 8, 31% Beckon = 5, 19% Read aloud = 4, 15% Converse = 10, 39%

			Use benches or stools = 0, 0%	
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COASTAL SAGE –RIPARIAN CONTINUED

	Component	Number (n) and % Stopped	Time (mins : secs)	General Behaviors – Number to do Behavior, % of Stopped to do Behavior	Social Behaviors – Number to do Behavior, % of Stopped to do Behavior
28	Where are We? Kiosk	n = 4, 4%	Median = 0:47 Min = 0:18 Max = 1:06	Read = 3, 75% Touch = 1, 25% Take photo = 0, 0% Use benches or stools = 0, 0%	Point = 1, 25% Beckon = 0, 0% Read aloud = 0, 0% Converse = 2, 50%
29	Live Aquatic Animal Tanks	n = 47, 47%	Median = 1:11 Min = 0:03 Max = 16:31	Read = 23, 49% Look closely = 36, 77% Touch models = 6, 13% Take photo = 4, 9% Use benches or stools = 6, 13%	Point = 19, 40% Beckon = 8, 17% Read aloud = 4, 9% Converse = 26, 55%
30	Where Does SD's Water Come From?	n = 27, 27%	Median = 0:39 Min = 0:04 Max = 2:09	Read = 14, 52% Turn knob = 11, 41% Continuously = 10, 37% Take photo = 2, 7% Use benches or stools = 2, 7%	Point = 5, 19% Beckon = 2, 7% Read aloud = 0, 0% Converse = 8, 30%
31	Riparian Plants and Native Baskets	n = 11, 11%	Median = 0:18 Min = 0:03 Max = 3:08	Read = 5, 46% Video = 3, 27% Open drawers = 3, 27% Take photo = 1, 9% Use benches or stools = 4, 36%	Point = 0, 0% Beckon = 0, 0% Read aloud = 0, 0% Converse = 3, 27%
32	Now you see it, now you don't	n = 27, 27%	Median = 0:27 Min = 0:03 Max = 3:56	Read = 6, 22% Video = 16, 59% Take photo = 0, 0% Use benches or stools = 0, 0%	Point = 1, 4% Beckon = 0, 0% Read aloud = 2, 7% Converse = 5, 19%

CHAPARRAL – Stops = 43, 43%; Time Spent: Median = 1:36, Min = 0:07, Max = 8:42

	Component	Number (n) and % Stopped	Time (mins : secs)	General Behaviors – Number to do Behavior, % of Stopped to do Behavior	Social Behaviors – Number to do Behavior, % of Stopped to do Behavior
33	Where are We? Kiosk	n = 3, 3%	Median = 0:18 Min = 0:16 Max = 0:19	Read = 2, 67% Touch = 2, 67% Take photo = 0, 0% Use benches or stools = 0, 0%	Point = 0, 0% Beckon = 0, 0% Read aloud = 0, 0% Converse = 2, 67%
34	Intro	n = 17, 17%	Median = 0:19 Min = 0:03 Max = 1:06	Read = 14, 82% Take photo = 0, 0% Use benches or stools = 0, 0%	Point = 1, 6% Beckon = 1, 6% Read aloud = 1, 6% Converse = 2, 13%
35	Immersive Environment	n = 42, 42%	Median = 1:34 Min = 0:04 Max = 7:57	Read = 24, 57% Look closely = 12, 29% Spin animals = 3, 7% Crawl = 3, 8% Touch = 9, 21% Video spider = 17, 41% <u>Entrance:</u> Left to right = 21, 50% Right to left = 3, 7% Random = 16, 38% Take photo = 2, 5% Use benches or stools = 4, 10%	Point = 14, 33% Beckon = 6, 14% Read aloud = 3, 7% Converse = 19, 45%

DESERT – Stops = 77, 77%; Time Spent: Median = 2:12, Min = 0:04, Max = 12:51

	Component	Number (n) and % Stopped	Time (mins : secs)	General Behaviors – Number to do Behavior, % of Stopped to do Behavior	Social Behaviors – Number to do Behavior, % of Stopped to do Behavior
36	Palm Oasis Diorama Overall	n = 37, 37%	Median = 0:28 Min = 0:03 Max = 1:59	Read palm = 3, 8% Look closely = 18, 49% Take photo = 2, 5% Use benches or stools = 0, 0%	Point = 15, 41% Beckon = 9, 24% Read aloud = 5, 14% Converse = 18, 49%
37	Land of Extremes + Where are We?	n = 10, 10%	Median = 0:11 Min = 0:04 Max = 1:15	Read = 5, 50% Touch = 4, 40% Take photo = 0, 0% Use benches or stools = 0, 0%	Point = 0, 0% Beckon = 0, 0% Read aloud = 0, 0% Converse = 0, 0%
38	Activity Cart	n = 19, 19%	Median = 0:10 Min = 0:03 Max = 0:53	Look closely = 3, 16% Touch = 9, 47% Take photo = 0, 0% Use benches or stools = 0, 0%	Point = 2, 11% Beckon = 3, 16% Read aloud = 0, 0% Converse = 4, 21%
39	Desert at Night Theater	n = 46, 46%	Median = 1:39 Min = 0:04 Max = 10:56	<u>Entrance:</u> Left = 32, 70% Right = 14, 30% <u>Start theater</u> = 1, 100% with captions = 0, 0% without = 1, 100%	Point = 5, 11% Beckon = 4, 9% Read aloud = 0, 0% Converse = 13, 28%
40	Airstream Trailer	n = 60, 60%	Median = 0:46 Min = 0:03 Max = 9:24	Look inside = 46, 77% Go inside = 42, 70% Sit at table = 6, 10% Take photo = 6, 10%	Point = 13, 22% Beckon = 10, 18% Read aloud = 3, 5% Converse = 19, 32%
41	Desert in Bloom Diorama Overall	n = 47, 47%	Median = 0:24 Min = 0:03 Max = 1:57	Read adv. org. = 11, 23% Take photo = 1, 2% Use benches or stools = 0, 0%	Point = 10, 21% Beckon = 2, 4% Read aloud = 1, 2% Converse = 15, 32%
42	With Blooms Come Bugs and Birds	n = 14, 14%	Median = 0:12 Min = 0:04 Max = 1:39	Read = 5, 36% Flipcard = 6, 43% Look closely = 6, 43% Take photo = Use benches or stools = 1, 7%	Point = 1, 7% Beckon = 1, 7% Read aloud = 1, 7% Converse = 3, 21%
43	Scarce Water, Scorching Heat	n = 16, 16%	Median = 0:10 Min = 0:04 Max = 1:05	Read = 5, 31% Video = 7, 44% Flipcard = 7, 44% Take photo = 0, 0% Use benches or stools = 0, 0%	Point = 0, 0% Beckon = 1, 6% Read aloud = 0, 0% Converse = 0, 0%

MOUNTAINS – Stops = 58, 58%; Time Spent: Median = 1:12, Min = 0:03, Max = 17:16

	Component	Number (n) and % Stopped	Time (mins : secs)	General Behaviors – Number to do Behavior, % of Stopped to do Behavior	Social Behaviors – Number to do Behavior, % of Stopped to do Behavior
44	Snake	n = 38, 38%	Median = 0:20 Min = 0:04 Max = 3:01	Read = 15, 40% Look closely = 20, 53% Take photo = 3, 8% Use benches or stools = 5, 13%	Point = 8, 21% Beckon = 4, 11% Read aloud = 2, 5% Converse = 16, 42%
45	Where are We? Kiosk	n = 11, 11%	Median = 0:12 Min = 0:03 Max = 1:30	Read = 4, 36% Touch = 6, 55% Take photo = 0, 0% Use benches or stools = 0, 0%	Point = 2, 18% Beckon = 1, 9% Read aloud = 1, 9% Converse = 3, 27%

MOUNTAINS CONTINUED

	Component	Number (n) and % Stopped	Time (mins : secs)	General Behaviors – Number to do Behavior, % of Stopped to do Behavior	Social Behaviors – Number to do Behavior, % of Stopped to do Behavior
46	Mountain Mural + Conifer Tree	n = 21, 21%	Median = 0:11 Min = 0:04 Max = 1:57	Read adv. org = 2, 10% Step in conifer = 5, 24% Take photo = 5, 24% Use benches or stools = 0, 0%	Point = 6, 29% Beckon = 4, 19% Read aloud = 0, 0% Converse = 8, 38%
47	Sky Islands (A fraction of what once was...)	n = 26, 26%	Median = 0:41 Min = 0:04 Max = 2:14	Read = 15, 58% Spin = 13, 50% Stop and read = 3, 12% Take photo = 0, 0% Use benches or stools = 0, 0%	Point = 2, 8% Beckon = 1, 4% Read aloud = 1, 4% Converse = 10, 39%
48	Mighty Oak	n = 29, 29%	Median = 0:16 Min = 0:04 Max = 11:36	Read = 5, 17% Touch = 10, 35% Look back & forth = 6, 21% Look closely = 5, 17% Take photo = 0, 0% Use benches or stools = 0, 0%	Point = 5, 17% Beckon = 3, 10% Read aloud = 1, 3% Converse = 12, 41%
49	Granary Tree	n = 17, 17%	Median = 0:23 Min = 0:06 Max = 4:10	Read = 10, 59% Touch = 8, 47% Take photo = 0, 0% Use benches or stools = 0, 0%	Point = 3, 18% Beckon = 2, 12% Read aloud = 2, 12% Converse = 8, 47%
50	Grinding Stone	n = 4, 4%	Median = 0:06 Min = 0:03 Max = 0:07	Read = 2, 50% Touch = 1, 25% Take photo = 0, 0% Use benches or stools = 0, 0%	Point = 0, 0% Beckon = 1, 25% Read aloud = 0, 0% Converse = 2, 50%
51	Hollow Log	n = 21, 21%	Median = 0:15 Min = 0:03 Max = 1:32	Touch = 6, 29% Crawl = 2, 10% Take photo = 3, 14% Use benches or stools = 0, 0%	Point = 6, 29% Beckon = 4, 19% Read aloud = 0, 0% Converse = 5, 24%

UNDERSTANDING CHANGE – Stops = 51, 51%; Time Spent: Median = 1:24; Min = 0:04, Max = 11:51

	Component	Number (n) and % Stopped	Time (mins : secs)	General Behaviors – Number to do Behavior, % of Stopped to do Behavior	Social Behaviors – Number to do Behavior, % of Stopped to do Behavior
52	Whale (A Changing Tide)	n = 27, 27%	Median = 0:19 Min = 0:03 Max = 1:14	Read = 13, 48% Look closely = 5, 19% Take photo = 4, 15% Use benches or stools = 0, 0%	Point = 1, 4% Beckon = 1, 4% Read aloud = 1, 4% Converse = 3, 11%
53	Bat (Not-so-silent Night)	n = 29, 29%	Median = 0:43 Min = 0:03 Max = 2:46	Read = 18, 62% Spin = 9, 31% Touch = 15, 52% Look closely = 11, 38% Take photo = 2, 7% Use benches or stools = 2, 7%	Point = 4, 14% Beckon = 2, 7% Read aloud = 5, 17% Converse = 15, 52%
54	Flying Squirrel (Have You Seen Me?)	n = 26, 26%	Median = 0:21 Min = 0:05 Max = 1:26	Read = 13, 50% Spin = 12, 46% Look closely = 11, 42% Take photo = 1, 4% Use benches or stools = 0, 0%	Point = 4, 15% Beckon = 3, 12% Read aloud = 2, 8% Converse = 10, 39%
55	Frogs (Giving Frogs a Head Start)	n = 6, 6%	Median = 0:08 Min = 0:03 Max = 1:52	Read = 4, 67% Touch model = 1, 17% Look closely = 1, 17% Take photo = 0, 0% Use benches or stools = 0, 0%	Point = 0, 0% Beckon = 0, 0% Read aloud = 0, 0% Converse = 3, 50%

UNDERSTANDING CHANGE CONTINUED

	Component	Number (n) and % Stopped	Time (mins : secs)	General Behaviors – Number to do Behavior, % of Stopped to do Behavior	Social Behaviors – Number to do Behavior, % of Stopped to do Behavior
56	Bird nest (Bird's Eye View)	n = 4, 4%	Median = 0:32 Min = 0:06 Max = 0:47	Read = 1, 25% Look closely = 3, 75% Video = 3, 75% Take photo = 0, 0% Use benches or stools = 0, 0%	Point = 0, 0% Beckon = 0, 0% Read aloud = 0, 0% Converse = 1, 25%
57	Logs (Learning from the Past)	n = 7, 7%	Median = 0:16 Min = 0:07 Max = 1:51	Read = 6, 86% Look closely = 2, 29% Take photo = 0, 0% Use benches or stools = 0, 0%	Point = 3, 43% Beckon = 3, 43% Read aloud = 3, 43% Converse = 3, 43%
58	Owls (Owls on the Ground)	n = 16, 16%	Median = 0:15 Min = 0:04 Max = 2:05	Read adv. org = 2, 13% Read other = 9, 56% Look closely = 5, 31% Books = 1, 6% Take photo = 1, 6% Use benches or stools = 2, 13%	Point = 1, 6% Beckon = 0, 0% Read aloud = 0, 0% Converse = 5, 31%
59	Sand-nesting birds (Beachfront Property)	n = 7, 7%	Median = 0:13 Min = 0:03 Max = 1:17	Read = 3, 43% Look closely = 3, 43% Touch model = 0, 0% Take photo = 0, 0% Use benches or stools = 0, 0%	Point = 0, 0% Beckon = 0, 0% Read aloud = 0, 0% Converse = 1, 14%
60	Butterflies / flowers (On the Rise)	n = 7, 7%	Median = 0:18 Min = 0:07 Max = 0:52	Read = 6, 86% Look closely = 5, 71% Slider = 0, 0% Take photo = 0, 0% Use benches or stools = 0, 0%	Point = 0, 0% Beckon = 0, 0% Read aloud = 0, 0% Converse = 2, 29%
61	Pelican & Eggs (Unhealthy Eggs)	n = 17, 17%	Median = 0:15 Min = 0:04 Max = 2:08	Read = 8, 47% Look closely = 6, 35% Take photo = 0, 0% Use benches or stools = 1, 6%	Point = 1, 6% Beckon = 0, 0% Read aloud = 0, 0% Converse = 4, 24%
62	California's iconic bird	n = 21, 21%	Median = 0:16 Min = 0:04 Max = 2:35	Read = 11, 52% Look closely = 5, 24% Touch model = 3, 14% Take photo = 0, 0% Use benches or stools = 0, 0%	Point = 3, 14% Beckon = 2, 10% Read aloud = 3, 14% Converse = 9, 43%
63	California Condor	n = 22, 22%	Median = 0:16 Min = 0:08 Max = 2:05	Read = 9, 41% Look closely = 12, 55% Take photo = 3, 14% Use benches or stools = 0, 0%	Point = 1, 5% Beckon = 1, 5% Read aloud = 1, 5% Converse = 2, 9%
64	Pronghorn	n = 14, 14%	Median = 0:14 Min = 0:03 Max = 0:59	Read = 4, 29% Look closely = 7, 50% Take photo = 1, 7% Use benches or stools = 0, 0%	Point = 2, 14% Beckon = 1, 7% Read aloud = 1, 7% Converse = 3, 21%
65	Protected Lands Map	n = 4, 4%	Median = 0:09 Min = 0:03 Max = 0:29	Read = 2, 50% Take photo = 0, 0% Use benches or stools = 0, 0%	Point = 0, 0% Beckon = 0, 0% Read aloud = 0, 0% Converse = 0, 0%
66	Change Affects Us All	n = 2, 2%	Median = 0:06 Min = 0:04 Max = 0:08	Read = 2, 100% Take photo = 0, 0% Use benches or stools = 0, 0%	Point = 0, 0% Beckon = 0, 0% Read aloud = 0, 0% Converse = 0, 0%

SHARING CHANGE STORIES – ATTIC – Stops = 22, 22%; Time Spent: Median = 5:41, Min = 0:41, Max = 22:49

	Component	Number (n) and % Stopped	Time (mins : secs)	General Behaviors – Number to do Behavior, % of Stopped to do Behavior	Social Behaviors – Number to do Behavior, % of Stopped to do Behavior
67	Then and Now Digital Scrapbook	n = 15, 15%	Median = 3:51 Min = 0:15 Max = 12:13	Read / look = 13, 87% Take photo = 0, 0% Use benches or stools = 4, 27%	Point = 4, 27% Beckon = 2, 13% Read aloud = 2, 13% Converse = 10, 67%
68	Leave Memory	n = 13, 13%	Median = 3:55 Min = 0:03 Max = 11:41	Read memories = 8, 62% Write memory = 5, 39% Leave memory = 3, 23% Take photo = 2, 15% Use benches or stools = 2, 15%	Point = 3, 23% Beckon = 3, 23% Read aloud = 0, 0% Converse = 8, 62%
69	Postcard + Book Area	n = 6, 6%	Median = 0:33 Min = 0:08 Max = 2:16	Look closely = 2, 33% Books = 1, 17% Sit = 0, 0% Take photo = 0, 0% Use benches or stools = 0, 0%	Point = 1, 17% Beckon = 0, 0% Read aloud = 0, 0% Converse = 2, 33%
70	Listening Stories	n = 7, 7%	Median = 1:45 Min = 0:12 Max = 7:56	Use cards = 4, 57% # phones: 1 phone = 5, 71% 3 phones = 1, 14% No phones = 1, 14% Take photo = 0, 0% Use benches or stools = 3, 43%	Point = 1, 14% Beckon = 0, 0% Read aloud = 0, 0% Converse = 2, 29%
71	Kids Zone	n = 3, 3%	Median = 0:11 Min = 0:09 Max = 3:23	Color = 0, 0% Books = 2, 67% Sit = 0, 0% Touch model = 0, 0% Take photo = 0, 0% Use benches or stools = 0, 0%	Point = 0, 0% Beckon = 0, 0% Read aloud = 1, 33% Converse = 0, 0%
72	Staff Picks	n = 2, 2%	Median = 0:09 Min = 0:07 Max = 0:10	Look closely = 1, 50% Take photo = 0, 0% Use benches or stools = 0, 0%	Point = 0, 0% Beckon = 0, 0% Read aloud = 0, 0% Converse = 1, 50%