



Museum Visitor Studies, Evaluation & Audience Research

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**Remedial Evaluation
of
*Oceans Revealed: Powers of the Planet***

Prepared for the
**North Carolina Aquarium on Roanoke Island
Manteo, NC**

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INTRODUCTION

This report presents the findings from a remedial evaluation of *Oceans Revealed: Powers of the Planet* conducted by Randi Korn & Associates, Inc. (RK&A) for the North Carolina Aquarium on Roanoke Island (NCARI) in Manteo, North Carolina. *Oceans Revealed: Powers of the Planet* was designed around *Science on a Sphere*[®]—a room-sized global display system that uses computers and video projectors to display planetary data onto a sphere or giant animated globe—and, as supplementary to the sphere, includes LCD text panels and a local weather display. The National Oceanic and Atmospheric Administration (NOAA) developed *Science on a Sphere*[®] and NCARI is one of many institutions to purchase a *Science on a Sphere*[®] installation. RK&A conducted this evaluation to identify aspects of *Oceans Revealed: Powers of the Planet* exhibit and programming that require remediation. Data for this study were collected in April 2009.

Specifically, the remedial evaluation explores:

- ◆ Visitors' overall experiences with the exhibit and related programming;
- ◆ Specific exhibit- and program-related behaviors; and,
- ◆ Visitors' overall exhibit and program learning, including visitors' understanding of:
 - ❖ NOAA's mission and goals;
 - ❖ the effects of oceans, weather, and climate on everyday life; and,
 - ❖ ocean conservation issues, including how visitors anticipate using knowledge gained to make informed decisions.

METHODOLOGY

RK&A used two data collection strategies to assess visitors' experiences in the *Oceans Revealed: Powers of the Planet* programs and exhibit: naturalistic observations and in-depth interviews.

OBSERVATIONS

RK&A conducted naturalistic observations of visiting families to explore visitors' response to the *Oceans Revealed: Powers of the Planet* exhibit and programs. RK&A observed visitors at three exhibit-related programs and took detailed notes of visitors' behaviors. RK&A also unobtrusively observed walk-in visitors as they interacted with exhibit components and noted select behaviors (please see Appendix A for the observation guide).

Naturalistic observations provide an objective account of visitors' response to the exhibit and program experiences—rather than visitors' recollections. They provide detailed information about how visitors use and respond to exhibit components and programs. They also suggest the range of visitor responses.

IN-DEPTH INTERVIEWS

Open-ended interviews produce data rich in information because interviewees are encouraged and motivated to describe their experiences, express their opinions and feelings, and share with the interviewer the meaning they constructed during a visit. RK&A interviewed program participants and

walk-in visitors. Adults (18 years and older) visiting in family groups were eligible for participation in an interview.

To recruit program interviewees, staff made an announcement at the end of the program asking for attendees' participation in an interview about their experience. Program participants were offered a small gift—a toy shark or sea turtle—in exchange for their participation. Willing participants remained in the exhibit after the program and, one at a time, were asked several open-ended questions about their program experience. To recruit walk-in interviewees, RK&A intercepted eligible visitors as they exited the *Oceans Revealed: Powers of the Planet* exhibit following a continuous random sampling method. In accordance with this method, the interviewer stationed herself at the exhibit's exit, selected the first eligible visitor to exit the exhibit, and asked him or her to participate in an interview. Willing visitors were asked several open-ended questions about their exhibit experience. After each interview was complete, the interviewer returned to the exit to await the next eligible visitor.

The interview guide for program and exhibit visitors was intentionally open-ended to allow interviewees to discuss what they felt was meaningful (see Appendix B for the interview guide). Interviews were audio-recorded with participants' permission and transcribed to facilitate analysis.

DATA ANALYSIS AND REPORTING METHOD

Naturalistic observation and interview data are qualitative, meaning that results are descriptive. In analyzing qualitative data, the evaluator studies the data for meaningful patterns and trends, and as patterns and trends emerge, groups similar responses. Quotations in this report illustrate interviewees' thoughts and ideas as fully as possible and give the reader the flavor of visitors' experiences.

The data are presented in narrative. Interviewees' verbatim quotations (edited for clarity) are included and the interviewer's questions appear in parentheses. Visitors' gender and age are included in brackets following quotations and within quotations, an asterisk (*) signifies the start of a different speaker's comments. Trends in the data are presented from most- to least-frequently occurring.

SECTIONS OF THE REPORT:

1. Principal Findings: Observations
2. Principal Findings: In-depth Interviews
3. Recommendations

PRINCIPAL FINDINGS: OBSERVATIONS

INTRODUCTION

Observation data for the remedial evaluation of *Oceans Revealed: Powers of the Planet* were collected in April 2009 at NCARI. RK&A observed visitors at three exhibit-related programs developed by NCARI staff and walk-in visitor groups in the exhibit. This section presents findings from observations of program participants followed by findings from observations of walk-in visitors.

PROGRAM PARTICIPANTS

RK&A observed visitors who attended one of three programs developed by NCARI staff to compliment the *Oceans Revealed: Powers of the Planet* exhibit. Approximately 20 to 30 visitors attended each program; most visitors were in groups with children, however there were a few adult-only groups in attendance.

PROGRAM OVERVIEW

Staff facilitated one program each day at 2:30 pm, announcing the program and its location to aquarium visitors 5-10 minutes before it began. Because the exhibit is fairly new, the three programs RK&A observed were the first programs to take place in the *Oceans Revealed: Powers of the Planet* exhibit. Two programs were unscripted—that is, staff chose a variety of individual data sets they felt were meaningful to present, however the data sets were not necessarily chosen around a specific theme. Each of these programs was unique. Using various data sets, presenters discussed natural processes such as how hurricanes form, how the moon influences the movement of the tides, and how sea turtles migrate. Presenters also discussed current environmental concerns like global warming and energy use and tied data sets to visitors' everyday lives (e.g., showed the amount of air traffic at different times of the day).

A third program was scripted and entitled *Oceans 101*. This program focused on different aspects of the ocean (e.g., tides, marine life, etc.), how the ocean relates to everyday life (e.g., rain comes from the ocean), and issues currently affecting the ocean and how those issues might affect visitors (e.g., ocean acidity is affecting some marine life's ability to create the shells that protect them).

Each program was primarily in lecture format—the presenter talked about different topics and facts, using the sphere as a visual learning tool. Each presenter also asked a few questions throughout the program such as “Where do we get a lot of earthquakes?” and “How many oceans do we have?” or answered the few visitor questions that arose. At the end of each program, presenters encouraged visitors to stay if they wanted to see different data sets, play with the Wii that controls the sphere, or ask questions.

PARTICIPANTS' LEVEL OF ENGAGEMENT

- ♦ Most visitors stayed throughout the entire program; a few visitors left mid-way or walked by after the program had already started, stayed for a few minutes, and left.
- ♦ Most visitors were engaged in watching the sphere or listening to the presenter during the program; very few side conversations occurred.
- ♦ During each program, the presenter asked participants a few questions and a few visitors in each program volunteered to answer. For example, a presenter asked “Who can name all the

planets?” and a child asked “starting closest to what?” to which the presenter responded “the sun.” The child then named all eight planets correctly.

- ◆ Visitors rarely asked their own questions during the program, although the presenter encouraged visitors to stay after each program to play with the sphere and ask questions, and a few in each program did.

EXHIBIT VISITORS

RK&A unobtrusively observed 41 visitor groups comprised of 144 visitors as they interacted with the *Oceans Revealed: Powers of the Planet* exhibit. About two-thirds of visitor groups had at least one child; the remaining one-third were adult-only groups. RK&A observed visitors in the morning and afternoon on three consecutive weekdays and during different levels of crowding—low, moderate, and high.

EXHIBIT OVERVIEW

Oceans Revealed: Powers of the Planet includes the sphere, a flat-screen television describing current and upcoming data sets, a flat-screen display of local/current weather conditions, and five LCD text panels with information about the ocean, NOAA’s mission and goals, and *Science on a Sphere*[®]. During the course of the observations, 20 data sets, including four films of varying length, were projected on the sphere in a continuous loop (see Appendix C for a list of data sets).

VISITORS’ USE OF EXHIBIT COMPONENTS

RK&A noted whether visitors interacted with exhibit components and visitors’ approximate dwell time in the exhibit. Key findings are presented here.

- ◆ The majority of visitors remained in the exhibit for three to four minutes; however, visitors’ dwell time in the exhibit ranged from one to 20 minutes.
- ◆ Nearly all visitors engaged with the sphere while in the exhibit, watching between one and four data sets. The majority of visitors watched one to two data sets.
- ◆ About one-third of visitors looked at text and/or the introductory flat-screen panel displaying and describing current and upcoming data sets; the remaining visitors did not stop to look at text or introductory panels or did not notice them.
- ◆ About one-third of visitors looked at the local weather display while in the exhibit.
- ◆ Regardless of dwell time, most visitors were engaged with exhibit components during their entire experience; there was very little exhibit misuse and non-exhibit related conversation.
- ◆ A few visitor groups played in the projector lights making hand puppets or children in the group swung on the rails surrounding the sphere.

VISITORS’ LEVEL OF ENGAGEMENT

RK&A noted how (if at all) visitors interacted with exhibit components, including visitors’ exhibit-related conversation. Key findings are presented here.

- ◆ Visitors’ level of engagement varied widely:
 - ❖ Some visitors engaged only briefly with the sphere, walking around it once without stopping or took their groups’ picture before exiting. These visitors did not engage with any other exhibit components.

- ❖ Some visitors paused to watch the current data set, briefly pointing something out to a group member (e.g., “look, earthquakes”), or quickly answered a child’s question before exiting (e.g., “What is it doing?” “It is showing how the water heats up”). These visitors also did not engage with any other exhibit components.
- ❖ Some visitors were extremely visually engaged with the sphere (e.g. “That’s incredible!” “Wow, look!”) and actively tried to figure out how images were projected on the sphere. For example, visitors said “the ball is not moving, the images are” and “How is it doing that? Is it coming from the inside?” Some of these visitors also engaged with the local weather display or looked at text panels in the exhibit.
- ❖ Some visitors were not only visually engaged with the sphere, but also called others over to show them the sphere and actively engaged in conversation about the data sets. For example, one couple engaged in a conversation about the hurricanes: “What is it showing?” “The years; see how it changes?” “There we are; there’s Hurricane Rita. Is that the one we were here for?” Some of these visitors also engaged with the local weather display or looked at text panels in the exhibit.
- ◆ While it is difficult to conclusively state that certain data sets were more engaging than others, RK&A noticed that visitors were often very engaged with data sets where they had a personal connection. For example, visitors were often interested in seeing representations of human activity (e.g., daily air traffic or *Earth at Night*, showing lights generated from electricity) or natural phenomena they remember happening or being personally affected by (e.g., *Indian Ocean Tsunami Model*, 2005 hurricanes, or earthquake activity).

VISITORS’ LEVEL OF UNDERSTANDING

About two-thirds of visitors engaged in conversations while in the exhibit and these conversations were often indicative of visitors’ understanding or adults’ coaching of children. Key findings are presented here.

- ◆ Most visitor groups’ conversations were about the specific data set that was showing; many of these visitors demonstrated some understanding of what they were seeing. For example, one visitor, after reading the introductory panel, said “it [the *Sea WiFi*] shows the effect on the plankton; the weather, tides, and climate affect it.”
- ◆ On the other hand, some visitors’ conversations also indicated that they were confused by or had misinterpreted a data set they were viewing. For example, a few different people said “is that showing global warming?” when looking at data sets such as *NOAA’s CarbonTracker* or *Aerosol Optical Thickness*.
- ◆ Several visitors also carried on conversations about the Earth’s geography; for example, several parents pointed out different continents to their children or used the sphere to talk about different aspects of the earth (e.g., “the colored spots are ocean and the black spots are land”).

PRINCIPAL FINDINGS: IN-DEPTH INTERVIEWS

INTRODUCTION

RK&A conducted on-site interviews with 30 visitor groups—8 with visitor groups who attended an *Oceans Revealed: Powers of the Planet* program and 22 with visitor groups who visited the *Oceans Revealed: Powers of the Planet* exhibit on their own.

PROGRAM PARTICIPANTS

RK&A interviewed 8 visitor groups who participated in one of three observed programs. Visitor groups were comprised of 31 visitors—19 were female and 12 were male. Visitors' ages ranged from 2 to 66 years, with a median of 31 years. Most visitor groups were visiting NCARI for the first time ($n = 7$) and all were seeing *Science on a Sphere*[®] for the first time.

OVERALL EXPERIENCE

When asked their overall thoughts about their program experience, some said they thought the sphere itself was “eye-catching” or aesthetically pleasing and that they were intrigued by how the data sets were projected on the sphere (see the first quotation below). Some also said they thought the sphere was an innovative use of technology because it presents viewers with a three-dimensional perspective of the Earth and is, at the same time, interactive (e.g., shows natural phenomena changing over time) (see the second quotation). A few also said they liked learning new and interesting information and appreciated that the program kept their children engaged.

I was distracted by how cool the ball was. I missed some of what she said because I was so interested in how the whole [projection] process worked. . . . It is a cool way to present things and it makes things interesting. [male, 32]

It is a great use of technology. (In what way do you think?) Modeling all the [information]. It is better than [something] flat and having the sphere really puts [the information] in perspective. [It] brings statistics to life. Rather than just saying we would lose New York City, you actually see all the different coastal areas that [would be] gone, under [water]. The time-lapse is [also] really [interesting]; you can see [things] change with the time-lapse. [female, 37]

A few interviewees said they would have appreciated better seating (as opposed to sitting on the floor) and a couple said some topics should have been covered in more depth, specifically what visitors could do to address issues facing the environment (see the first quotation below).

I think the seating could be a little nicer. I think if she used a light [laser pointer] it would be better and a little more information on the topics she was discussing. (Any topics in particular that you would have liked to know more about?) She could discuss how we could save the oceans, what we could do because that is the main topic. [female, 51]

PROGRAM TAKEAWAY

When asked what they took away from their overall program experience, about one-half of groups said they would take away the perspective that everything in the world is connected or the idea that we are each only one small part of the world (see the first quotation below). A couple each said they would take away specific facts they learned (e.g., the percentage of Earth's surface that is covered in water) or that the experience was unique and enjoyable (see the second quotation).

This [*Science on a Sphere*[®]] is really so visual because it makes you feel like you are really part of the world, the whole world. You do not really see that on [other] displays so this kind of detail was really great; it really stuck out—all the planes [traveling] at a certain time of day. . . . You feel like the world is a lot smaller than you thought . . . and our relation to it. [female, 55]

If nothing else, the presentation [aspect] is a unique thing. I will think about this and tell people about the Aquarium. [male, 32]

CONVEYING CONTENT

When asked what they remembered seeing or hearing during the program, most interviewees recalled specific facts presented in the program (e.g., there is only one main ocean, not five or North Korea turns its lights off at 9:00 pm every night to save energy). A couple also said they remembered seeing or hearing about how everything on Earth is connected—for example, natural events (e.g., tsunamis) that occur on one side of the world can influence tidal movement or water temperatures far away.

LEARNING RELATED TO EVERYDAY LIFE

When asked whether they learned anything that affects or relates to their everyday life, nearly all interviewees said they did. More specifically, some said they learned about how the moon affects the ocean tides and how the ocean affects the weather (see the first quotation below), and a couple said they learned about possible effects of global warming (see the second quotation). The remaining responses were idiosyncratic, including learning about the levels of carbon dioxide in the atmosphere and the number of planes traveling during any given day.

(What, if anything, did you learn that affects or relates to your everyday life?) Well, the tides for one thing and how the oceans control our seasons and hot and cold. I had not thought about it that way—that it [the ocean] controls if it is going to be hot or ‘what was it doing today? Raining. And what causes it [the rain]? The oceans.’ [female, 35]

I got the point about global warming. I thought that was great. That was brought out and emphasized. . . . Well, even with the sea level, I think [the presenter] started to explain it [global warming] a little bit more in detail when somebody asked, ‘what did that really mean when the red color took over on the coast line?’ So, it was interesting to hear that if the colored line [the ocean] covered [the coast], you would not be here. [female, 55]

LEARNING ABOUT THE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

When asked whether they learned anything about the National Oceanic and Atmospheric Administration (NOAA), most interviewees said they did not. A couple said they knew about NOAA, but not from the exhibit (see the quotation below).

I do not remember [the program] talking about that [NOAA]. I know about it [NOAA] from science class and their Web site. [female, 64]

LEARNING ABOUT ENVIRONMENTAL ISSUES

When asked whether they learned anything about issues facing the environment, most interviewees said they did. Interviewees’ responses varied widely—a few said they learned about the effects of climate change (see the first quotation below), and the remaining responses were idiosyncratic (e.g., learned about alternative energy resources and that trash is being dumped in the ocean, etc.).

My main concern is the fresh water [from polar ice caps melting] that is going to [affect] the ocean [environments]; where we live, of course, is all salt water. What is going to happen if all that fresh water comes in? Our environment and habitat are not used to fresh water. [Our

ocean environment] is all salt water so that means they [aquatic life] would die—especially the oysters and the clams. . . . It all comes down to that [climate change]. So, it makes you stop and think. [female, 35]

Interviewees were also asked whether they took anything away from the program that might affect their decision-making about environmental issues; most said they did not learn anything that would change their decision-making. However, some said they are already environmentally-aware (see the quotation below).

We are decently environmentally aware. We try to be. *That's right; we try to do our part, but I do not know if there is anything specific that we learned that would be new for us.
[male, 32; female, 31]

EXHIBIT VISITORS

RK&A interviewed 22 visitor groups who visited the *Oceans Revealed: Powers of the Planet* exhibit. Visitor groups were comprised of 46 visitors—29 were female and 17 were male. Visitors' ages ranged from 2 to 67 years, with a median of 28 years. The majority of visitor groups were visiting NCARI for the first time ($n = 16$) and all were seeing *Science on a Sphere*[®] for the first time.

OVERALL EXPERIENCE

When asked their overall thoughts about their exhibit experience, many interviewees said the sphere was “neat” or “fascinating.” Some of these further specified that its colors and interactive nature were pleasing to look at (see the first quotation below). Some interviewees also liked seeing information presented in an interactive, three-dimensional format or learning new information (see the second quotation). A few also liked the display showing current weather and tidal conditions for the Outer Banks. While many interviewees were intrigued by the sphere's visual aspects, about one-third said they found it confusing and were not sure what the current data set was trying to communicate (see the third quotation).

(What are your overall thoughts about this exhibit?) I thought it was very educational for the kids. *It was very fun. I liked the beginning part where you got to see all the coral reefs. I liked all the color. It was very colorful. (What was most engaging about the exhibit?) [I liked] the color and the motion together. It was very eye catching. [female, 39; male, 11]

(What are your overall thoughts about this exhibit space?) It was neat. (What did you think was neat?) [It was neat] the way it [the sphere] is showing the turtles and the temperature of the water. We did not think that South America would get that cold but it does. *It is impressive to have that globe thing to look at. (What do you feel like is impressive about it?) The size of it and the space around it so you can walk around and look and see what is going on.
[female, 51; female, 24]

I was unsure what the colors represented on the globe as the dates increased. I just needed some information. Maybe it was on the wall but I did not see it with my son dragging me along. I was just wondering, ‘Can it do something else? Can it show heat patterns? Can it show you other kinds of patterns?’ I mean it is fascinating to look at, but I just do not know what it means. [female, 43]

EXHIBIT TAKEAWAY

When asked what they took away from their overall exhibit experience, interviewees' responses varied widely. About one-third said they would take away a global perspective of how certain natural or cultural phenomena operate (see the first quotation below), about one-third said they would remember the experience as unique, enjoyable and educational (see the second quotation), and about one-third said they would not take anything specific away from the experience.

(What do you think you might take away from your overall experience?) The current and the constant flow in the earth and how it really affects the weather. The information on what is happening today, but I [will also] say this: we can take [something] from how the current and the water flows. I know they [did that] but I did not know it went that far. [The exhibit] gave me the whole detail on how the current flows and the Earth and how it affects the weather even more. [male, 48]

(What might you take away from the experience as a whole?) Well, I am a teacher. I teach elementary school, so I just think it would be a cool thing to [show students]; I always look for things that my kids would like to look at because that would catch kids attention and teach them something at the same time. That is always good. [female, 49]

CONVEYING CONTENT

When asked what they saw or heard on the sphere, interviewees' responses varied widely. About one-third of interviewees gave broad, partially accurate descriptions of what they saw or heard on the sphere (e.g., "earthquakes" or "the rise of the water"), and another approximately one-third gave more in-depth, accurate descriptions, often citing new facts they learned (see the first quotation below). On the other hand, about one-third of interviewees were confused or unsure what the data set(s) were depicting, and a few interviewees articulated a response but misunderstood the data set(s) (see the second quotation).

It was nice that they [NOAA] had tagged fish and birds and things and followed them with the satellite. I did not know they were doing that. It is very educational. (Can you tell me a little bit more about what you remember seeing or hearing on the sphere?) [I remember information about the] bleaching of the corals and the water temperature's effect on the coral reefs. *Also, boating can affect it [a coral reef]. **Some of the places are protected now. *The satellite that goes around the world takes pictures every few minutes. It keeps track of the water temperatures. [female, 67; female, 39; male, 11]

(Can you tell me a little bit about what you were watching or what you heard on the sphere?) I thought I was watching all the sharks on the ocean but apparently they were airplane flights. (How did you figure out they were airplane flights?) My mom told me. . . . I was kind of confused as to why a bunch of sharks were out on land but I do not know how she knew that. [female, 35]

Additionally, interviewees were asked if they did anything besides look at the sphere while in the exhibit. Some said they looked at the display depicting local weather and tidal conditions, and some said they read or glanced at the introductory flat screen panel or supplementary text panels, but could not articulate what they read or learned (see the first quotation below). A couple read text panels and remembered learning specific facts or ideas (see the second quotation).

(Okay and did you notice any of the text panels or read any of the text panels?) I looked at some of these over here in this spot [on the wall]. (Did you glean anything from any of the text

panels?) Not too much. I did not pay a lot of attention to it because I was trying to figure out what that globe thing was. [female, 42]

(Did you guys see or look at any of the text panels that were on the wall over here?) I read that one [the introductory panel] and I read a few other ones. (What, if anything, did you get out of looking at the intro panel?) I just kind of glanced over it and got the general gist of it I guess you can say. (What was the general gist that you got?) I read the one about the aerosol, all the gases, it shows where they are and how they move and shift around the atmosphere. [female, 20]

LEARNING RELATED TO EVERYDAY LIFE

When asked whether they learned anything that affects or relates to their everyday life, some interviewees said they did. More specifically, a few said they discovered what the weather or tidal conditions would be for the remainder of their vacation, a few said they learned how the oceans affect the weather, and a couple said they learned about climate change and current levels of pollution (see the quotations below). The remaining interviewees said they did not learn anything that related to their everyday life; however, some of these talked about viewing the local weather conditions or learning about issues affecting their environment at another point during the interview.

Well, from the local weather [display], we wanted to see if it is still raining where we came from way up in Corolla. (And what did you find out?) It is raining a little but by the time we get back there it will be fine. [female, 43]

(What, if anything, did you learn that affects or relates to your everyday life?) I was looking at the current and everything and how hurricanes can spawn, just basically how [the data set] said that the current and the warm weather collide. That is one thing I did not know. [male, 48]

LEARNING ABOUT THE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

When asked whether they learned anything about the National Oceanic and Atmospheric Administration (NOAA), most interviewees said they did not. Several said they have heard of NOAA and were vaguely aware of its goals or had been on NOAA's Web site to look up weather-related information (see the quotation below).

(What, if anything, did you learn about NOAA—the National Oceanic and Atmospheric Administration?) I know they do the weather channel or the weather stations but other than that, no. (Is that previous knowledge or did you learn it here?) I [already] knew it. [female, 46]

LEARNING ABOUT ENVIRONMENTAL ISSUES

When asked whether they learned anything about issues facing the environment, about one-third of interviewees said they did. Interviewees' responses varied widely—a few said they learned that we are using a lot of energy or learned about alternative energies, a couple said they learned that climate change is causing the sea level to rise, and a couple said they learned that coral reefs are in danger (see the quotations below). The remaining interviewees said they did not learn anything about environmental issues or did not respond to the question.

(Did you take anything away from the exhibit about issues facing the environment or the oceans?) [The *Earth at Night* data set] is amazing; [that] one is what we are consuming at that time [of day]. That was amazing. The first thing I said was I think we are using too much electricity. (Anything else?) The colors; it seemed like it was a whole lot more, I mean I understand population, but it seems like the east coast uses a lot more electricity than anywhere else. [male, 48]

(Did you take anything away from the exhibit about issues facing the environment or the oceans?) Sure. The global warming and then, the waters are warmer than they normally are; reefs are dying because of bleaching. [female, 47]

Interviewees were also asked whether they took anything away from the program that might affect their decision-making about environmental issues; many said they did not learn anything that would change their decision-making. However, a few of these said they felt more informed (see the first quotation below). The remaining few interviewees said they might alter their decision-making and their responses varied (e.g., stop polluting and use a different detergent).

(Did you take away anything from the exhibit that might affect the decisions you make about the ocean or environment?) I honestly think that you get all this information and you kind of process it with everything else you hear. I do not necessarily think I would make any immediate changes, but it is just that you feel a little more informed. [female, 47]

RECOMMENDATIONS

INTRODUCTION

While visitors had engaging and educational experiences in the *Oceans Revealed: Powers of the Planet* exhibit and programs, findings from visitor observations and interviews highlight a few aspects of both that staff might consider remediating. Through conversations with staff, RK&A was informed of aspects of the exhibit that can and cannot be altered. The following recommendations take those limitations into consideration.

ASPECTS TO CONSIDER REMEDIATING

- ◆ Consider moving the introductory flat screen panel so that it is more central to the exhibit space and adding a text panel next to or above it highlighting that (1) the data sets change and (2) the introductory panel describes the current data set (e.g., “What is *currently* showing on the sphere?”). A majority of exhibit visitors did not notice or stop to read the introductory panel and some visitors were confused by or misinterpreted data sets.
- ◆ Staff is already considering adding seating to the exhibit space; a few program interviewees mentioned wanting better seating and RK&A observed exhibit visitors leaning against the wall and sitting on the floor during data sets with voice-over (e.g., *Blue Planet*). Seating may also help increase dwell time in the exhibit (most visitors spent three to four minutes).
- ◆ Consider moving the “Oceans Revealed: Science on a Sphere (SOS) Technological Specification” text panel into the central exhibit space. Many visitors were curious about how the images were projected on the sphere and very few visitors noticed or looked at this text panel on their way out of the exhibit.
- ◆ Consider making the connection between NOAA and the exhibit and programs more transparent—clearly and concretely draw connections to NOAA throughout each program or if possible, pair the NOAA text panel with another exhibit component (i.e., not alone). Very few visitors remembered learning about NOAA while in the exhibit or participating in the program.
- ◆ As part of each program, consider including one simple, concrete change visitors can make in their everyday lives that would address current environmental concerns. Staff might even consider using props to emphasize this change—for example, show visitors two light bulbs—one more environmentally-friendly than the other—so they know what to look for when shopping. Interviewees mentioned wanting to know more specifically what they could do to address environmental issues presented in the programs.

APPENDICES

APPENDIX A: OBSERVATION GUIDE

Removed for proprietary purposes

APPENDIX B: INTERVIEW GUIDE

Removed for proprietary purposes

APPENDIX C: *SCIENCE ON A SPHERE*® DATA SETS

- ◆ Earth – The Blue Marble
- ◆ Energy Planet by National Renewable Energy Laboratory
- ◆ NOAA’s Carbon-Tracker
- ◆ Aerosol Optical Thickness
- ◆ Daily Air Traffic with Day/Night Terminator
- ◆ NASA Sea Currents
- ◆ Ocean Conveyor Belt
- ◆ Animal Tracking
- ◆ Coral Science from Outer Space to Inner Space by NOAA
- ◆ NASA Global Sea Surface Temperature Model
- ◆ Loggerhead Sea Turtle Tracks with Ocean Temperatures
- ◆ Earth at Night
- ◆ Sea WiFs
- ◆ 2005 Hurricane Season: Water Vapor with SST; Gray Scale IR Satellite
- ◆ Earthquakes (3/20/06 – 3/27/06)
- ◆ Indian Ocean Tsunami Model, December 26, 2004
- ◆ NCDC Sea Surface Temperature Anomaly Data, 1980-1999
- ◆ Blue Planet by Science Museum of Minnesota and American Museum of Natural History
- ◆ Sea Ice Concentration
- ◆ Sea Level Rise