

**Aquarium of the Pacific**  
*Ocean Science Center*  
Final Evaluation Report

August 2012

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## Introduction

The Aquarium of the Pacific (the Aquarium) in Long Beach, California, contracted with the Research Group at Lawrence Hall of Science to conduct an evaluation of their new Ocean Science Center (OSC). The OSC was designed to house a room-sized global display system designed and distributed by the National Oceanic and Atmospheric Administration called *Science on a Sphere* (SOS), upon which public science centers can project a range of shows and interactive data about Earth system science. The primary goal of the project was to develop programs for use with the Science on a Sphere (SOS) and linked flat screens that will help communicate climate change concepts to and encourage the adoption of a stewardship ethic in the visiting public through an interactive and immersive visitor experience. The evaluation explored the impact of these programs on participants and documented how effectively the programs:

- communicate climate change concepts audiences,
- encourage the adoption of a stewardship ethic, and
- make connections between ocean issues, climate change and visitors' own habits and behaviors.

This report documents the compiled results of data collection for the OSC evaluation including a focus group, five rounds of surveys and observations and an on-line follow-up survey. A total of 611 surveys were collected representing over 1700 visitors. Evaluation included three shows that were displayed on the SOS at The Aquarium. The shows were:

*Rising Sea:* Scientists estimate sea levels could rise more than three feet by the end of this century. In California, that would mean the flooding of San Francisco International Airport, the Ports of Los Angeles and Long Beach, and much of the commercial and residential property along the coast. See firsthand how sea level rise will affect people locally and across the globe.<sup>1</sup> Opened May, 2011.

*A Working Waterfront: Seaports of San Pedro Bay* The seaports of San Pedro Bay, which are the Ports of Long Beach and Los Angeles, represent the nation's first- and the world's fifth-busiest container port complex. Nearly half of all the manufactured goods that enter and leave the United States pass through this bay. Watch as this global trade center unfolds across the planet.<sup>1</sup> Opened May, 2011.

*Ocean in Motion:* Connects ocean health to animal and human health. It details how disruptions to marine ecosystems—like rising temperatures, increasing ocean acidity, improper fishing techniques, and pollution—travel up the food chain. The show includes images of sea surface temperatures, carbon dioxide levels, animal migration routes, and more.<sup>2</sup> Opened June 2012.

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<sup>1</sup> Ocean Science Center Featured Presentations. *Aquarium of the Pacific*. Retrieved August 27, 2012. From [http://www.aquariumofpacific.org/exhibits/ocean\\_science\\_center](http://www.aquariumofpacific.org/exhibits/ocean_science_center).

<sup>2</sup> New show Added to Aquarium's Ocean Science Center. (2012), *Pacific Currents*. Spring 2012.

Findings from the evaluation suggest that:

- Visitors have an overall positive experience in the OSC,
- Visitors identify and remember the main messages presented in the programs,
- The *Rising Sea* program inspired changes in visitors' actions as a result of what they learned about global climate change,
- Presentations encourage discourse with others outside of the aquarium, and
- Program choice dictated by convenience rather than topic.

## **Methodology**

A variety of methods were utilized throughout the project at different times and for different purposes. Reports detailing each data collection effort were generated; a brief summary of these methodologies follows and original, individual reports are appended.

Focus Groups; August, 2010 (Appendix A): The Research Group conducted a formative evaluation with a rough cut of the *Rising Sea* program. The program was in an early stage of development, so the purpose of the focus groups was to gather initial information about audiences' interest in the topic, appropriateness of the vocabulary, length of the presentation, etc. based on a rough cut of the production material. Two 1-hour focus groups were conducted. Research Group staff provided an introduction to the evaluation and to the Science on a Sphere, as well as showing two slides of the upcoming OSC. The 7+ minute slideshow was then presented to participants; a discussion of the film and viewers' thoughts on it followed. Participants for the focus groups were recruited via the following methods: a kiosk placed on the floor at the Aquarium, the Aquarium Facebook page, e-mail, and by personal invitation from staff or volunteers. Recruits were asked to complete a short, on-line questionnaire. Forty-nine people expressed interest in participating; of those we selected 12 members for each focus group. We selected participants according to their availability, and ones that represented a range of men and women, a range of people with and without children, and a range of racial backgrounds. Of the 24 members that were invited, 17 adults total (9 women and 8 men) responded and arrived to participate.

Remedial Surveys and Observations; May 2011 (Appendix B): The goal of the remedial evaluation was to gather preliminary data on the public's reaction to the globe, the effectiveness of the program to communicate intended messages and to identify any potential issues that could be remedied prior to the public opening. Data was collected during 18 presentations of the *Rising Sea* program over the course of two days. Participants were recruited from the Great Hall; groups were asked if they would like to preview a new program being presented on the Sphere and told that they would be asked to complete a short survey following the program. During the presentations, observations were conducted of the group in general as well as of one focal group per presentation. Following the presentation, each group was given a paper survey to complete. Over 300 individuals attended the programs and a total of 92 surveys were collected.

Ongoing Surveys and Observations: Four rounds of surveys and observations were conducted after the OSC opened to the public. Surveys included a set of questions that was

the same across all the data collection, but each also had unique questions designed to provide information about specific issues or questions. On data collection days, visitors to the OSC were told that an evaluation was taking place and notified that they would be asked to complete a survey upon exiting the gallery. Evaluators positioned themselves outside the exit from the OSC gallery with paper surveys to be completed. During the presentations, observations were conducted of the group in general as well as of one focal group per presentation.

August 2011 (Appendix C): The purpose of this particular evaluation task was to explore possible issues with the flow, entry and exit patterns, and the general physical experience of viewing SOS programming in the OSC as well as to document the visitor experience with the OSC as it is designed at this time. Programs presented included *A Working Waterfront: Seaports of San Pedro Bay* and *Rising Sea*<sup>3</sup>. The research team collected 31 completed surveys.

November 2011 (Appendix D): The purpose of the November data collections was to continue to document visitors' overall experience in the OSC, the extent to which they are provided with an educational experience and to explore options for a longer experience in the gallery. Further, data were collected regarding potential change in visitors' behavior as a result of their experience. Programs presented included *A Working Waterfront: Seaports of San Pedro Bay* and *Rising Sea*; 168 groups (approximately 80% of groups solicited) completed surveys.

February 2012 (Appendix E): The purpose of this round of evaluation was to gather additional data about visitors' overall experience in the OSC. The February surveys included a question regarding why visitors chose the particular show that they watched. Programs presented included *A Working Waterfront: Seaports of San Pedro Bay* and *Rising Sea*; 166 groups (approximately 75% of groups solicited) completed surveys.

July/August 2012 (Appendix F): The purpose of this particular evaluation task was to continue to gather data about the visitors' experience in the OSC, including data on the new program, *Ocean in Motion*. The summer surveys included similar questions to previous surveys; in addition, visitors were asked to rate both educational and entertainment value of the different programs so that comparisons could be made between the various presentation formats, in particular. Programs presented included *A Working Waterfront: Seaports of San Pedro Bay*, *Ocean in Motion* and *Rising Sea*; 186 groups (approximately 66% of groups solicited) completed surveys. Surveys were collected following ten of each of the programs; approximately the same number of surveys were collected for each program (*Rising Sea*: 62; *Working Waterfront*: 61; *Ocean in Motion*: 63). This was the only data collection effort that included all three programs.

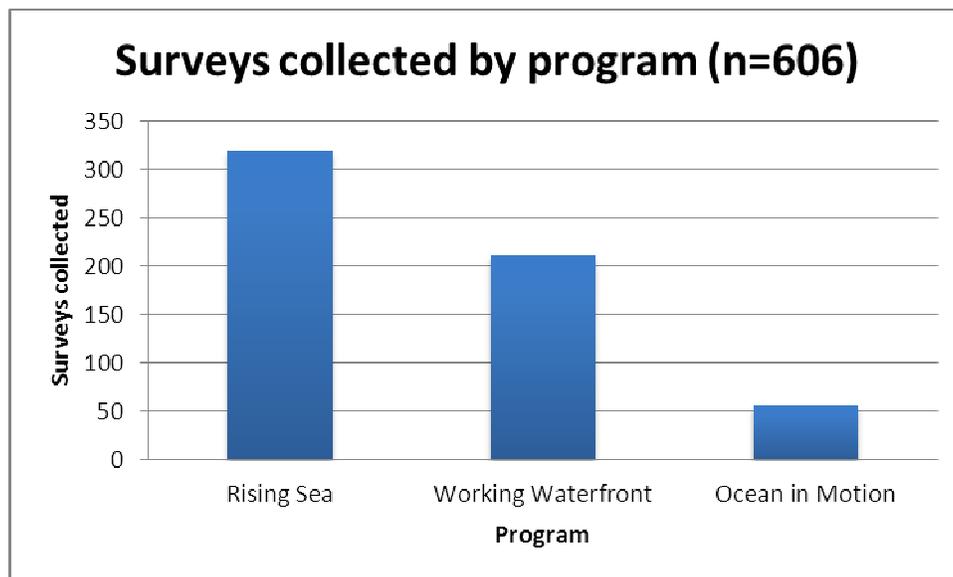
Follow-Up Survey; February and May 2012 (Appendix G): Follow up surveys were administered to guests who visited the OSC on data collection days in November 2011 and February 2012 and who had viewed either *A Working Waterfront: Seaports of San Pedro Bay*, *Rising Sea* or both. The purpose of this particular evaluation task was to gather data

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<sup>3</sup> During the first year of programming, Working Waterfront was shown once per hour and Rising Sea five times per hour.

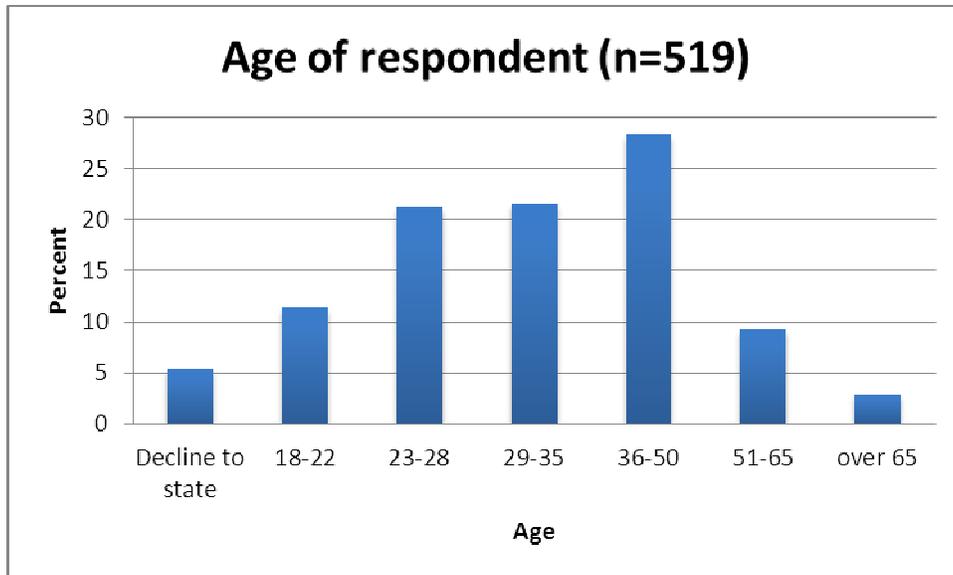
about what they remember from their visit to the OSC, to what extent they have shared their experience with others and whether they have made changes to their actions after their experience in the OSC. The survey was administered approximately three months following their visit. An email invitation was sent to ninety-one previous survey respondents who provided contact information. Completing the survey was voluntary; an incentive of entry into a raffle for a \$100.00 Amazon.com gift card was provided. Approximately 40% of those solicited (36) completed surveys.

In total, surveys were collected from 319 *Rising Sea* programs, 211 *Working Waterfront* programs and 36 *Ocean in Motion* programs. The discrepancy in number of surveys collected per program is due primarily to how long each of the programs was running. As data was collected on several occasions and the programs had a staggered release, more surveys were collected from the first program released (*Rising Sea*, opened May 2011) than the last (*Ocean in Motion*, opened June 2012). Examining attendance for each round indicates that each show received a nearly equal number of viewing groups.

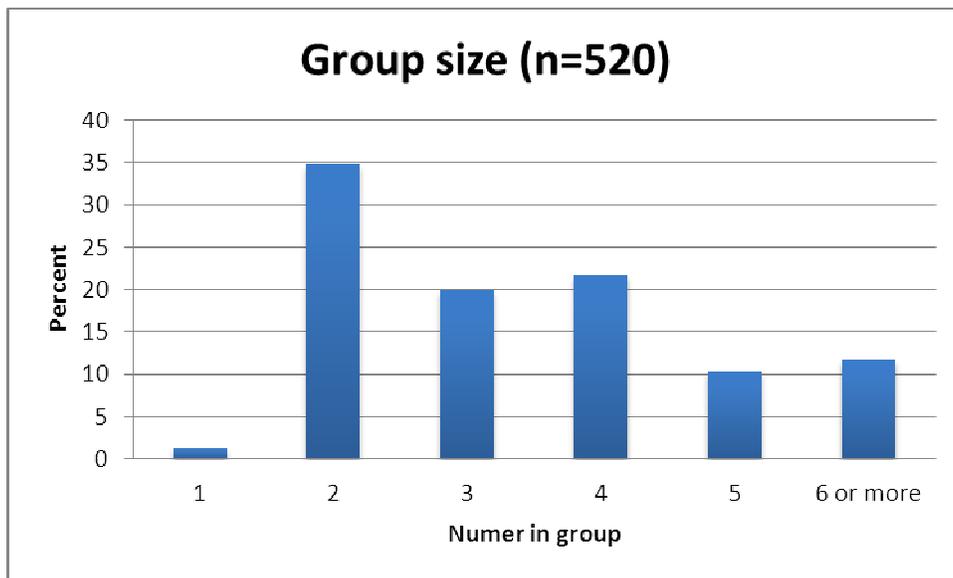


### Visitor Demographics

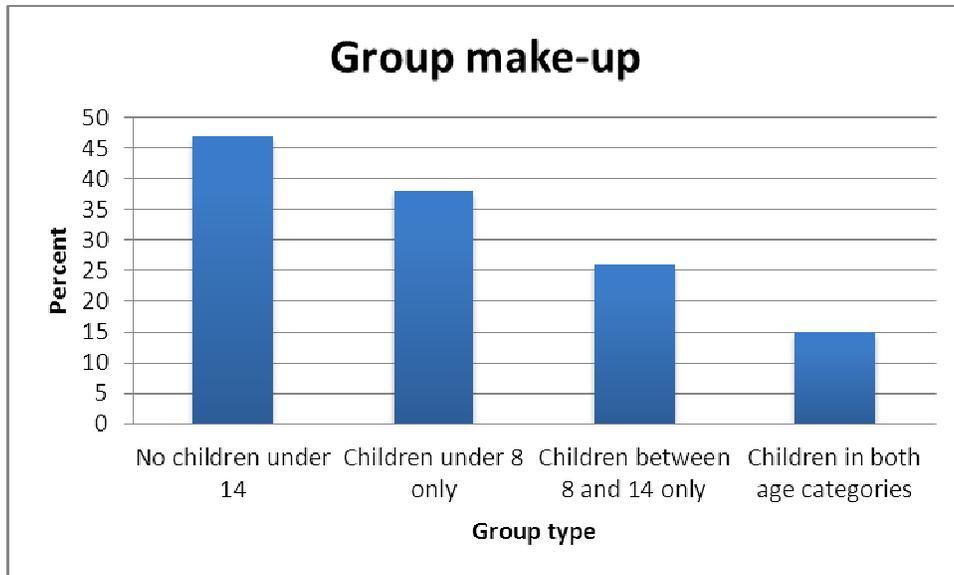
Respondents to the OSC surveys were slightly more likely to be male (52%) than female (48%). Of those who provided an age, the largest group fell into the category of 36 to 50 years old. The least represented group was the over 65 category.



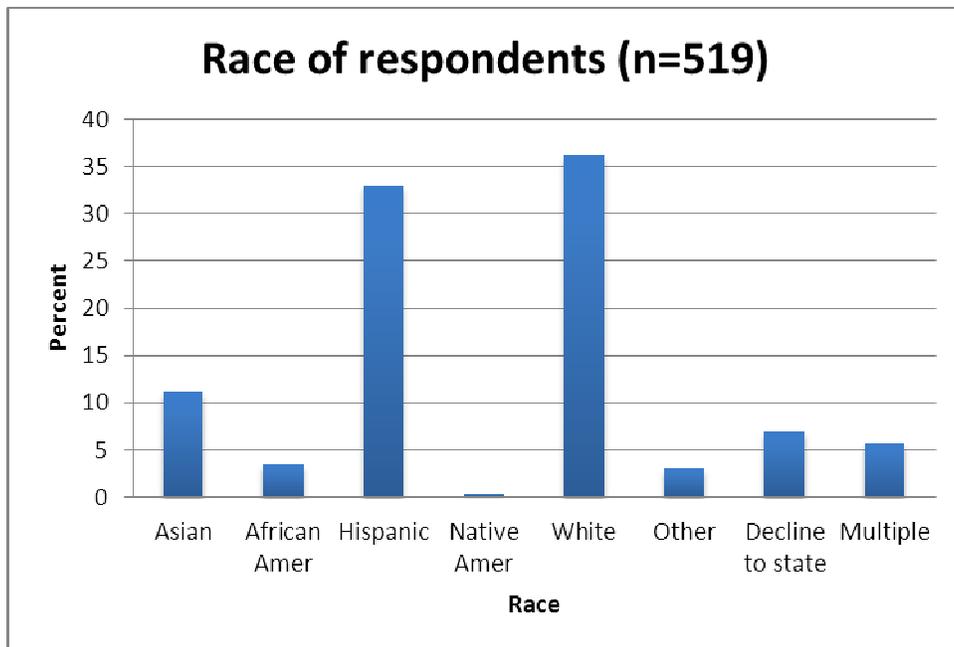
Groups ranged in size from one to over six people; most visitors came in groups of 2 to 4.



Just over half of groups (54%) that completed the survey included children under 14 years of age. Thirty-eight percent (38%) of groups only had children under the age of 8, while 26% had children between the ages of 8 and 14. Approximately 15% had kids in both age categories while 46% did not include children under 14.



The majority of respondents were White and Hispanic.



In general, the demographics of OSC visitors are similar to that of the general visiting population for The Aquarium. The minor differences (slightly higher Hispanic population and more male respondents than female) likely have more to do with weekend versus weekday populations than trends regarding attendance in the OSC.

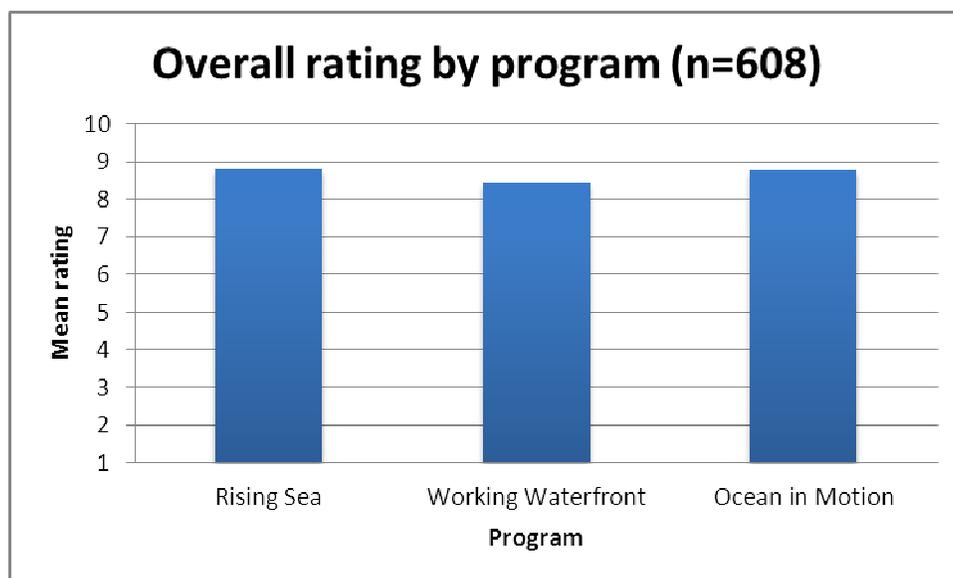
## Evaluation Findings

*Visitors have an overall positive experience in the Ocean Science Center*

The August 2011 survey laid out a set of 14 statements related to different aspects of visitors' experience in the gallery; respondents were asked to rate the extent to which they agree or disagree with those statements. Overall the visitors rated their experience as being very satisfactory. They were in agreement that the entry and exit process to the gallery was well managed, that the lighting and sound were comfortable and not distracting, and that with a few exceptions the shows were the right length. The majority of visitors felt that the atmosphere in the space was good; that light and sound levels were appropriate.

Observations indicate that visitors are very engaged in viewing the program; the clips shown on flat screen and the globe are well integrated and visitors appear to have no problem transitioning their attention between the two at appropriate times. Early data suggested that because the space was unfamiliar to most visitors, they were not certain whether they should stand close or far away from the globe. Most groups were drawn to the globe and started near the rail, but backed away as it is difficult (and uncomfortable) to view the flat screens from the rail; likewise, the video segments on the globe are easier to view from a distance. Visitors also complained during the May 2011 data collection, prior to the public opening, that there was no seating. Benches and stools added to the gallery alleviated both of these issues; as visitors were drawn to the seating which was positioned in way that made viewing comfortable.

Ongoing surveys indicate that visitors were very satisfied with their experience with the OSC gallery. On a scale of 1 to 10 (*1=poor; 10=excellent*), 61% rated their overall experience as a 9 or 10. No visitors rated their experience a 2 or lower. The mean rating for overall experience was 8.68 out of 10. When disaggregated by program, the *Rising Sea* program received a slightly higher rating for overall experience (mean = 8.81) than *Working Waterfront* (mean = 8.42) or *Ocean in Motion* (mean = 8.77), however these differences were not significant.



In an effort to compare the visitor experience with relation to different production styles, visitors were asked on the summer 2012 survey to rate the programs on how informative *and* how entertaining they were. There was some variation by program on these ratings; *Rising Sea* received the highest informative rating while *Ocean in Motion* received the highest entertaining rating; however, only one difference was statistically significant: *Rising Sea* was rated significantly higher on *informative* than *Working Waterfront*. This suggests that although the three programs presented in the OSC differ both in content and in production styles, the visitor experience is similar across the programs. In all cases, the visitors rate the overall experience highly and find the programs both informative and entertaining.

### Visitors take away the main messages

Visitors felt that all of the programs were informative, giving them a mean rating of 8.82 on a scale of 1 to 10 (1=*not at all informative*; 10=*very informative*). Sixty-seven percent (67%) rated the show they watched as 9 or 10. When disaggregated by program, the *Rising Sea* program received a statistically higher rating for informative (mean = 8.97) than *Working Waterfront* or *Ocean in Motion* (mean = 8.59). On average, most groups (85%) were able to identify at least one of the main messages of the program they saw. By program, 84% of respondents who saw *Rising Sea*, 83% of respondents who saw *Working Waterfront* and 96% of respondents who saw *Ocean in Motion* did so.

For *Ocean in Motion*, visitors identified the main messages as conservation of marine resources, saving/protecting the oceans and the things that live there and that people need to help nature.

Common responses for *Working Waterfront* focused both on the importance of the port as well as efforts to be more environmentally responsible.

Representative responses include:

- *Container shipping is efficient. San Pedro Bay is a central shipping facility for the world.*
- *Global impact of the shipping industries. Greener technologies.*
- *How key the San Pedro Bay is for the world and how they are becoming more efficient.*
- *Port of San Pedro ships around the world effectively. Trying to be more green.*

The most common response from viewers of *Rising Sea* was that the main message was sea level rise; other common responses mentioned the effects of global warming on sea level, climate change and the need to decrease dependency on fossil fuels. Approximately 10% named a related, but often more general topic such as environmental awareness or energy conservation. Some visitors also mentioned a more general environmental message, generally indicating that it is important to take care of the earth.

Nearly all (75%) accurately identified the main message of the program they saw. Some were quite detailed as can be seen in examples below from *Rising Sea* viewers.

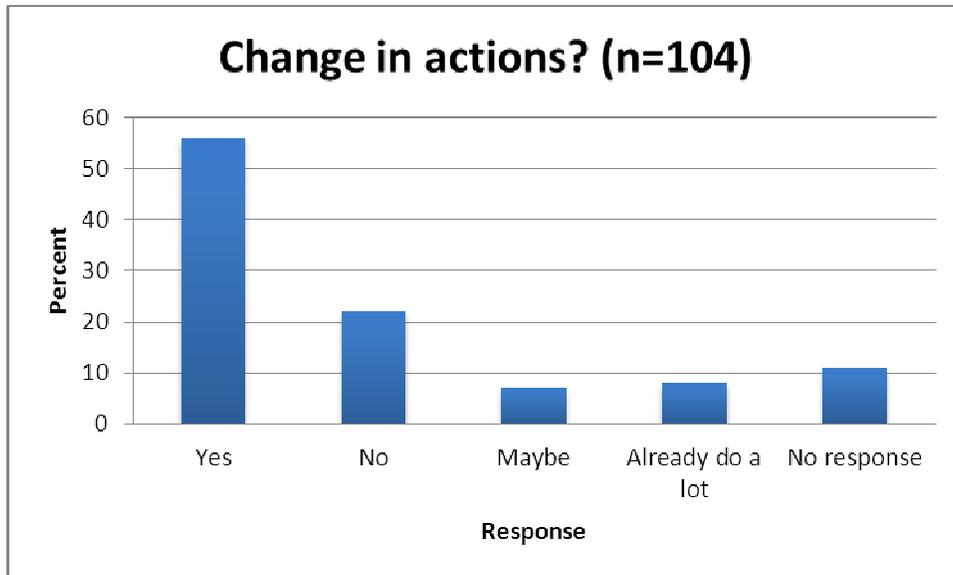
- *Global warming has great negative implications for the future and humans need to modify their behavior to help minimize their negative effects on the environment.*
- *How global warming is leading to the rising sea levels and endangering lives.*
- *The human race has to work as one unit to preserve the fragile earth we all call home.*
- *Man has to watch what he is doing to the environment or suffer the consequences*
- *The way the earth is being treated is leading to melting ice and making the water rise and destroys coastal communities across the planet.*
- *To try to help keep pollution down in order that the greenhouse effect doesn't get worse.*

There was a small number of *Rising Sea* respondents (~2%) who felt the presentation was biased, politically motivated or unfounded stating that the program was “one-sided” and that there was too much “political preaching”. These types of responses are expected for a topic such as Global Climate Change, and there is likely little that can be done to change such attitudes during a presentation of this nature.

#### *Rising Sea inspires changes in behavior*

OSC programs, specifically *Rising Sea*, impact guests’ actions after they leave the Aquarium. Information provided in the program regarding global climate change inspired many to make more of an effort to reduce their carbon footprint and be more environmentally responsible.

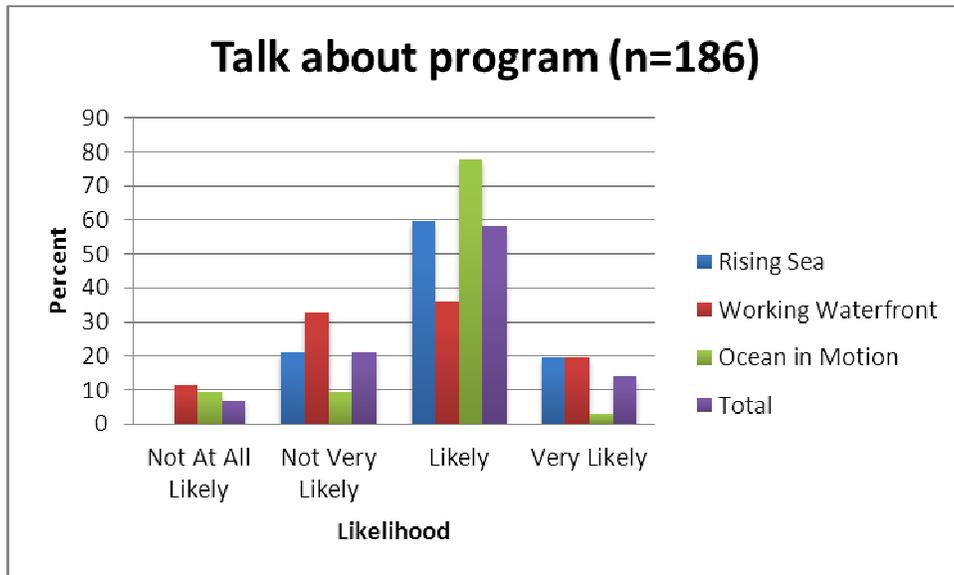
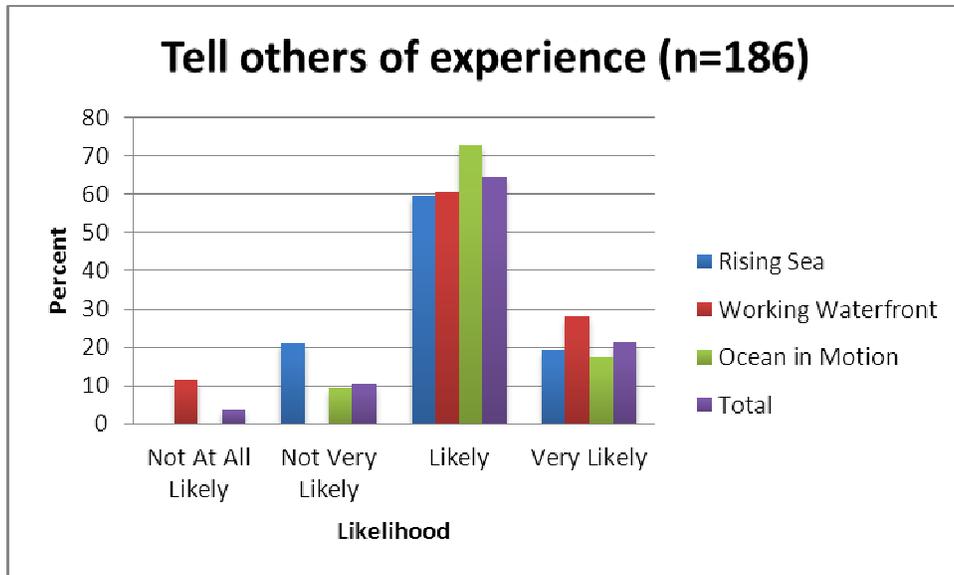
Visitors who saw *Rising Sea* wanted to learn what they could do to help prevent or prepare for sea level rise. Of the responses to the open-ended question “What else would you like to learn about this topic,” 48% wanted to know what they could do. Other responses included: what are the impacts on animals, when will the sea level rise occur, what will happen specifically to the local (Southern California) area, and what specifically will the impacts be (what does a 55 inch increase look like, how far will the water come in, what would the flooding look like). When asked directly, most of those who viewed *Rising Sea* (56%) said that what they had learned about global climate change would lead to changes in their actions.



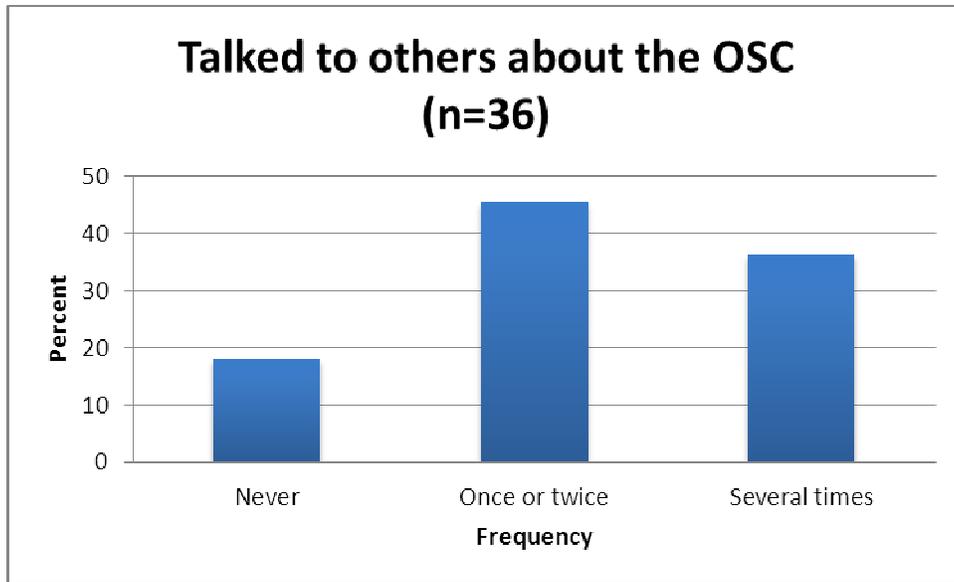
Data from the follow up surveys indicate that the information presented in the OSC programs is memorable and retained by viewers. Guests who visited the OSC remember their experience and can provide a detailed description of the main messages even three months after their visit. When asked in the follow-up surveys if the information presented in the *Rising Sea* program led to any changes in their actions as a result of what they learned about global climate change, half of respondents said *Yes*. Further, of the six who saw *Rising Sea* and said *No* to this question, four of them elaborated saying that they already do all they can to reduce their impact on global warming. When asked in what ways they were changing their actions, those who said *Yes* gave examples such as: increasing their composting, recycling, carpooling, buying organic and local produce, walking/public transit where possible instead of using the car and cutting back on power usage at the house. Comments from those who said *Sort of* were of two types: first, those who felt that their awareness has been raised and had good intentions, but had not yet made significant changes, or second, those who already did a lot and were now trying to find new ways of helping.

*Presentations encourage discourse with others*

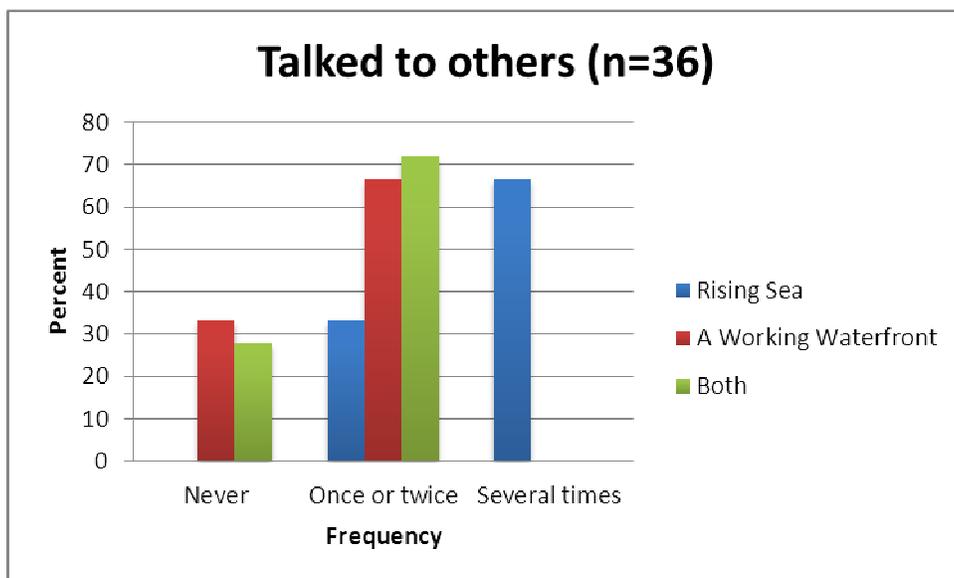
When asked on the summer 2012 survey, 86% of respondents said that they would be *Likely or Very Likely* to tell others about their experience in the OSC. Further, 74% reported that they would be *Likely or Very Likely* to talk to others about the program they saw. Not surprisingly, there was little difference across programs for telling others about the experience; however, *Rising Sea* and *Ocean in Motion* showed a significantly higher likelihood that people would talk with others about the program they saw.



The programs inspiring discourse is also reflected in data from the follow-up survey where most guests reported talking about their experience with others: reiterating messages to their children, encouraging others to see the programming or discussing implications of the topic. Over 80% of respondents stated that they had thought or talked to others about the program or their experience in the OSC since their visit; many of these had done so several times. Similarly, about 80% said that they had shared something about the program with friends or family. Examples of what they shared include: how they can work to minimize the effects of sea level rise - reduce energy use, recycling, reducing waste, carpooling, etc. (43%), recommendations to go see the show (33%), and their enjoyment of the globe (22%).

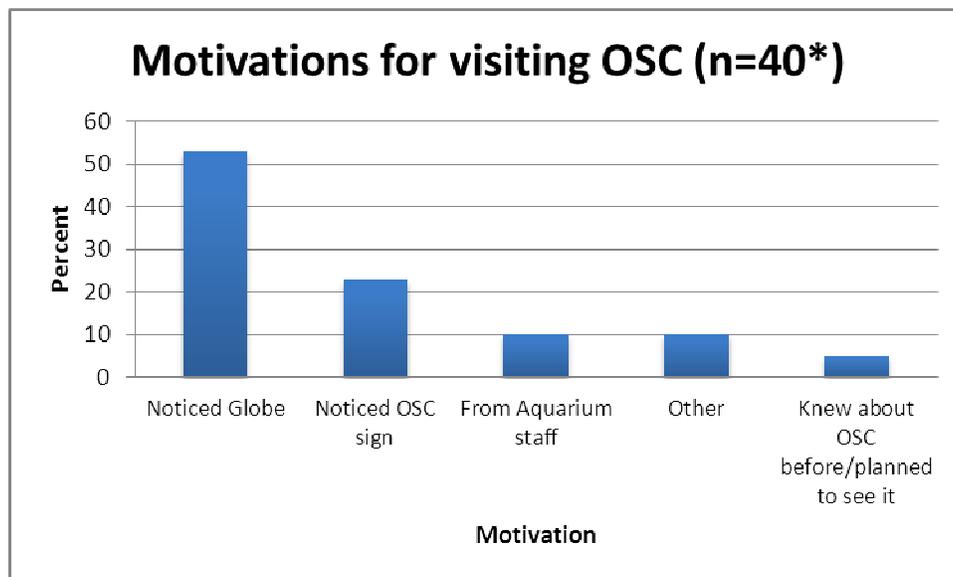


Some reported speaking generally about the program making comments such as “*We talked about how necessary it is for more people to see videos like the one presented at the aquarium*” or discussing with family how informative and fun the experience was. Others noted talking about specific content (particularly with their children), or discussed how they could “do their part” to help the planet and oceans. The percentage of respondents who reported that they had talked to others differed depending upon the show they saw. Overall, more of those who saw *Rising Sea* reported talking to others and did so more frequently than those who saw *Working Waterfront*.



Program choice dictated by convenience rather than topic

Most visitors surveyed in August 2011 were motivated to visit the OSC because they noticed the *Science on a Sphere* globe. Of the 31 visitors who responded to this question, 53% indicated that noticing the globe motivated them to visit the OSC. Twenty-three percent reported that they were motivated by seeing the OSC sign. Five percent (2 people) had heard about the OSC ahead of time and had planned to visit before they arrived.

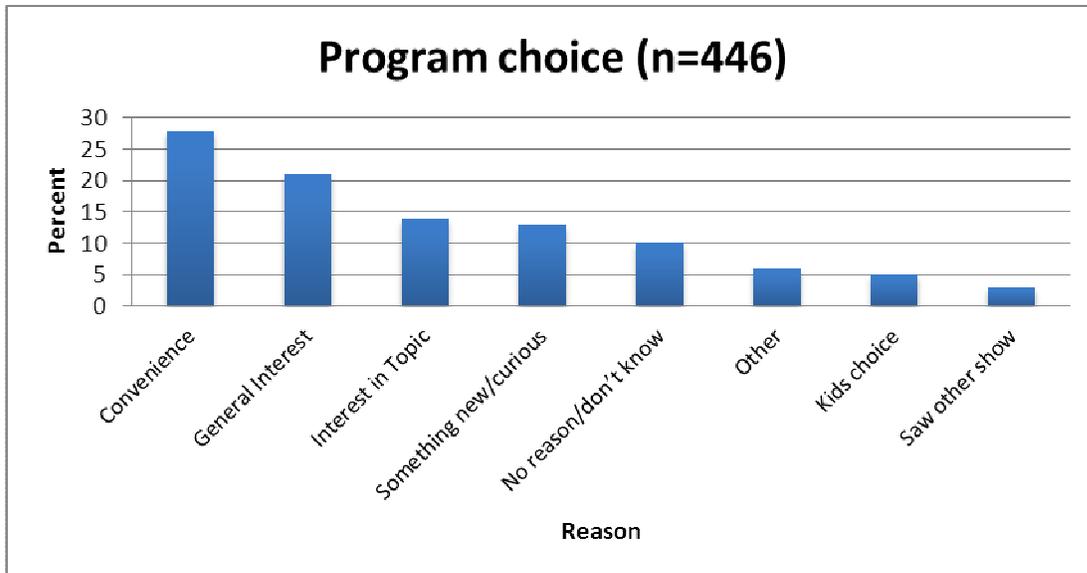


\*Note that n=40 because each visitor could check multiple motivations for visiting the OSC.

In later data collection efforts, visitors cited a variety of reasons for why they chose to see the program they did. The most common response (28%) was to say they watched the show that just happened to be on when they came by. Next most common (21%) said that they were generally interested, but visitors in this category did not specify what specifically they were interested in. An additional 14% mentioned that they were specifically interested in the content of the show. For example:

- *More interested in natural history than commerce. (Rising Sea respondent)*
- *For my 7 year old, he needs to be aware of our climate change. (Rising Sea respondent)*
- *Because we live in San Pedro and were interested. (Working Waterfront respondent)*
- *Curious about the shipping system in Long Beach. (Working Waterfront respondent)*

Smaller percentages of visitors indicated that they wanted to take advantage of this new experience at the aquarium or were generally curious, their kids made the choice, they had already seen the other show, or they didn't know why they chose the particular show.



One explanation for this finding is that at the time of data collection, visitors were provided with little information regarding the choices of programs in the OSC. Information regarding the next program was provided at the entrance of the OSC and *Rising Sea* and *Working Waterfront* were listed in the visitor guide. However, a guest passing by would not have a sense of the options available and therefore choose to enter because of the convenience of the start time and general interest in the OSC rather than the content of the program itself.

## Conclusions

Data collected through the evaluation suggest that the OSC and the programs presented within are functioning successfully and as designed. Visitors are very engaged in viewing the program and are able to identify the key messages. The *Rising Sea* program is doing an excellent job at helping people understand the importance and almost certain inevitability of rising water levels due to human influenced climate change. Nearly half wanted to know what they could do to help the situation. The data also supports the conclusion that the OSC programs are providing audiences with a positive and educational experience. Very high ratings were received for both overall experience and how informative visitors felt the programs were and nearly all respondents were able to articulate at least one of the main messages for the program they saw. In addition, the experience shows the potential to change visitors' behavior after their visit. Most of those who viewed *Rising Sea* said that what they learned about global climate change would lead to changes in their actions and many followed through. In sum, the OSC gallery has successfully met its goals of communicating climate change concepts to audiences and encouraging the adoption of a stewardship ethic. Furthermore, the programs presented inspire discourse with others about both the OSC gallery and the topics presented. This ongoing communication and reflection about topics such as protecting marine ecosystems, climate change and sea level rise surely

contribute to visitors making connections between ocean issues, climate change and their own habits and behaviors.

**Aquarium of the Pacific: Science on a  
Sphere**  
*Sea Level Rise* Film  
Focus Group  
Findings August  
2010

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**Introduction**

The Center for Research, Evaluation and Assessment (REA) was contracted by the Aquarium of the Pacific (AoP) to conduct an evaluation for its new Ocean Science Center. As part of that evaluation, REA is conducting an evaluation of a film currently called *Sea Level Rise*, which will be projected onto the Ocean Science Center's Science on a Sphere globe.

On August 14th, 2010, REA conducted a formative evaluation on a rough cut of the SLR film. This document is a summary of findings from that evaluation session. The SLR film was in an early stage of development; the purpose of the focus groups was to gather initial information about audiences' interest in the topic, appropriateness of the vocabulary, length of the presentation, etc. based on a rough cut of the production material.

**Recruitment and Demographics of Participants**

Participants for the focus groups were recruited via the following methods: a kiosk placed on the floor at the Aquarium, the AoP Facebook page, e-mail, and by personal invitation from staff or volunteers. Recruits were asked to complete a short, on-line questionnaire. Forty-nine people expressed interest in participating; of those we selected 12 members for each focus group. We selected participants according to their availability, and ones that represented a range of men and women, a range of people with and without children, and a range of racial backgrounds. Of the 24 members that were invited, 17 adults total (9 women and 8 men) actually responded and arrived to participate.

**Evaluation Methods**

Two 1-hour focus groups were conducted. The discussions were facilitated by Dawn Robles of REA; Sean Devereaux from the AoP was also in attendance. REA provided an introduction to the evaluation and to the Science on a Sphere, as well as

showing two slides of the upcoming Ocean Science Center. We then showed the 7+ minute film to participants and finally, discussed the film and viewers' responses.

The nature and tone of the focus groups was conversational; the discussion was guided by a set list of questions, although given the enthusiastic participation and time constraints, we were not able to ask every question of every participant.

## **Summary Findings**

Overall people liked the film and the topic is of interest:

- People liked the overall approach of the film: the focus on what's happening now and on current events and solutions to sea level rise – i.e., the focus on the positive. They were impressed by the “natural” ways that people are “going with” the ocean (e.g., planting mangrove forests, the Dutch floating neighborhoods) -- especially those in other countries besides the United States -- instead of fighting against it (e.g., creating artificial barriers). One man suggested showing examples of what these two approaches would look like in different places: “in London, in Holland, in Long Beach...” Another suggested that the Sphere always be updated to show current ideas about how to address global warming and SLR. The whole group seemed to resonate with the presentation of cutting edge science and engineering.
- They liked that with a few exceptions, the tone is not too “preachy” and “without the fear factor.” “I liked it as more of an acceptance [of global warming]. It's reality. Change is not controversial.... I like how they brought that up in the very beginning.” Another said he liked that it “just provided information” and not “what you should do.”
- People liked the inclusion of the teenage boy and his placement of measuring sticks along the coastline; one person specifically said he felt this segment could have a lot of impact. A few thought there could be more about young people and what they are doing or can do about SLR.
- Participants felt that in general, the content and level was appropriate for a public audience in an informal learning environment. A few people said or inferred that it's important to have layered information and at least a little something for everyone.
- One liked the addition of the plasma monitors around the Sphere; she felt that they will provide fresh images for those coming in for a second or third time (because they won't be able to look at those and the Sphere at the same time).
- We asked people, as they watched the film, to consider its length. No one commented about this as an issue, and we infer that they were satisfied with the length.

This was a fairly sophisticated and knowledgeable audience, but they still learned some new information (and seemed motivated and inspired to learn more):

- They learned that sea level rise is happening more rapidly than they thought; that places like Alaska would be affected; what precautions are being taken to address SLR; and “that Long Beach would be so affected.”
- They expressed interest in learning more: We discussed the fact that the SOS will be in a gallery with other exhibits. Participants wanted to see:
  - o images of the coastlines around the world and how they will change with SLR
  - o how SLR and the addition of more fresh water into the oceans will affect animals, food webs, other water-based systems; implications of SLR for the ocean overall (“this film was very continent-based”)
  - o how people might incorporate “self-sufficient energy creation” into solutions to SLR
  - o facts vs. myths about SLR
  - o something about the wetlands
  - o more about what is already happening; polar bears
  - o something for younger children – really basic, hands-on
  - o connections to other exhibits at AoP
  - o a call to action

One man said, “I will definitely look a few things up when I get home – like about what is being done already.”

The group wanted authentic and believable images, voices, and concepts:

- The participants felt it was very important that the voices match the person talking (especially with the teen boy and the Maldivian president; also the Alaskan native).
- One person suggested that the underwater summit meeting, and the quote from the Maldivian president, takes away from the credibility of the film: “It is counterproductive to imply that for the U.S. It is not going to happen here, but we *will* be harmed [just not so dramatically]. I thought that it hurt the credibility of the whole message.” A woman said this segment was “ridiculous – it’s like Atlantis.” Others disagreed and felt that this information was like “a canary in a coalmine” and shows how “the community is the world.”
- One person mentioned the Native Alaskan’s parka did not seem authentic – “it’s not even an indigenous garment.” The same person wanted to see images of Alaska, not “just a parka...” “...What does an ocean beach, a land-water interface look like in Alaska, and why should we care?”

- One suggested adding photos (for example how water use has sunk the water tables in the San Joaquin Valley and the Central Valley) as a reference, a visual comparison to show that things can change even over just one lifetime.
- One man expected the film would have a more local focus, comparing it to another AoP exhibit of how rainfall effects the Los Angeles Basin.

The group had a few things to say about the technology of the film and the Sphere:

- A few people felt that the high-tech and impressive-looking Sphere might distract from the content, at least for the first part of the film. They wondered if there were some way to ease people into the experience, to provide an introductory period of exposure to the Sphere itself (for example by showing moving pictures with no words), so visitors don't miss the first part of the film's content because they are distracted by the technology.
- The group wanted animation – almost everyone felt this was very important, and several people mentioned the static quality of the show when talking about their overall impressions.
- One man suggested that the film incorporate “THX/infrasonics” – subtle sounds that can't be heard consciously but that can “elicit people's emotions.”
- They wanted music, and more sound effects. One woman suggested that cultural music associated with different countries be played as each place is introduced in the film.

Some ideas for the title of the film included:

- “See levels rise”
- “Sea Change”
- Have the title ask a thought-provoking question: “Is this our future?” or “How long can you tread water?”

Ideas about accessibility included:

- A suggestion that the plasma monitors could be used to “speak to” people who speak other languages.
- Audio tours in different languages.
- Show different areas along Asian and European coastlines, places where people's heritage are from. “A picture can say a 1000 words in any language.”

## **Summary**

Overall this film was very interesting and well-presented for these focus group participants. We learned that the biggest issues or problems that participants had with this draft of the film (such as the voices not matching the speakers, and the fact that the images were static) were things that the film crew had already anticipated and were planning to address. This is a very positive finding because it shows that the overall level, content, and flow of the film works fairly well as it is now.

It was clear that these viewers were engaged by the content, and that even though they were familiar with the topic they wanted to know more. They suggested that the Ocean Science Center address the important questions of: “How can I find out more, and what can I do?” We recommend that the Ocean Science Center team utilize other exhibits in the Center to address visitors’ interests, in particular around the topic of the impact of sea level rise on all ocean life and ecosystems.

## Appendix B

### **Aquarium of the Pacific Ocean Science Center Remedial Evaluation**

May 13, 2011

Center for Research, Evaluation, & Assessment  
The Lawrence Hall of Science  
University of California, Berkeley

#### **Introduction**

A remedial evaluation of the Aquarium of the Pacific's Ocean Science Center was conducted the weekend of May 7<sup>th</sup> and 8<sup>th</sup>. The Ocean Science Center is slated to open to the public May 20<sup>th</sup>. The space houses a Science on a Sphere with integrated flat screens; the weekend of the data collection, the Sea Level Rise program was being presented. The goal of the evaluation was to gather preliminary data on the public's reaction to the globe, the effectiveness of the program to communicate intended messages and to identify any potential issues that could be remedied prior to the public opening.

#### **Data Collection**

Data was collected during 18 presentations of the Sea Level Rise Program over the course of two days. Half of these were facilitated, where an aquarium staff person provided an introduction and closing discussion. The other half were not facilitated; visitors were welcomed to the space, but given no additional information. Participants were recruited from the Great Hall; groups were asked if they would like to preview a new program being presented on the Sphere and told that they would be asked to complete a short survey following the program. For most of the presentations, a target of 3 to 5 family groups was sought. For one presentation, a general announcement was made in the Great Hall inviting everyone to join; for that presentation, there were 17 groups with a total of 45 individuals. During the presentations, observations were conducted of the group in general as well as of one focal group per presentation. Following the presentation, each group was given a paper survey to complete. Over 300 individuals attended the programs and a total of 92 surveys were collected.

#### **Findings**

##### General Experience

Observed behavior of the visitors was very consistent across all of the presentations. Most groups focused their attention on the globe or flat screens throughout the presentation. Only two groups were observed being distracted (texting, talking about un-related topics, etc.) during the presentation; none of the groups left during the presentation. Audiences were observed shifting their attention from the globe to the flat screens when interview or other clips were shown suggesting that the flat screens were well integrated with the globe and that visitors transitioned

their attention between the two at appropriate times. Visitors typically aligned themselves with the flat screens upon entry, though two different patterns of positioning were noted. Most groups would cluster around the rail close to the globe, while others would line the walls. Which pattern occurred depending greatly on what the first groups entering the space did. Groups entering later followed the example of the early groups. This was also true for groups sitting on the floor. Groups who started close to the rail were almost always seen backing away as the program went on to a distance two to three meters away. The experience for visitors was a standard transmission model where information was provided with little input or interaction from the audience. Three groups were observed discussing images or topics on the globe during the presentation. Visitors rated their overall experience very highly with a mean of 8.7 out of 10. Rating scores were similar across the different conditions. There were no significant differences between facilitated and unaffiliated or between the large and small groups.

The majority of visitors felt that the atmosphere in the space was good; that light and sound levels were appropriate. Three mentioned needing blinds or shades on the front windows to block light from the Great Hall. Two commented that the space was not appropriate for kids (“too dark for kids, kids were scared”) while one said the space was “not inviting”.

Approximately 36% of respondents stated that they spoke Spanish; of these, 31% said that the Spanish captioning was important to their group, 25% said the captioning was not important and the remaining did not comment. Several commented that the captions needed to be larger, while one saw only the English captioning and stated that there was no Spanish captioning.

#### Communicating Key Ideas

Visitors rated the presentation as very informative giving it a mean score of 8.8 out of 10. Like the overall rating, there were no significant differences across the different conditions. Most groups (73%) were able to identify at least one of the main messages of the program. Examples include: Sea Level Rise, Global Warming, Climate Change and the need to reduce dependence on fossil fuels. Of the remaining groups, 12 (13%) named a related, but often more general topic such as environmental awareness or energy conservation. Six of the groups (7%) listed something unrelated and seven groups left the answer blank. Disaggregating by presence of facilitator showed no difference between groups.

Overwhelmingly, visitors wanted to learn what they could do to help prevent or prepare for sea level rise. Of the 61 responses to the question “What else would you like to learn about this topic,” 29 (48%) wanted to know what they could do. Other responses included: what are the impacts on animals, when will the sea level rise occur, what will happen specifically to the local (Southern California) area, and what specifically will the impacts be (what does a 55 inch increase look like, how far will the water come in, what would the flooding look like). None of the visitors commented on any content-based aspect of the program that was confusing or frustrating. Most comments received in response to this prompt concerned issues that will be discussed later under Suggestions for Improvement. The two responses that were relevant to content stated that the program was “one-sided” and that there was too much “political preaching”.

### Families with Children

Over half of the groups (58%) had children with them – consistent with information previously gathered by the Aquarium. Approximately 30% of groups had children under 7. Although in most cases children under 7 were observed getting restless or looking bored, none of them became disruptive during the presentation. Conversations with these families suggest that although the kids were not getting much from the presentation, that it was short and was stimulating enough to hold their interest for the time. Five respondents to the survey commented that the programming was not appropriate for kids, or suggested creating a program that was.

### Suggestions for Improvement

The final question on the survey asked visitors to suggest ways to improve their experience; 58 responses were given. Overwhelmingly, visitors requested seating (38 of 58 responses, 66% of those who made suggestions, 42% of all groups). Other frequent responses included fixing the mismatch between the audio and video (7 responses), Bigger flat screens (8 responses) and positioning the screens/globe lower (5 responses). For the first three programs on the second day of observations, 20 seats were brought into the space; the remaining programs that day had 8 seats in two groups of four against the walls. None of the groups who attended presentations with 20 seats mentioned seating as an issue. The percentage of groups suggesting more seats was nearly the same for presentations with no seats and those with 8 seats.

### **Conclusions and Recommendations**

Data collected suggest that the Ocean Science Center in general and the Sea Level Rise program in particular are functioning successfully and as designed. Visitors are very engaged in viewing the program and are able to identify the key messages. The flat screen and the clips shown on them are well integrated and visitors appear to have no problem transitioning their attention between the two at appropriate times. Light and sound levels are appropriate though blinds or curtains over the front windows would improve the situation (it is my understanding that this is already planned). Although most groups had no problem engaging with the program as a multi-media presentation, the space seemed unfamiliar to most visitors; they were not certain whether they should stand close or far away, to stand or to sit. Most groups were drawn to the globe and started near the rail, but backed away as it is difficult (and uncomfortable) to view the flat screens from the rail; likewise, the video segments on the globe are easier to view from a distance. The fact that many visitors stood close to the globe the whole time probably accounts for comments about lowering the globe or screens. Spanish captioning was important to about 10% of the groups; this percentage will likely increase when the space is open to the public as the method of recruitment may have favored English speaking audiences. Larger captions, and larger flat screens if possible, should be considered as should some indication of where Spanish captions will appear.

The Sea Level Rise program did an excellent job at helping people understand the importance and almost certain inevitability of rising water levels due to human influenced climate change. Nearly half wanted to know what they could do to help the situation. This sets the audience up for programming throughout the Aquarium designed to address actions people can take. More detailed information about Southern California and connections to wildlife would be prime topics for extension.

It is assumed that the discrepancy between the audio and video timing will be corrected. Also recommended would be to have the exact same images and clips showing on all of the screens. At several points during the program, different clips are visible on the English and Spanish captioned versions. This was distracting to some visitors and two mentioned that they moved around to see what they were missing. Another consideration regarding the video is alignment of the flat screens with the “seams” of the images projected onto the globe. It was observed early in the testing that people often positioned themselves under the flat screens, but that when the program was running, the “seams” between the globe quadrants appeared directly under the screens. Although the “seams” rotated slightly, they seemed to be under the flat screens more often than not. It is recommended that this be examined more closely to determine if indeed the “seams” are under the screens more than they are not, and whether a re-alignment could be made.

Seating was obviously an issue. On more than one occasion on the first day, elderly visitors were observed to be shifting around and visibly uncomfortable from standing. It is recommended that a small number of benches be installed for those who cannot stand for long periods of time (again, it is my understanding that this is planned).

There were no significant differences seen in any aspect of the survey or visitor behavior between the facilitated and non-facilitated versions of the show. Comments specific to the facilitated shows included: “there should be more than one speaker”, “less talking and more visuals” and “material was repetitive”. Although these comments are few and rather vague, it is recommended that the format for the facilitation be revised. Visitors did not appear to gain anything from the introduction to the technology of the Sphere, and the reiteration of concepts in the “outro” did not increase the numbers of groups who went away with key ideas. It is acknowledged that a more rigorous method of data collection and opportunities to probe visitors’ understanding of key ideas might reveal that there is a real difference between the groups and their levels of understanding. However, it is recommended that a less didactic approach be used to inspire audiences to engage more deeply with the material, make it more relevant for them and serve as a conversation starter as opposed to a “lesson”.

Although minor changes to the Ocean Science Center space could serve to improve the visitor experience and comfort, it is apparent from the data collected that the Ocean Science Center and Sea Level Rise program (both facilitated and non-facilitated) are well positioned to be successful and effective at the goal of helping visitors understand the very real threat of sea level rise and inspiring them to take action.

## Appendix C

**Aquarium of the Pacific**  
*Ocean Science Center*  
Summary Evaluation Report  
Prepared by the Research Group at Lawrence Hall of Science  
September 2011

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### **Background**

The Aquarium of the Pacific (AoP) in Long Beach, California, contracted with the Research Group at Lawrence Hall of Science to conduct an evaluation of their new Ocean Science Center (OSC). The OSC was designed to house a room-sized global display system designed and distributed by the National Oceanographic and Atmospheric Administration called *Science on a Sphere* (SOS), upon which public science centers can project a range of shows and interactive data about Earth system science. At this time, there are two shows being displayed on the SOS at AoP: *A Working Waterfront: Seaports Of San Pedro Bay* and *Rising Sea*.

A brief evaluation of the visitor experience in the OSC gallery took place on August 21, 2011. The Research Group had hypothesized, based on earlier visits to AoP, that visitors may be experiencing some issues with the flow, entry and exit patterns, and the general physical experience of viewing SOS programming in the OSC. The purpose of this particular evaluation task was to check these hypotheses, and to document the visitor experience with the OSC as it is designed at this time.

It is important to note that LHS's Research Group study of this project encompasses a range of evaluation tasks and efforts; this particular task and report on findings is one "snapshot" that will be integrated into the larger context of the evaluation as a whole.

### **Methodology**

On the day of this evaluation, visitors were asked to leave out the back of the OSC gallery (after having entered from the Great Hall) onto the Harbor Terrace. Visitors were informed at the end of each show that researchers would be approaching them upon their exit.

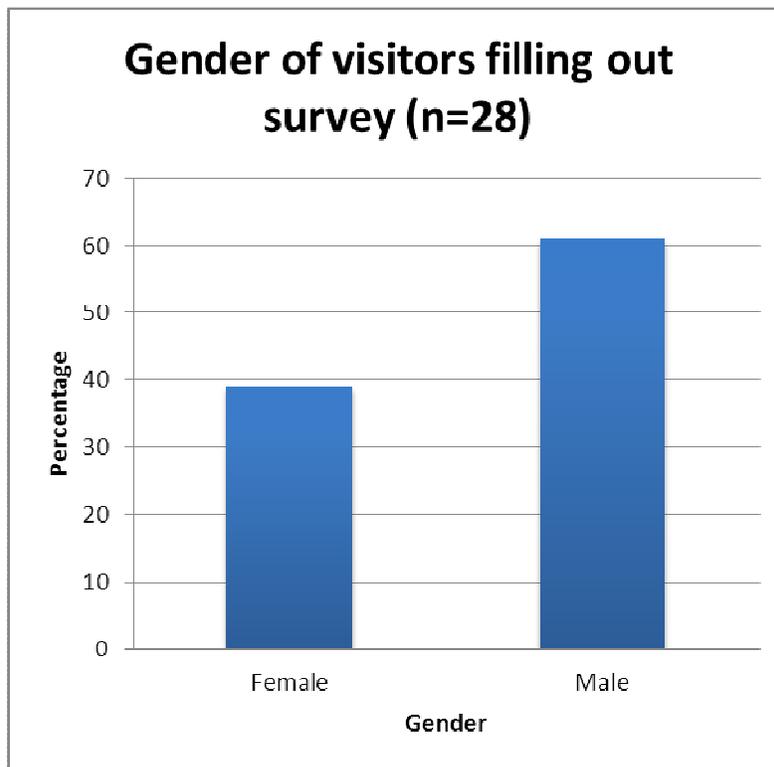
Two researchers from LHS's Research Group positioned themselves outside the exit from the OSC gallery. The researchers approached as many visitors as possible to fill out a paper questionnaire (14 questions total). The research team was able to collect 31 completed surveys.

## Summary of Survey Findings

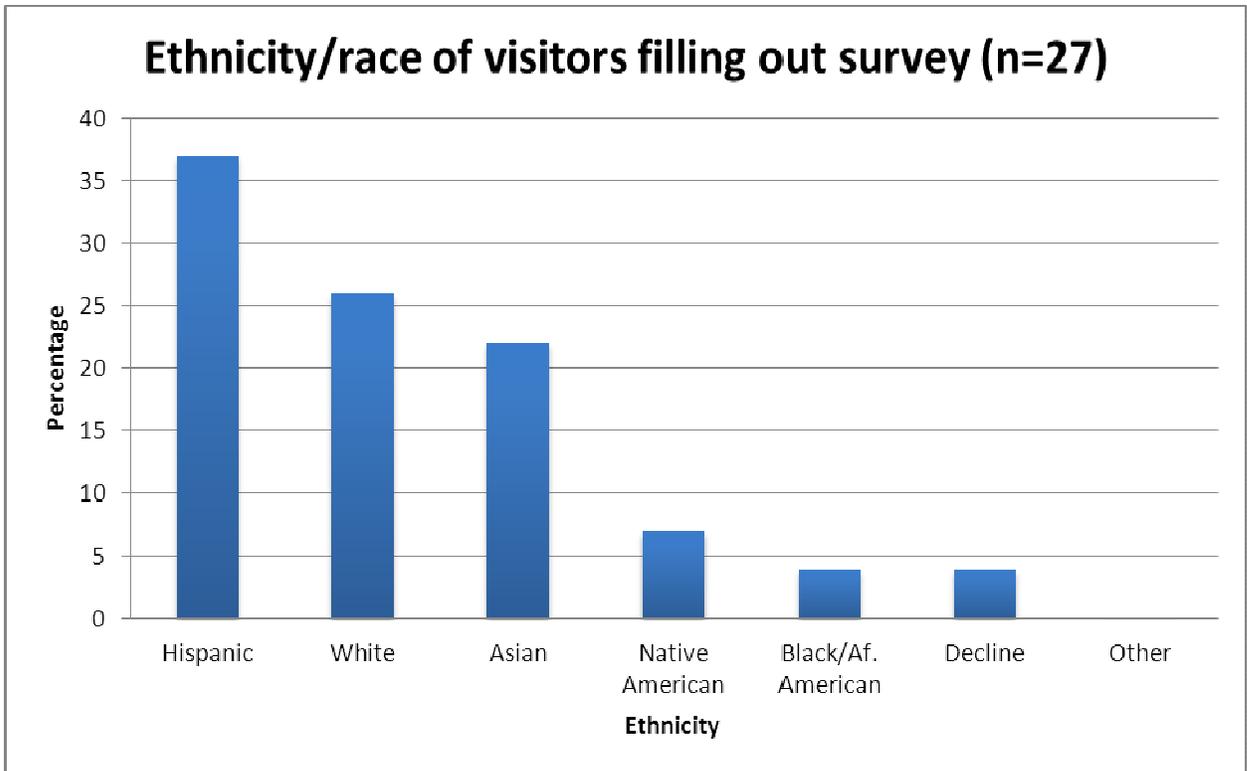
The survey asked questions in three broad areas: 1) about the visitors' demographic background and group makeup; 2) about the visitors' overall experience of the OSC and the shows; and 3) about the visitors' physical experience within the OSC gallery. The survey also asked three questions specifically related to the Spanish caption component of the SOS shows.

### The visitors' demographic background and group makeup

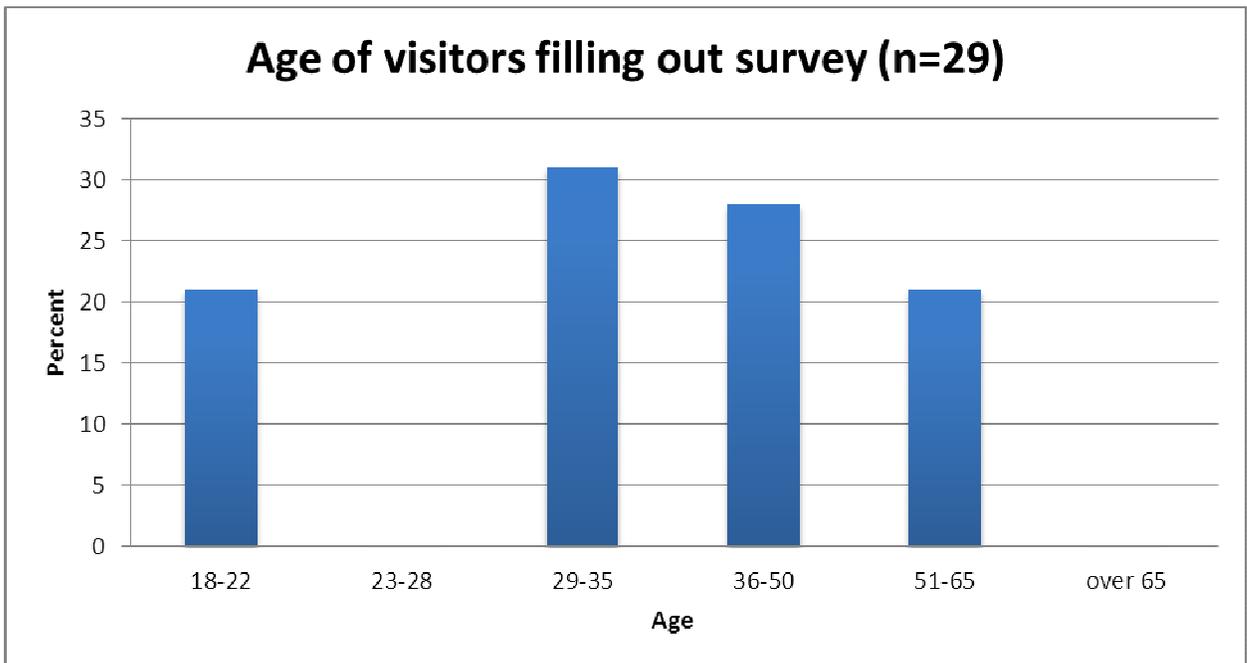
Within the groups that the researchers approached, slightly more males than females agreed to fill out the survey.



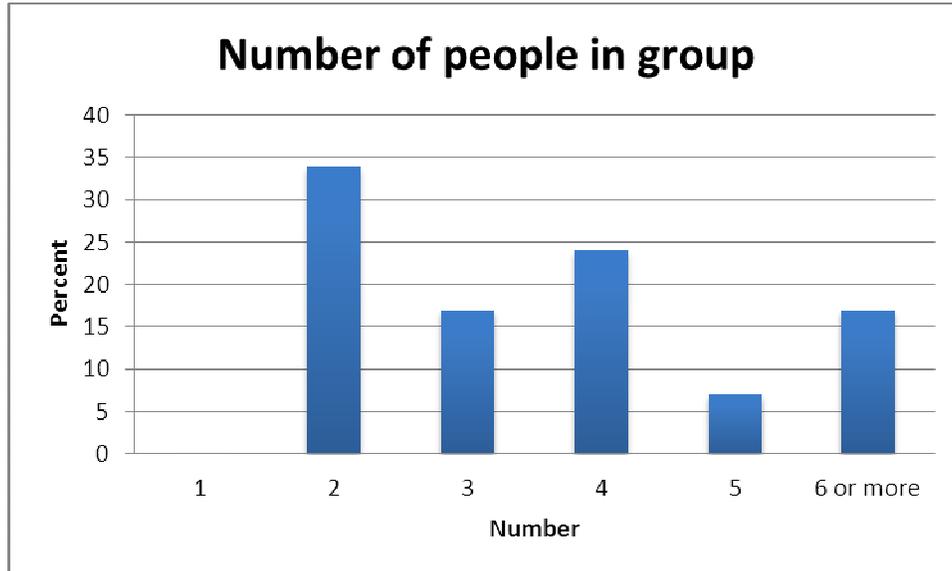
Thirty-seven percent of visitors who filled out the survey (37%) indicated they are Hispanic.



Most visitors who completed the survey were between the ages of 29 and 65, which is likely representative of the weekend audience at the Aquarium (families with children).



Most people attended the shows in smaller groups of two or three people.



Almost 75% of 17 respondents reported having one child in their group age 6 or under. Eight-eight percent of 16 respondents reported having a child between the age of 7 and 14 in their group. These numbers are higher than the ~60% typically seen in Aquarium of the Pacific visitors. It is not clear whether the sample is simply not representative of those who attended the programs, or of the Ocean Science Center is disproportionately attracting this audience.

#### Visitors' experience with the Spanish language

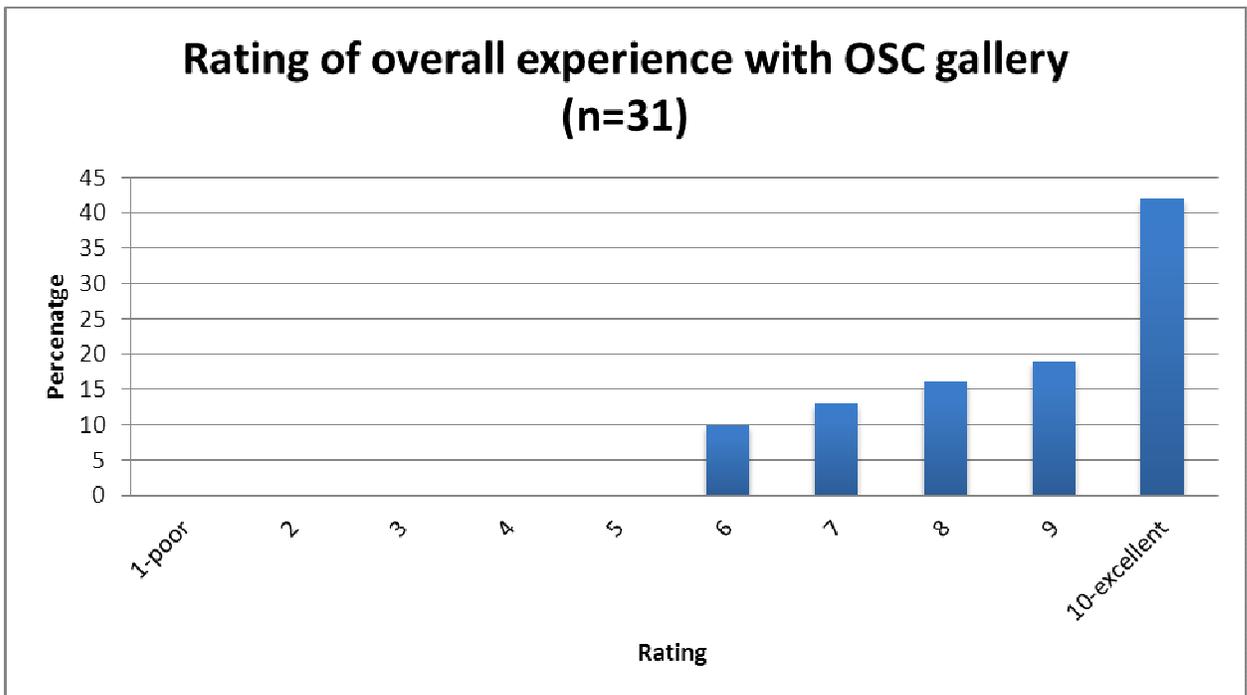
The SOS presentations appear primarily on the sphere; in addition there are four monitors that project images related to the program. These monitors face the four main seating areas of the gallery. On two of the four monitors, Spanish subtitles are displayed that reflect the spoken commentary of the program; on the other two monitors the subtitles are in English.

Just over half (55% of 29 respondents) reported that they speak or read Spanish. Thirty-four percent knew that there were Spanish captions available to them. Of 28 respondents, 43% reported that they did not use them or that they were “not applicable”. Twenty-one percent rated the Spanish captions as “very important.”

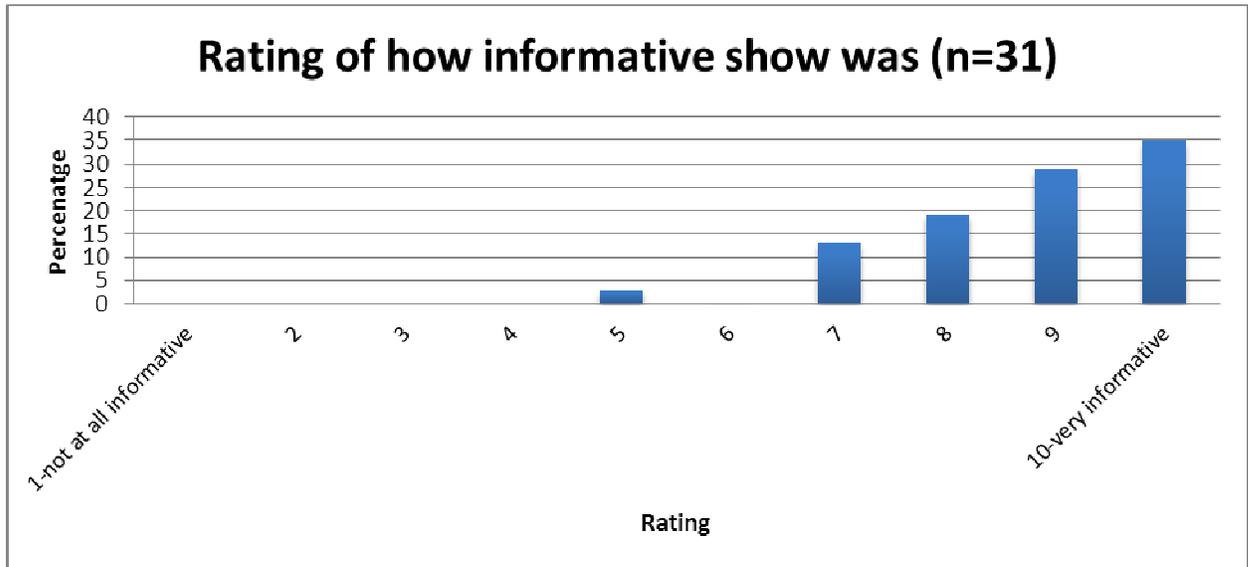


The visitors' overall experience of the OSC

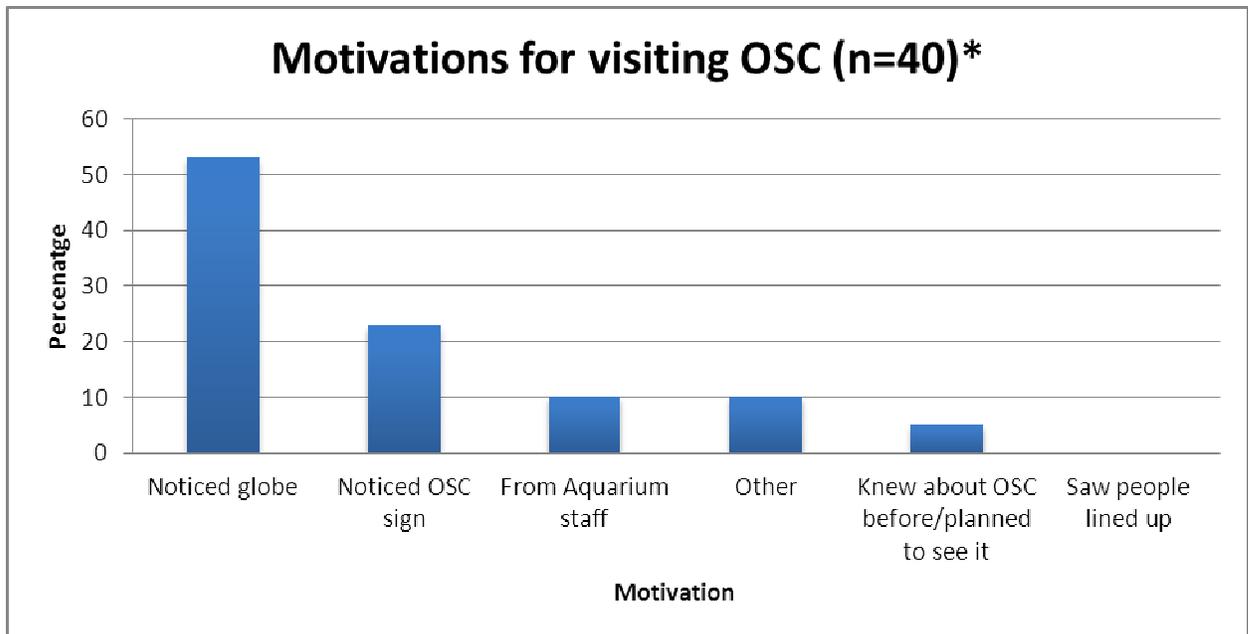
Overall, visitors were very satisfied with their experience with the Ocean Science Center gallery. On a scale of 1 to 10 (1=poor; 10=excellent), 61% rated their overall experience as a 9 or 10. No visitors rated their experience a 5 or lower.



Visitors also felt that the show that they watched was informative. On a scale of 1 to 10 (1=not at all informative; 10=very informative), 64% rated the show they watched as 9 or 10.



Most visitors were motivated to visit the Ocean Science Center because they noticed the *Science on a Sphere* globe. Of the 31 visitors who responded to this question, 53% indicated that noticing the globe motivated them to visit the OSC. Twenty-three percent reported that they were motivated by seeing the OSC sign. Five percent (2 people) had heard about the OSC ahead of time and had planned to visit before they arrived.

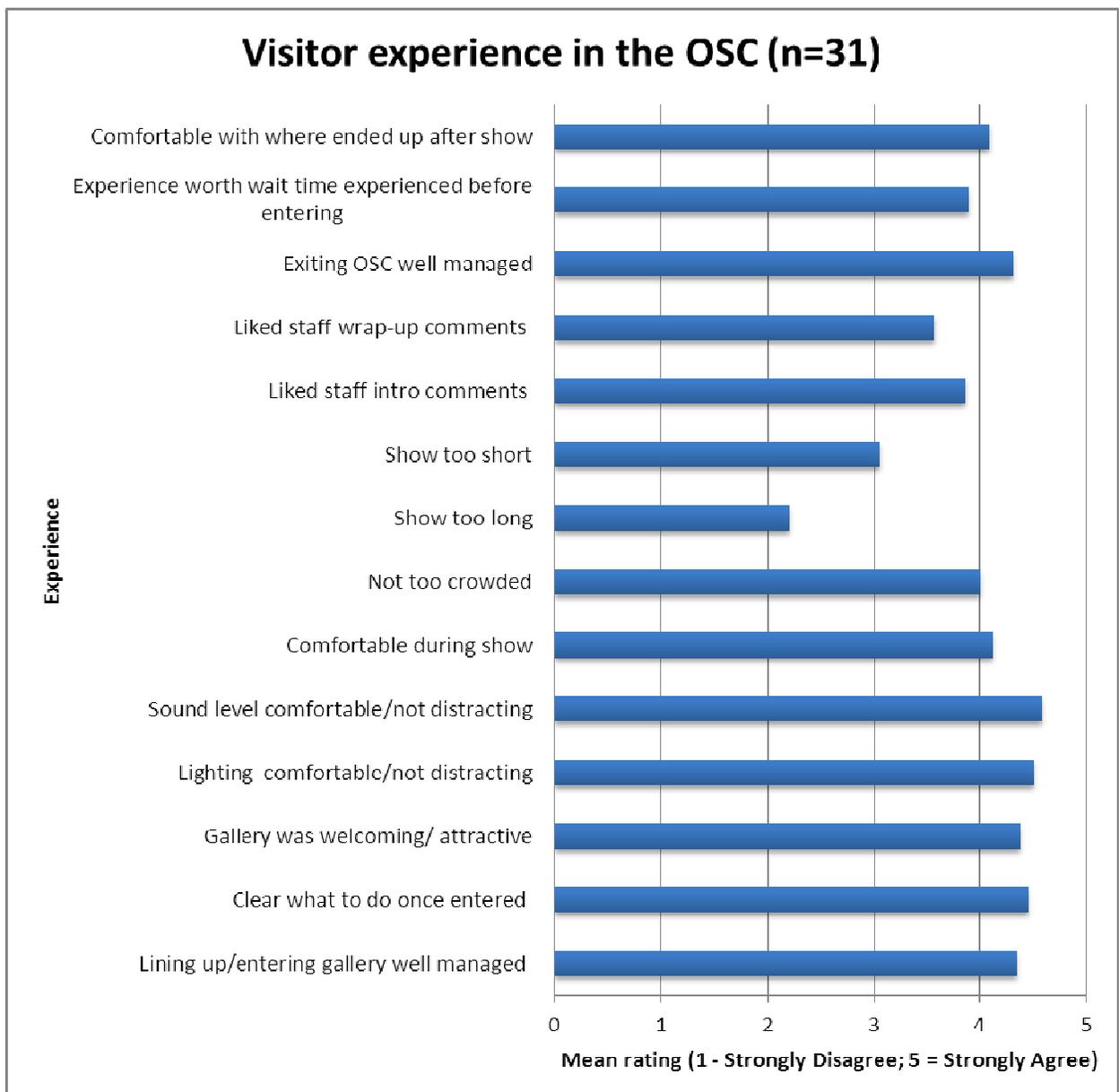


\*Note that n=40 because each visitor could check multiple motivations for visiting the OSC.

## The visitors' physical experience within the OSC gallery

The survey laid out a set of 14 statements related to different aspects of visitors' experience in the gallery. Respondents were asked to rate the extent to which they agree or disagree with those statements.

Overall the visitors rated their experience as being very satisfactory. They were in agreement that the entry and exit process to the gallery was well managed, that the lighting and sound were comfortable and not distracting, and that with a few exceptions the shows were the right length.



Visitors had very few comments about things that could be improved about the show that they watched. The following are all the open-ended comments about this:

- There was little to no pre-intro given. It would be good so judging age appropriateness can be done. Seating was not comfortable. Info was good but too advanced .
- Better intro? Quite good as is.
- I liked it just the way it was very informative.
- Make the show a smidgen longer. Better seating.
- Finding ways to fill it up.
- You can't [improve it], it was perfect.
- Seats were uncomfortable for people with short legs.
- My daughter wanted to go back to the indoor exhibit we pulled her from.
- Great show for adults. Could be improved for child view point and understanding.
- Popcorn and soda.
- Little too short.

The two comments that were repeated more than once included that the show was too short (2 visitors mentioned this), and that the seating was uncomfortable (3 visitors mentioned this).

### **Researcher observations and conclusions**

- The survey asked visitors to rate staff introductory and wrap-up comments. The evaluation included these items under the assumption that AoP staff would present introductory and wrap up comments to introduce the topic of the show, potentially summarize big ideas, and perhaps answer some of the visitors' questions about the presentations. On the day of evaluation, however, introductory and wrap-up comments primarily oriented people to where they would be exiting the gallery, and thanking people for their interest. Further work would be needed to explore visitor responses to more program-focused comments from OSC staff.
- The researchers noticed, in several of the shows they observed, that children in the audience (especially in *Rising Sea* presentation) started talking naturalistically with their families about solutions they could think of to deal with *Rising Sea*. This may present an opportunity for AoP staff to build on visitors' interests, answer questions, and provide an opportunity for visitors to feel invested in the issues that are explored in the presentation.

Thirty-nine percent of the survey respondents specifically agreed to a statement about the show being too short, and a few people mentioned this in open-ended comments; this suggests that visitors might be receptive to spending more time in the gallery. It is recommended that additional data collection explore this question and determine how visitors would prefer to spend the additional time. As the question asked specifically about the length of the show, one option would be providing a longer presentation on a single topic; a second option would be presenting two five to six minute shows in immediate succession. A third option would be to extend the experience through

other means. The proposed data collection would investigate visitors' preferences regarding longer or multiple shows, or potential other options.

- Although the OSC shows are not intended for very young children, the data indicates that a larger than expected percentage of groups attending the programs include children. Similar to surveys conducted in May 2011, a few visitors noted that the level of the presentation was too high for the children that accompanied them. Conversely, ratings of the shows were quite high even for groups including young children, and conversations with similar families from May suggest that although the kids were not getting much from the presentation, it was short and was stimulating enough to hold their interest for the time. Nevertheless, it might be useful to inform visitors, before they enter, of the target/appropriate age range for the films.
- The researchers noticed, as several visitors commented on, that the seating was uncomfortable (no back support). Given that people visiting the Aquarium may already have spent several hours on their feet, or be preparing to do so, this is an issue that may deserve some attention and resources.
- It is clear from the data that many visitors who could potentially benefit from the Spanish language captions did not have access to them. REA recommends either that the AoP staff introducing the show inform visitors who would like to see the captions where they need to sit, and/or post signs in Spanish indicating this information.
- The evaluators noticed that there was some awkward confusion at the end of the shows, when the lights come on, about what to do. To help people feel more comfortable, it is recommended that the wrap-up comments about exiting happen right away (as soon as the lights come up) so visitors know what is happening.

Overall, even though there are some minor concerns about the visitor experience of the gallery, the data from this survey show that people are pleased with the productions presented on the SOS, that they are learning new things there, and that there is potential to build on this already-successful program to further inform the public about the topics presented in the Ocean Science Center.

## Appendix D

**Aquarium of the Pacific**  
*Ocean Science Center*  
Summary Evaluation Report  
Prepared by the Research Group at Lawrence Hall of Science  
January 2012

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### **Background**

The Aquarium of the Pacific (AoP) in Long Beach, California, contracted with the Research Group at Lawrence Hall of Science to conduct an evaluation of their new Ocean Science Center (OSC). The OSC was designed to house a room-sized global display system designed and distributed by the National Oceanographic and Atmospheric Administration called Science on a Sphere (SOS), upon which public science centers can project a range of shows and interactive data about Earth system science. At this time, there are two shows being displayed on the SOS at AoP: A Working Waterfront: Seaports of San Pedro Bay and Rising Sea.

Paper surveys were administered to guests in the OSC gallery November 12 – 14, 2011. The purpose of this particular evaluation task was to continue to document visitors' overall experience in the OSC, the extent to which they are provided with an educational experience and to explore options for a longer experience in the gallery. Further, data were collected regarding potential change in visitors' behavior as a result of their experience. Follow-up data will be collected to determine the impact of the programs.

It is important to note that the evaluation of this project encompasses a range of tasks and efforts; this particular task and report on findings is one "snapshot" that will be integrated into the larger context of the evaluation as a whole.

### **Methodology**

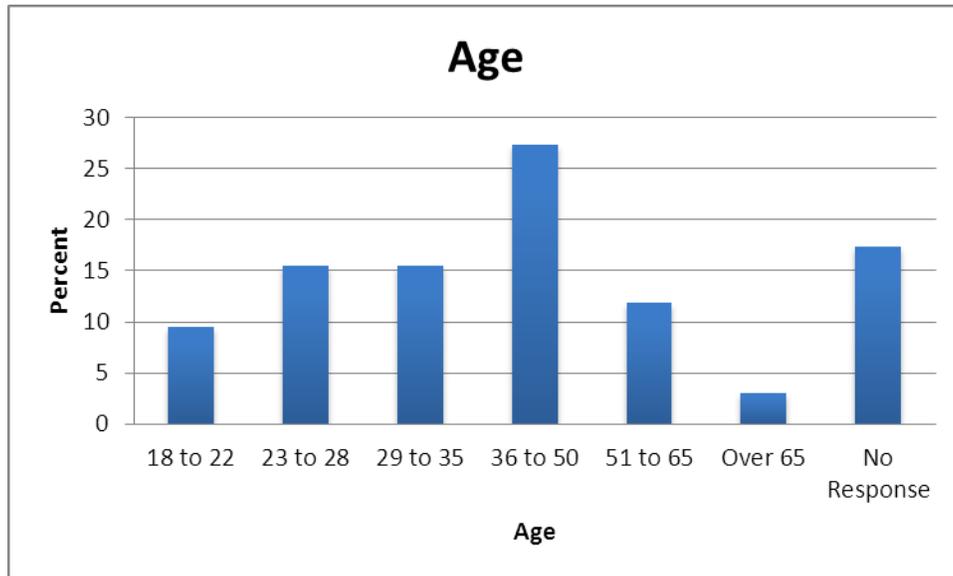
On the data collection days, visitors were told that an evaluation was taking place and notified that they would be asked to complete a survey upon exiting the gallery. Evaluators positioned themselves outside the exit from the OSC gallery with paper surveys to be completed. Completing the survey was voluntary; 168 groups (approximately 80% of groups solicited) completed surveys.

### **Summary of Survey Findings**

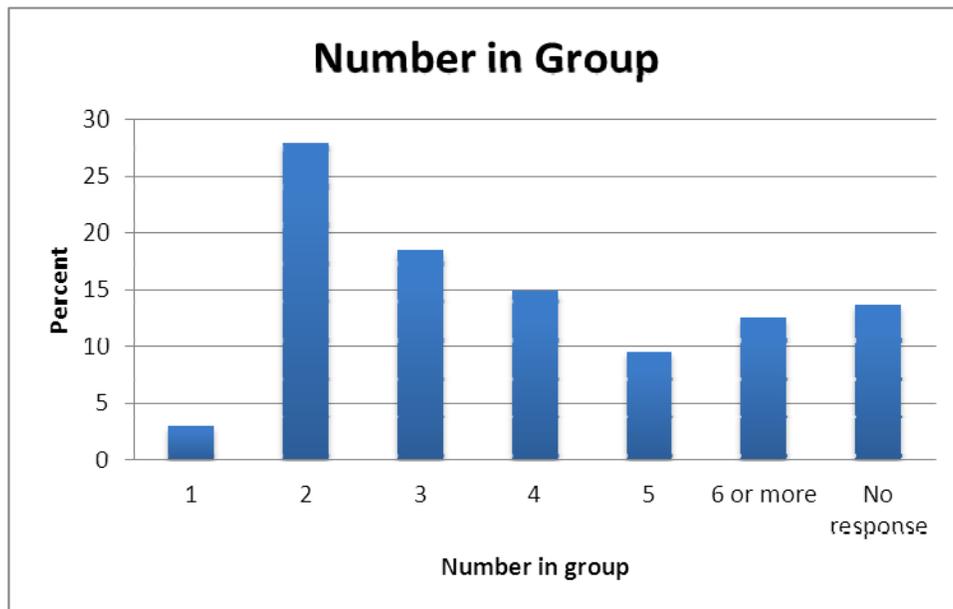
The survey asked questions in four areas: 1) about the visitors' demographic background and group makeup; 2) about the visitors' overall experience of the OSC and the shows; 3) about options for a longer experience; and 4) about potential changes to their actions as a result of what they learned about Climate Change.

## Visitors' demographic background and makeup

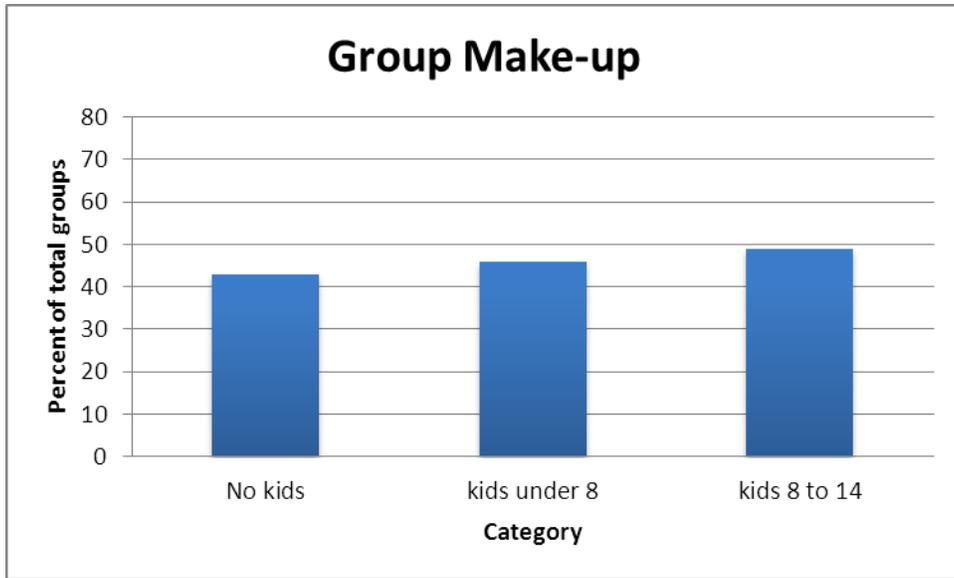
Respondents to the survey were split nearly equally by sex with 48% female and 52% male. Of those who provided an age, most fell into the category of 35 to 50 years old. The least represented group was the over 65 category.



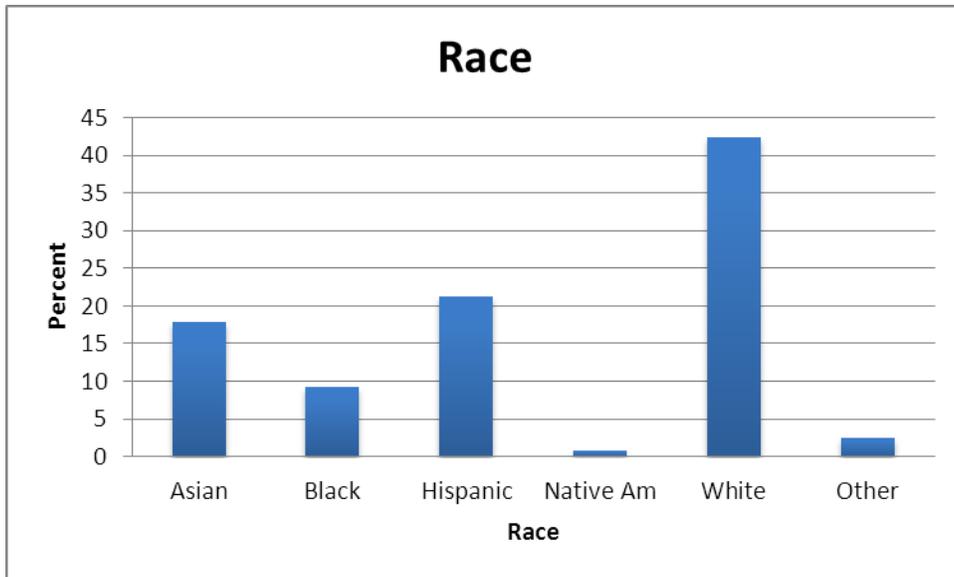
Groups ranged in size from 1 to over six people with most (28%) in groups of two.



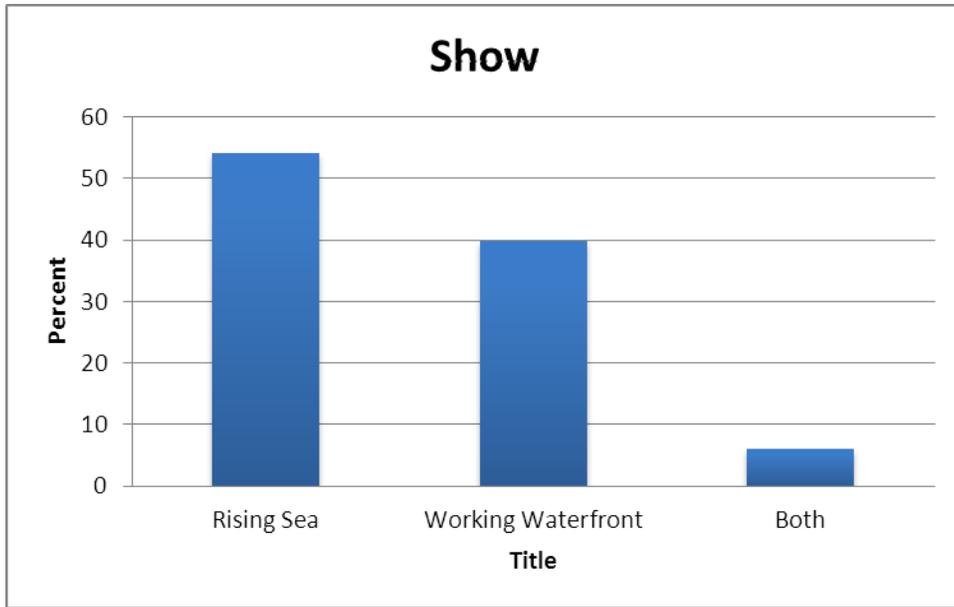
Just over half (57%) of groups that completed the survey included children under 14 years old. About half of all groups (49%) had kids 8 to 14 while fewer (46%) had kids under the age of 8. Almost one quarter (24%) of groups had kids both under 8 and between 8 and 14 years old.



Demographic make-up of the groups followed similar to that seen in general surveys of AoP visitors.

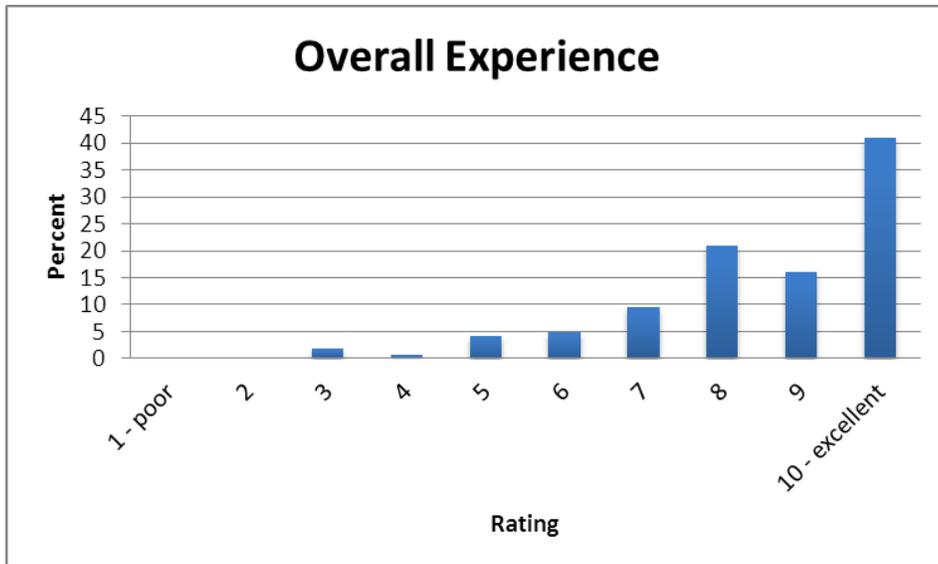


Most of the groups surveyed (54%) attended the Rising Sea program while 40% viewed Working Waterfront; 6% attended both the Rising Sea and Working Waterfront programs.

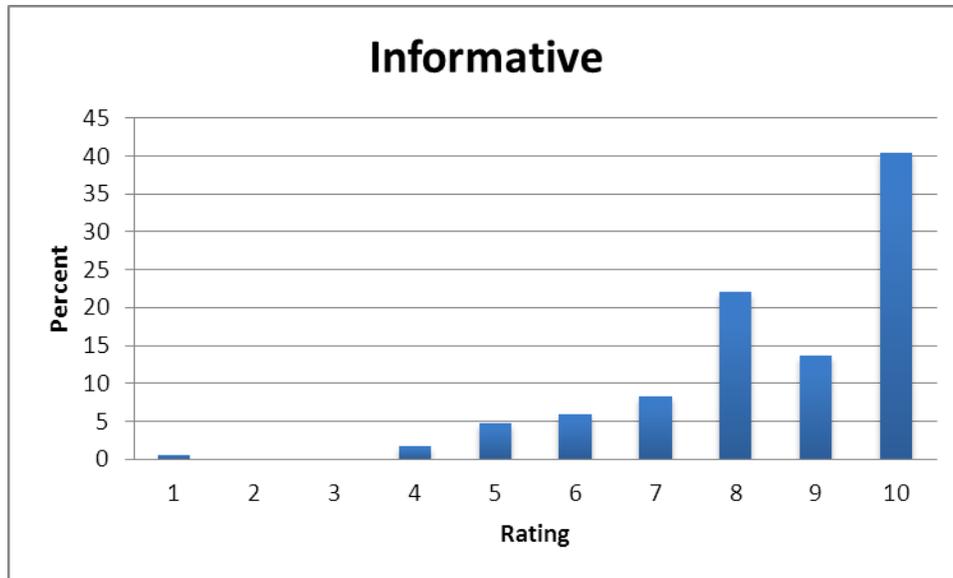


Visitors' overall experience of the OSC

Overall, visitors were very satisfied with their experience with the Ocean Science Center gallery. On a scale of 1 to 10 (1=poor; 10=excellent), 57% rated their overall experience as a 9 or 10. No visitors rated their experience a 2 or lower. Mean rating for overall experience was 8.46 out of 10. When disaggregated by program, the Rising Sea program received a significantly higher rating ( $p = 0.001$ ) for overall experience (mean = 8.89) than Working Waterfront (mean = 7.94). This was the only statistically significant difference between programs.



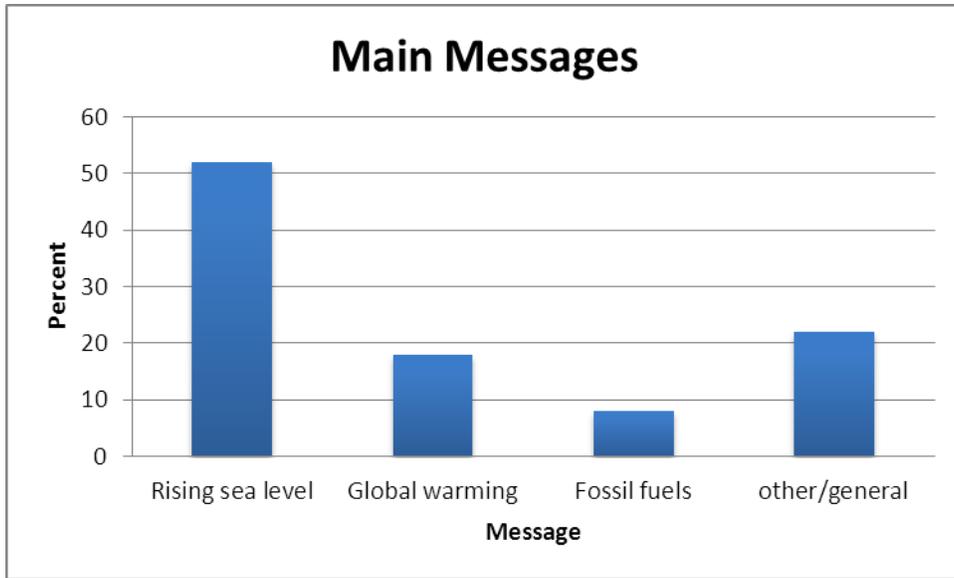
Visitors also felt that the show that they watched was informative giving it a mean rating of 8.3. On a scale of 1 to 10 (1=not at all informative; 10=very informative), 54% rated the show they watched as 9 or 10.



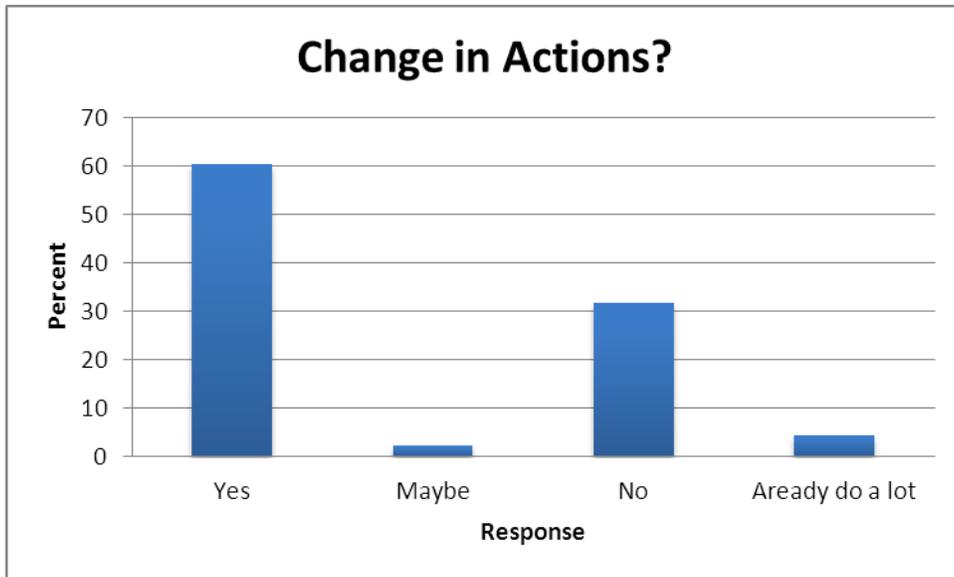
Nearly all respondents (91% Rising Sea, 88% Working Waterfront) were able to articulate at least one of the main messages for the program they saw. Common responses for Working Waterfront focus both on the importance of the port as well as efforts to be more environmentally responsible. Representative responses include:

- How important and efficient sea ports are to our global economy.
- They are doing all they can do to go green
- The importance of the Bay in shipping throughout the world
- How massive the shipping in S.P. Bay and how connects to world and USA.
- Educating the public about the San Pedro Ports and how they're trying to be environmentally friendly.

Most responses from viewers of Rising Sea stated that the main message was sea level rise; other common responses mentioned the effects of global warming on sea level and the need to decrease dependency on fossil fuels. There were a small number of respondents (~2%) who felt the presentation was biased, politically motivated or unfounded. These types of responses are expected for a topic such as Global Climate Change and there is likely little that can be done to change such attitudes during a presentation of this nature.

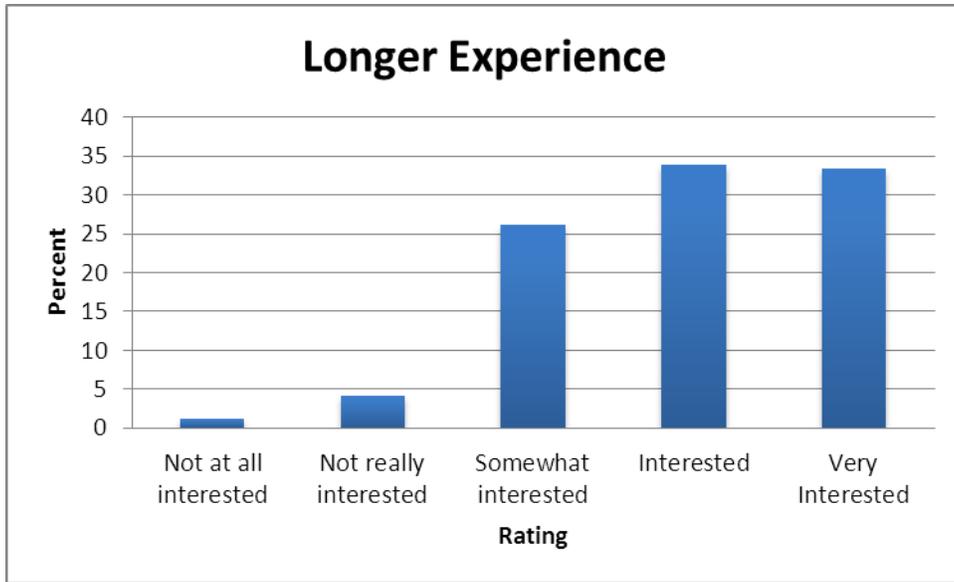


Most of those who viewed Rising Sea (60%) said that what they learned about global climate change would lead to changes in their actions.



Potential changes listed varied greatly however, many mentioned reducing their use of fossil fuels (saving energy at home, walking more, buying a hybrid car) and being more aware of what is going on. Many said that they would learn more about what they could do to help. Future data collection will follow-up with these respondents to see the extent to which they followed through with their ideas.

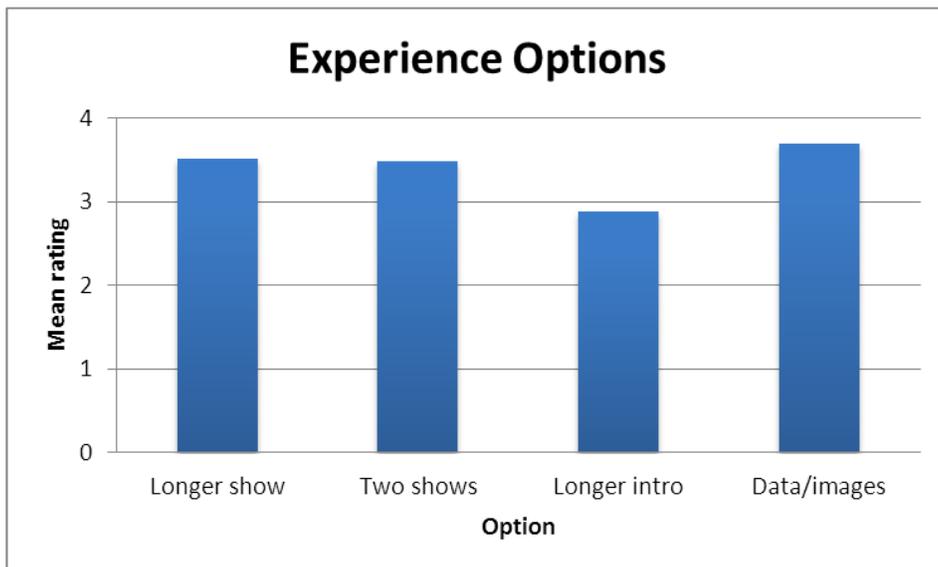
Most of the visitors surveyed are interested in a longer experience. On a scale from 1, Not at all interested to 5, Very Interested; the mean rating was a 3.9 with over two-thirds marking either Interested or Very Interested.



There was however, not clear favorite for how to extend the experience. Visitors were asked to rate on a scale from 1 to 5 (1 – Least favorite; 5 – Most favorite) how they would want to spend additional time in the Ocean Science Center. Their choices were:

- A longer show on a single topic,
- Two shows on different topics,
- A longer introduction to the projector and sphere technology, and
- Opportunities to see global data images projected onto the sphere.

Viewing global data images on the sphere edged out a longer show or two shows. A longer introduction was the only choice with a mean rating under 3; however differences are not statistically different.



## **Conclusions and Next Steps**

Data collected in November 2011 continues to support the conclusion that the Ocean Science Center programs are providing audiences with a positive and educational experience. Although more groups attended the Rising Sea program; it is unclear whether this is a coincidence of timing for groups, or if the Rising Sea program has greater appeal to visitors. If this is a question of interest, data collection in February could examine people's motivation for attending the show that they did. Very high ratings were received for both overall experience and how informative visitors felt the programs were and nearly all respondents were able to articulate at least one of the main messages for the program they saw. In addition, the experience shows the potential to change visitors' behavior after their visit. Most of those who viewed Rising Sea said that what they learned about global climate change would lead to changes in their actions. Follow-up with respondents in February will examine the extent to which people carried out changes they anticipated. Though both shows were rated very high, the overall experience rating for Rising Sea was higher than that of Working Waterfront. Further data collection would help determine whether this pattern holds true for larger numbers of groups; however, it does not seem worth investing resources in delving deeper in to the question of why the difference might occur when the ratings for Working Waterfront are as high as they are.

Most visitors are interested in a longer experience in the Ocean Science Center; however, it is not clear from the data collected what the best approach to extending the experience would be. It is recommended that this item on the survey be modified slightly for February data collection in an effort to better understand visitor preferences for longer experiences.

## Appendix E

**Aquarium of the Pacific**  
*Ocean Science Center*  
Summary Evaluation Report  
Prepared by the Research Group at Lawrence Hall of Science  
April 2012

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### **Background**

The Aquarium of the Pacific (AoP) in Long Beach, California, contracted with the Research Group at Lawrence Hall of Science to conduct an evaluation of their new Ocean Science Center (OSC). The OSC was designed to house a room-sized global display system designed and distributed by the National Oceanographic and Atmospheric Administration called *Science on a Sphere* (SOS), upon which public science centers can project a range of shows and interactive data about Earth system science. At this time, there are two shows being displayed on the SOS at AoP: *A Working Waterfront: Seaports of San Pedro Bay* and *Rising Sea*.

This report documents the results of the second round of data collection for the Ocean Science Center. Paper surveys were administered to guests in the OSC gallery February 17 – 19, 2012. The purpose of this particular evaluation task was to continue to gather data about visitors' overall experience in the OSC, the extent to which they are provided with an educational experience, and ways in which they anticipate changing their behavior as a result of the experience. The February surveys included a question that was not on the November surveys regarding why visitors chose the particular show that they watched.

It is important to note that the evaluation of this project encompasses a range of tasks and efforts; this particular task and report on findings is one “snapshot” that will be integrated into the larger context of the evaluation as a whole.

### **Methodology**

On the data collection days, visitors were told that an evaluation was taking place and notified that they would be asked to complete a survey upon exiting the gallery. Evaluators positioned themselves outside the exit from the OSC gallery with paper surveys to be completed. Completing the survey was voluntary; 166 groups (approximately 75% of groups solicited) completed surveys.

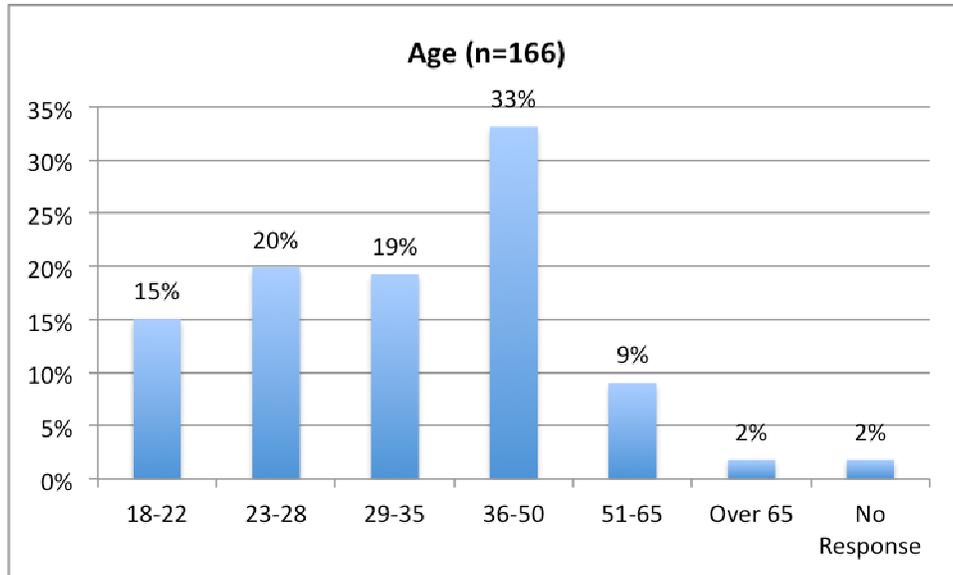
### **Summary of Survey Findings**

The survey asked questions in four areas: 1) about the visitors' demographic background and group makeup; 2) about the visitors' overall experience of the OSC and the shows; 3)

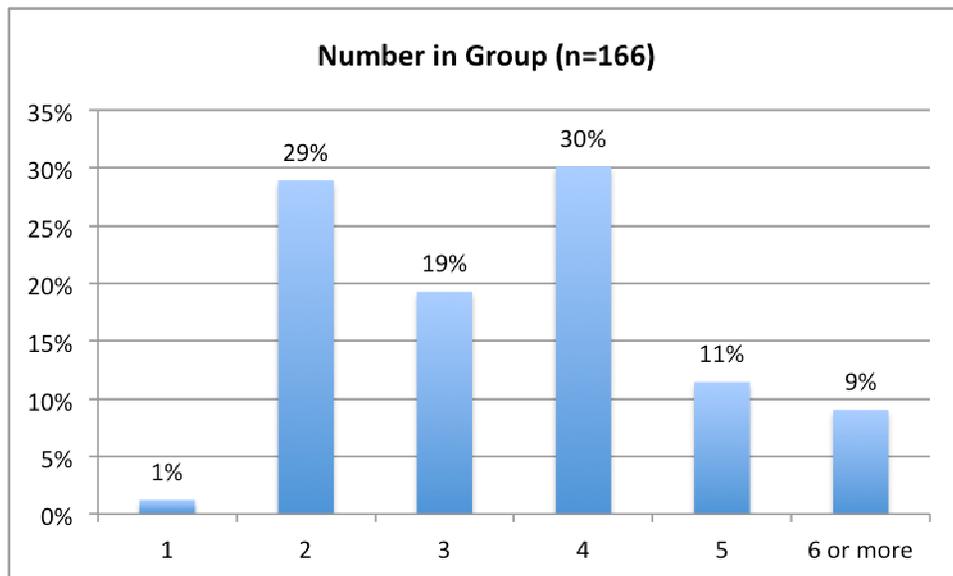
about why they chose the particular show that they watched; and 4) about potential changes to their actions as a result of what they learned about Climate Change.

The visitors' demographic background and group makeup

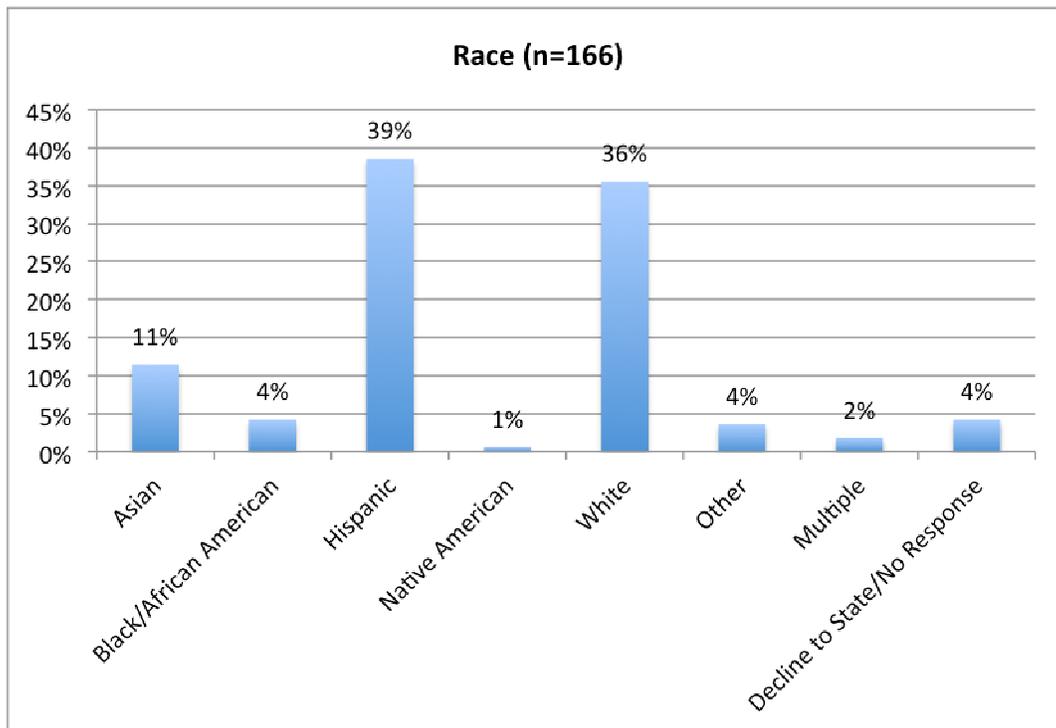
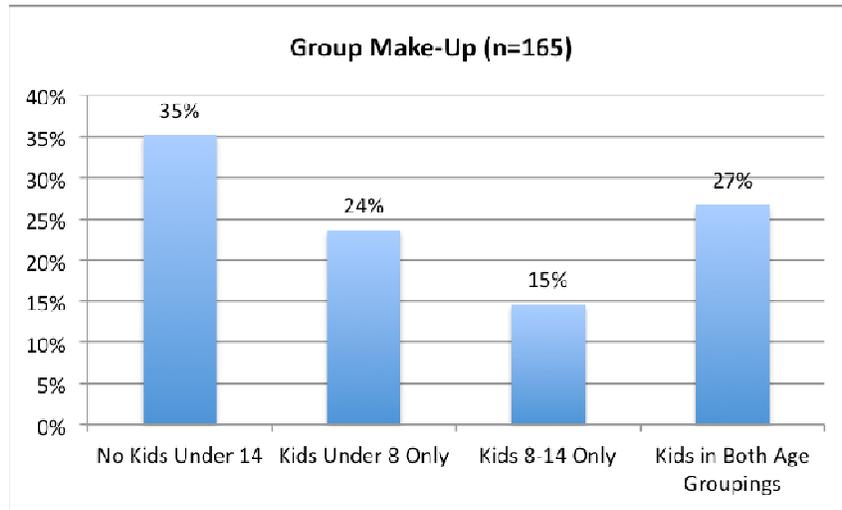
Respondents to the survey were slightly more likely to be female (58%) than male (42%). (One respondent did not indicate their gender.) Of those who provided an age, the largest group fell into the category of 36 to 50 years old. The least represented group was the over 65 category.



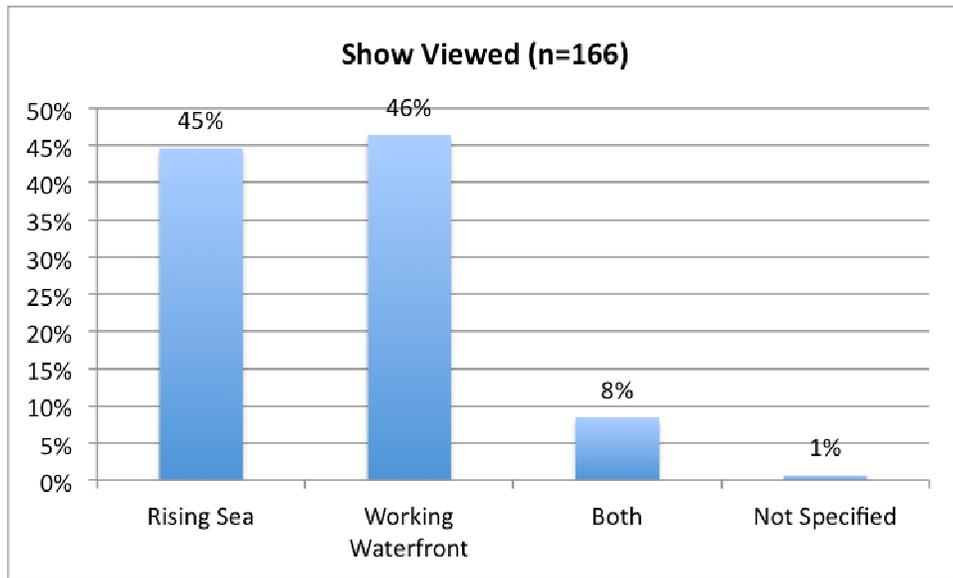
Groups ranged in size from 1 to over six people. Most visitors came in groups of 2 to 4.



Two-thirds (66%) of groups that completed the survey included children under 14 years of age. Most groups included young kids under the age of 8. Twenty-four percent (24%) of groups only had children under the age of 8, while an additional 27% had young children as well as older children (between the ages of 8-14), for a total of 51% of groups including children under the age of 8.



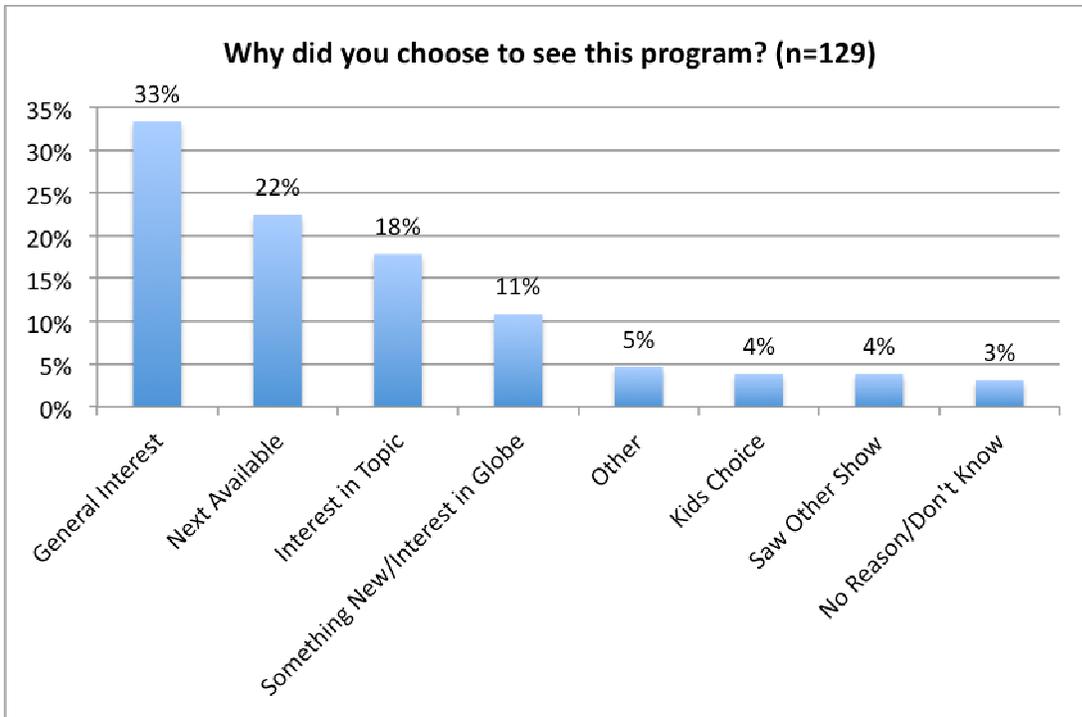
Surveys were collected from 11 *Rising Sea* shows and 12 *Working Waterfront* shows. An almost equal number of surveys were collected from visitors who attended the *Rising Sea* program (45%) and the *Working Waterfront* program (46%); 8% attended both the *Rising Sea* and *Working Waterfront* programs.



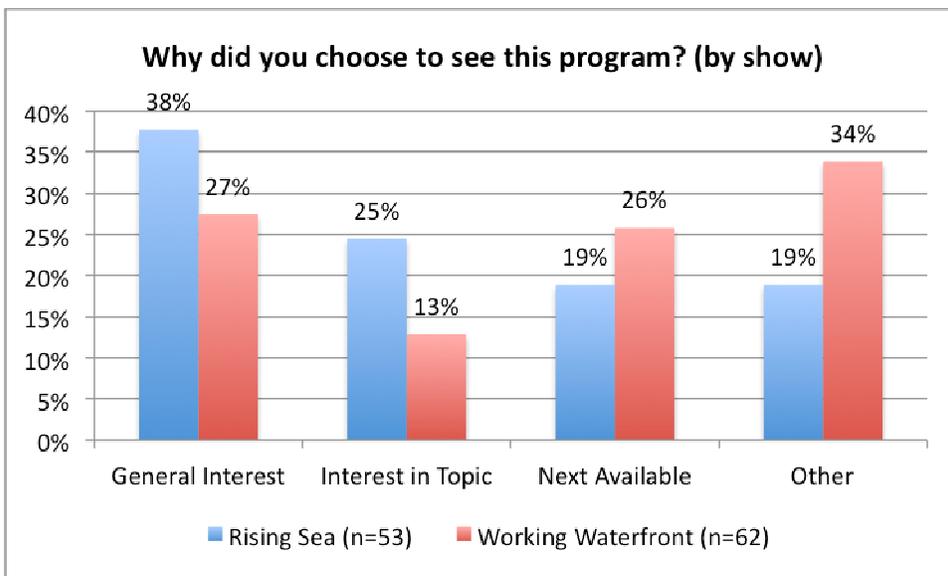
Visitors cited a variety of reasons for why they chose to see the program. The most common response (33%) was to say they were generally interested or curious, but visitors in this category did not specify what specifically they were interested in. An additional 18% mentioned that they were specifically interested in the content of the show. For example:

- “More interested in natural history than commerce.” (*Rising Sea* respondent)
- “For my 7 year old, he needs to be aware of our climate change.” (*Rising Sea* respondent)
- “Because we live in San Pedro and were interested.” (*Working Waterfront* respondent)
- “Curious about the shipping system in Long Beach.” (*Working Waterfront* respondent)

Twenty-two percent (22%) of visitors said they watched the show that just happened to be on when they came by. Smaller percentages of visitors indicated that they wanted to take advantage of this new experience at the aquarium or were generally interested in the globe, their kids made the choice, they had already seen the other show, or they didn’t know why they chose the particular show.

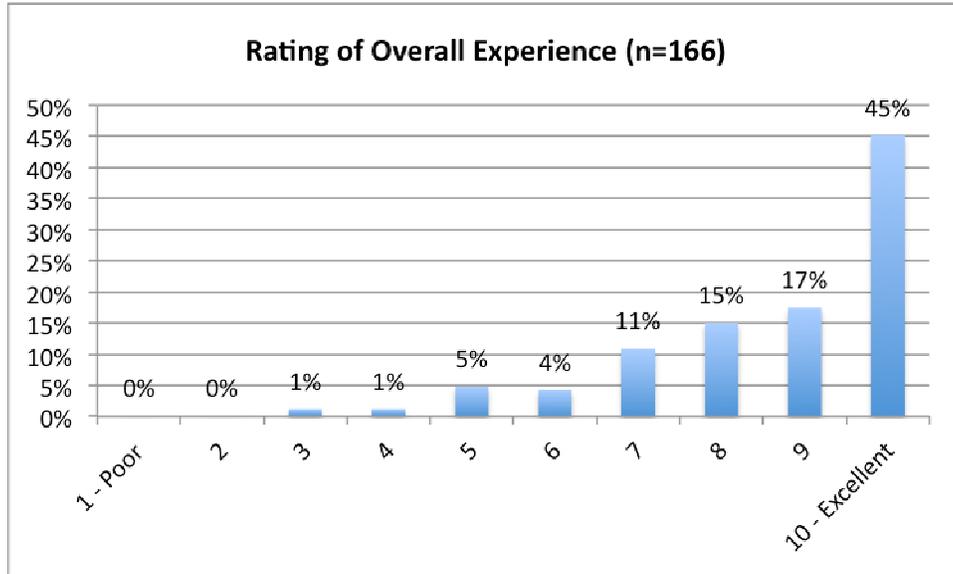


There were some interesting differences in the reasons why visitors chose to see the show they did when the answers are examined by show. Visitors who watched *Rising Sea* were more likely to say that they watched it because of general interest or interest in the specific topic, whereas visitors who watched *Working Waterfront* were more likely to say it was the next available show or to indicate other reasons for selecting it (e.g. no particular reason, kids' choice, saw other show, etc.)

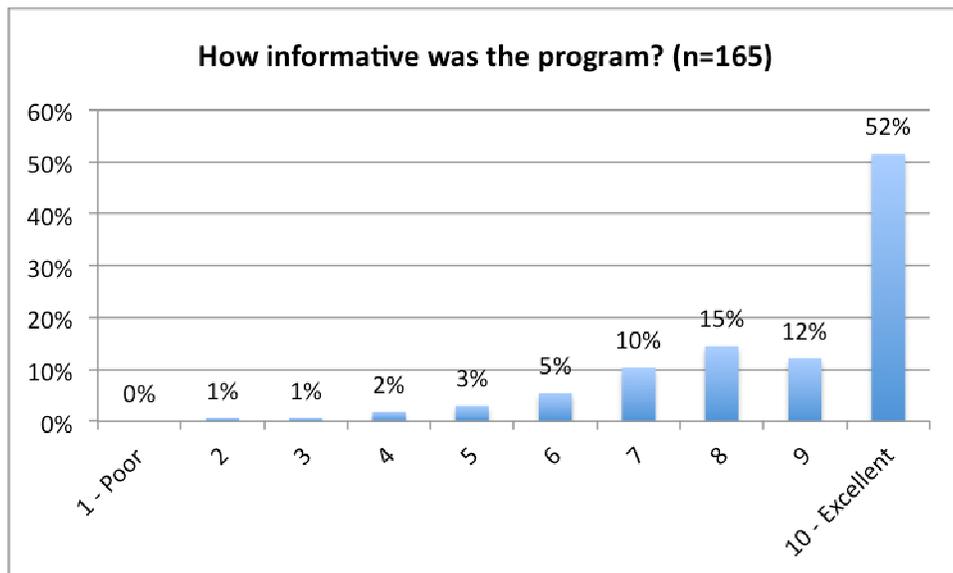


## The visitors' overall experience of the OSC

Overall, visitors were very satisfied with their experience with the Ocean Science Center gallery. On a scale of 1 to 10 (1=poor; 10=excellent), 62% rated their overall experience as a 9 or 10. No visitors rated their experience a 2 or lower. The mean rating for overall experience was 8.63 out of 10. When disaggregated by program, the *Rising Sea* program received a slightly higher rating for overall experience (mean = 8.77) than *Working Waterfront* (mean = 8.39), however this difference was not significant.



Visitors also felt that the show that they watched was informative, giving it a mean rating of 8.71. On a scale of 1 to 10 (1=not at all informative; 10=very informative), 64% rated the show they watched as 9 or 10. There was virtually no difference in the mean ratings of the two shows.

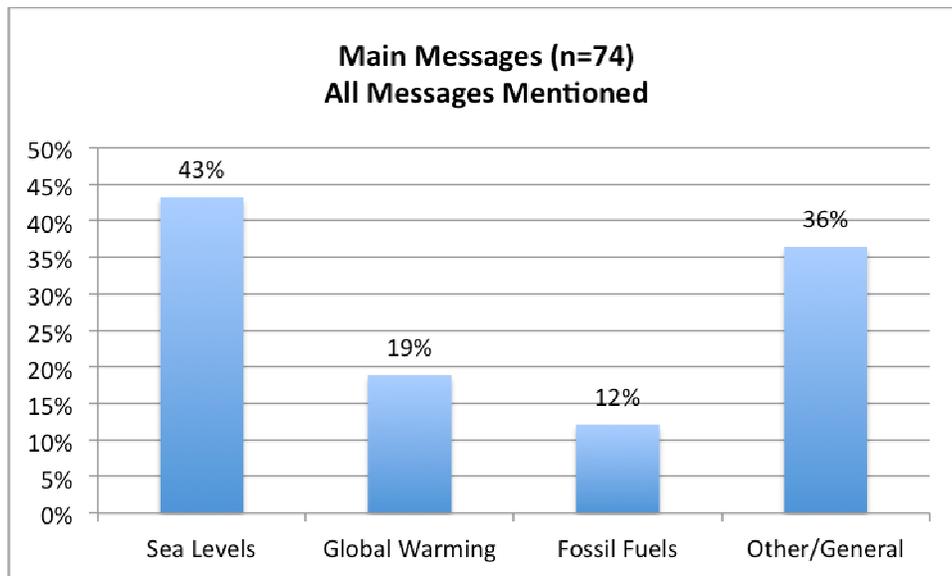


### Understanding of educational content

Most respondents (80% of respondents who saw *Rising Sea*, 66% of respondents who saw *Working Waterfront*, 100% of respondents who saw both shows) answered the question about the main messages for the program they saw. Common responses for *Working Waterfront* focused both on the importance of the port as well as efforts to be more environmentally responsible. Representative responses include:

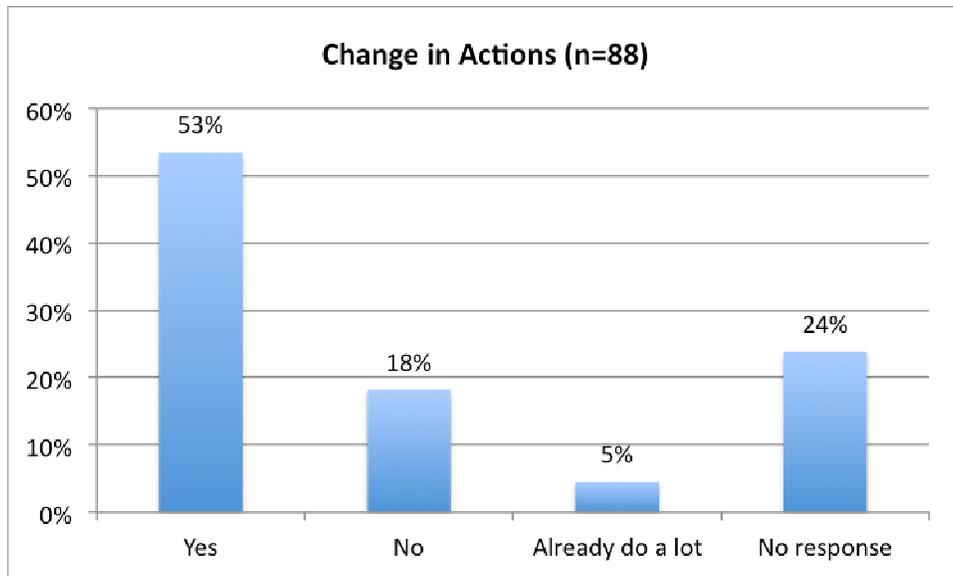
- “Container shipping is efficient. San Pedro Bay is a central shipping facility for the world.”
- “Global impact of the shipping industries. Greener technologies.”
- “How key the San Pedro Bay is for the world and how they are becoming more efficient.”
- “Port of San Pedro ships around the world effectively. Trying to be more green.”

The most common response from viewers of *Rising Sea* was that the main message was sea level rise; other common responses mentioned the effects of global warming on sea level and the need to decrease dependency on fossil fuels. Some visitors also mentioned a more general environmental message, generally indicating that it is important to take care of the earth. Some visitors mentioned more than one main message, so percentages do not total 100%.



### Plans to change behavior

A majority of those who viewed *Rising Sea* (53%) said that what they learned about global climate change would lead to changes in their actions.

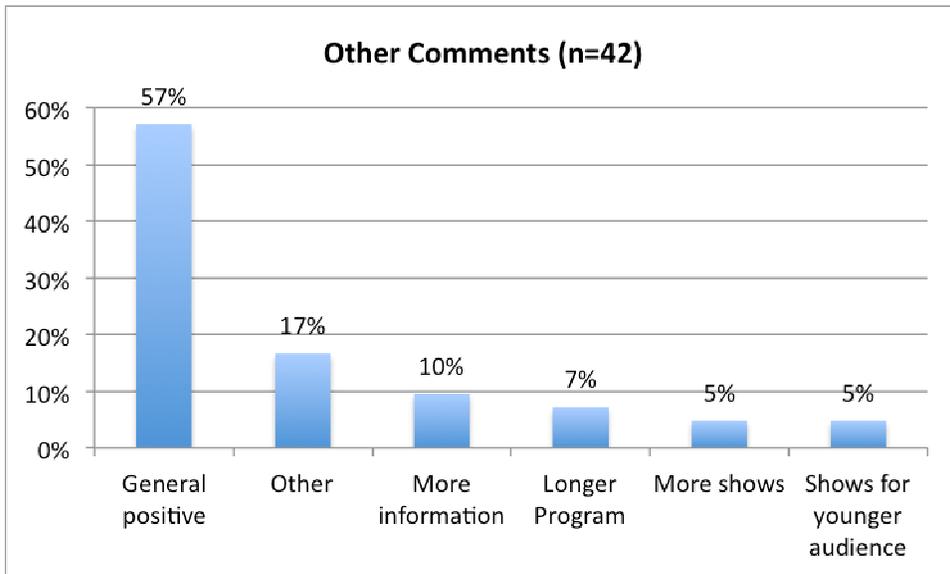


Potential changes listed varied greatly however, many mentioned reducing their use of fossil fuels (recycling, carpooling, driving less, reducing energy use,) and being more aware of what is going on. A small percentage of respondents (6%) indicated that they felt that the program should have included more information on what people can do to make a difference. Future data collection will follow-up with these respondents to see the extent to which they followed through with their ideas.

#### Additional comments

Survey respondents were also given an opportunity to make any additional comments regarding their experience. The majority of comments were generally positive comments (e.g. they enjoyed it, it was a great presentation, they like the globe, etc.) A small number of respondents had suggestion for how to improve the experience, including:

- Making the program longer or inviting visitors to watch both shows.
- Providing more information, particularly about what people can do to help.
- Offering more shows.
- Offering shows for a younger audience.
- “Other” comments, mentioned by 1 or 2 visitors each were related to refreshments, more relevant content for an aquarium, and getting the content out to other audiences.



### Conclusions and Next Steps

As with the data collected in November 2011 this data supports the conclusion that the Ocean Science Center programs are providing audiences with a positive and educational experience. Very high ratings were received for both overall experience and how informative visitors felt the programs were and nearly all respondents were able to articulate at least one of the main messages for the program they saw. In addition, the experience shows the potential to change visitors' behavior after their visit. Most of those who viewed *Rising Sea* said that what they learned about global climate change would lead to changes in their actions. Follow-up with respondents has already been collected from the November visitors and a survey in early May will follow up with February visitors to examine the extent to which people carried out changes they anticipated.

Differences in numbers attending each of the shows was not seen in this data set suggesting that differences in the November data was likely due to collecting surveys from more *Rising Sea* shows than *Working Waterfront*. Most visitors selected the show they were going to watch based on general interest, convenience (they watched the show that just happened to be on when they came by) and to take advantage of this new experience at the aquarium; however, there were differences depending upon which show was being watched. Visitors who watched *Rising Sea* were more likely to say that they watched it because of general interest or interest in the specific topic, whereas visitors who watched *Working Waterfront* were more likely to say it was the next available show or to indicate other reasons for selecting it (e.g. no particular reason, kids' choice, saw other show, etc.)

Summative data collection will begin in July with the release of the third program: *Marine Ecosystems*.

## Appendix F

**Aquarium of the Pacific**  
*Ocean Science Center*  
Evaluation Debrief Report  
Prepared by the Research Group at Lawrence Hall of Science  
July 2012

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### **Background**

The Aquarium of the Pacific (AoP) in Long Beach, California, contracted with the Research Group at Lawrence Hall of Science to conduct an evaluation of their new Ocean Science Center (OSC). The OSC was designed to house a room-sized global display system designed and distributed by the National Oceanographic and Atmospheric Administration called *Science on a Sphere* (SOS), upon which public science centers can project a range of shows and interactive data about Earth system science. At this time, there are three shows being displayed on the SOS at AoP: *A Working Waterfront: Seaports of San Pedro Bay*, *Ocean in Motion* and *Rising Sea*.

This report documents the results of the third round of data collection for the Ocean Science Center. Paper surveys were administered to guests in the OSC gallery June 30 and July 1, 2012. The purpose of this particular evaluation task was to continue to gather data about the visitors' experience in the OSC, including data on the new program, *Ocean in Motion*. The Summer surveys included similar questions to previous surveys; in addition, visitors were asked to rate both educational and entertainment value of the different programs so that comparisons could be made between the various presentation formats, in particular.

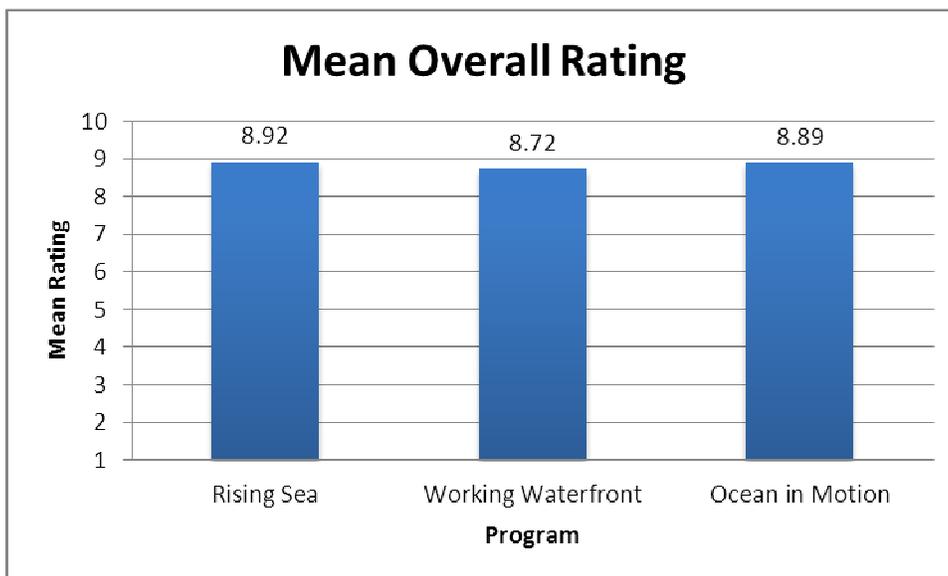
It is important to note that the evaluation of this project encompasses a range of tasks and efforts; this particular task and report on findings is one "snapshot" that will be integrated into the larger context of the evaluation as a whole and focuses primarily on findings comparing the different shows.

### **Methodology**

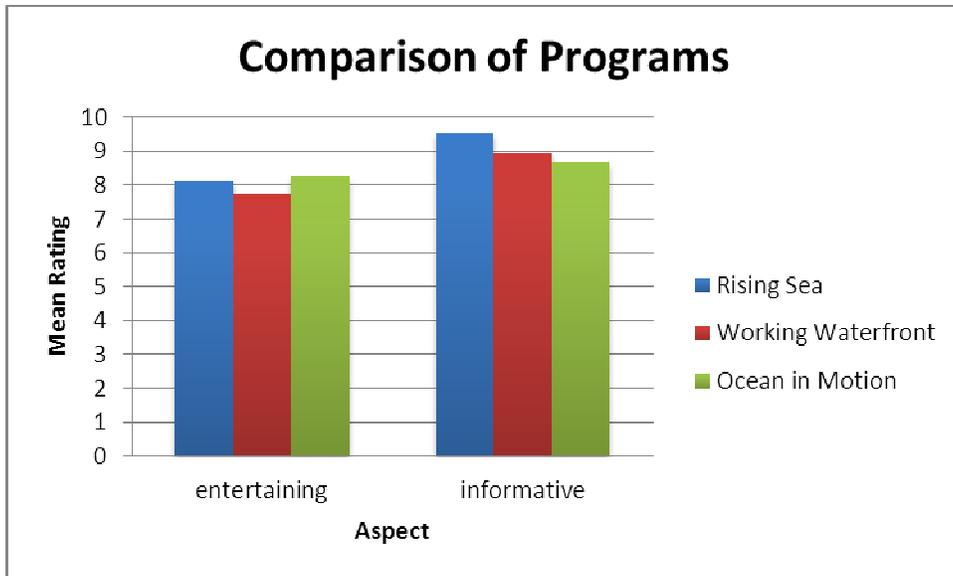
On the data collection days, visitors were told that an evaluation was taking place and notified that they would be asked to complete a survey upon exiting the gallery. Evaluators positioned themselves outside the exit from the OSC gallery with paper surveys to be completed. Completing the survey was voluntary; 186 groups (approximately 66% of groups solicited) completed surveys. Surveys were collected following ten of each of the programs; approximately the same number of surveys were collected for each program (*Rising Sea*: 62; *Working Waterfront*: 61; *Ocean in Motion*: 63).

## Overview of Survey Findings

Overall, visitors were very satisfied with their experience with the Ocean Science Center gallery. On a scale of 1 to 10 (*1=poor; 10=excellent*), the mean rating was 8.84; 65% rated their overall experience as a 9 or 10. No visitors rated their experience a 4 or lower. When disaggregated by program, the *Rising Sea* program received a slightly higher rating for overall experience (mean = 8.92) than *Ocean in Motion* (mean = 8.89) and *Working Waterfront* (mean = 8.72), however these differences were not statistically significant.



In an effort to compare the different presentation formats, visitors asked to rate the programs on how informative and how entertaining they were. Overall, visitors felt that the show that they watched was informative, giving it a mean rating of 9.03 on a scale of 1 to 10, while the mean rating for entertaining was 8.03 out of ten. There was some variation by program on these ratings; *Rising Sea* received the highest informative rating while *Ocean in Motion* received the highest entertaining rating. However, only one difference was statistically significant: *Rising Sea* was rated significantly higher on *informative* than *Working Waterfront* suggesting that although the presentation formats differ, the visitor experience is similar across the programs.



Nearly all respondents (98% of respondents who saw *Rising Sea*, 100% of respondents who saw *Working Waterfront*, and 96% of respondents who saw *Ocean in Motion*) were able to identify the main messages for the program they saw.

### Conclusions and Next Steps

Although the three programs presented in the Ocean Science Center differ both in content and in presentation format, the visitor experience across the three is very similar. In all cases, the visitors rate the overall experience highly and find the programs both informative and educational.

The data from this round of data collection (including demographic information and observations collected, but not presented in this debrief) will be merged with data collected previously. A single, final report will be presented that provides the combined findings and conclusions.

**Aquarium of the Pacific**  
*Ocean Science Center*  
Summary Evaluation Report  
Prepared by the Research Group at Lawrence Hall of Science  
June 2012

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## **Background**

The Aquarium of the Pacific (AoP) in Long Beach, California, contracted with the Research Group at Lawrence Hall of Science to conduct an evaluation of their new Ocean Science Center (OSC). The OSC was designed to house a room-sized global display system designed and distributed by the National Oceanographic and Atmospheric Administration called *Science on a Sphere* (SOS), upon which public science centers can project a range of shows and interactive data about Earth system science. At this time, there are two shows being displayed on the SOS at AoP: *A Working Waterfront: Seaports of San Pedro Bay* and *Rising Sea*.

This report documents the results of follow up surveys administered to guests who visited the OSC on data collection days in November 2011 and February 2012. On-line surveys were administered to guests who provided contact information on their original survey. The survey was administered approximately three months following their visit. The purpose of this particular evaluation task was to gather data about what they remember from their visit to the OSC, to what extent they have shared their experience with others and whether they have made changes to their actions after their experience in the OSC.

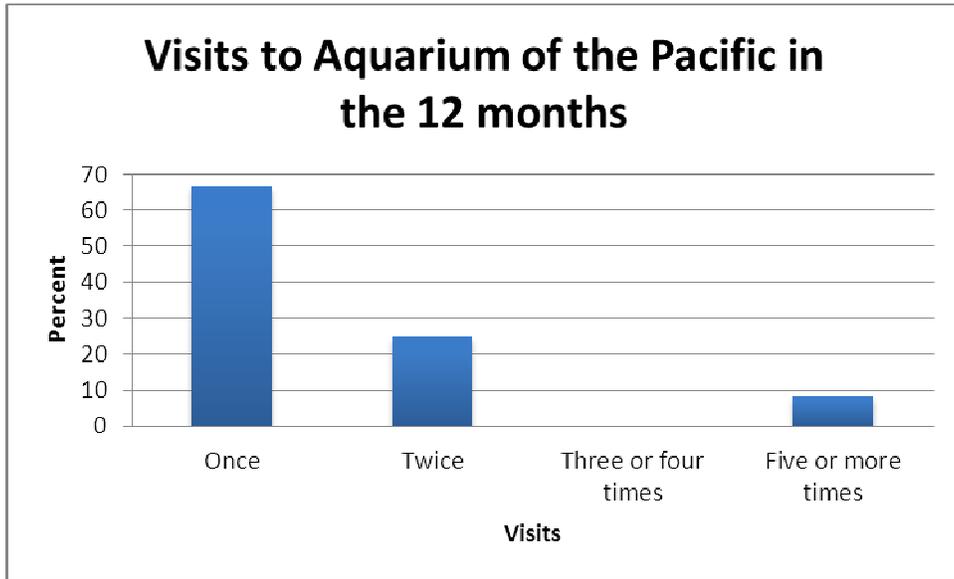
It is important to note that the evaluation of this project encompasses a range of tasks and efforts; this particular task and report on findings is one “snapshot” that will be integrated into the larger context of the evaluation as a whole.

## **Methodology**

An email invitation was sent to ninety-one previous survey respondents who provided contact information. Completing the survey was voluntary; an incentive of entry into a raffle for a \$100.00 Amazon.com gift card was provided. Approximately 40% of those solicited (36) completed surveys.

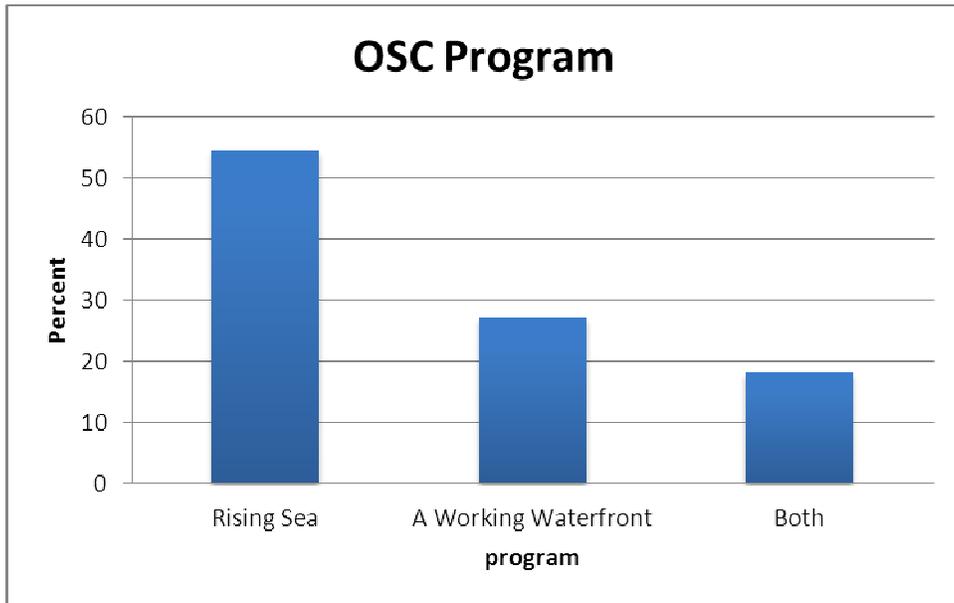
## **Summary of Survey Data**

All of the respondents remember visiting the Aquarium during the data collection periods. For most, that was their only visit the last year.



Respondents reported a variety of “most memorable” experiences from their trip. Some (25%) noted specific events such as the divers in the Great Hall display or the behind the scenes tour; others (42%) noted live animals (sharks, sea lions, lorikeets) or an exhibition (Tropical Pacific, Shark Lagoon). Four respondents mentioned the Aquarium’s environmental messages and work, three said “everything” and two said the *Rising Sea* movie.

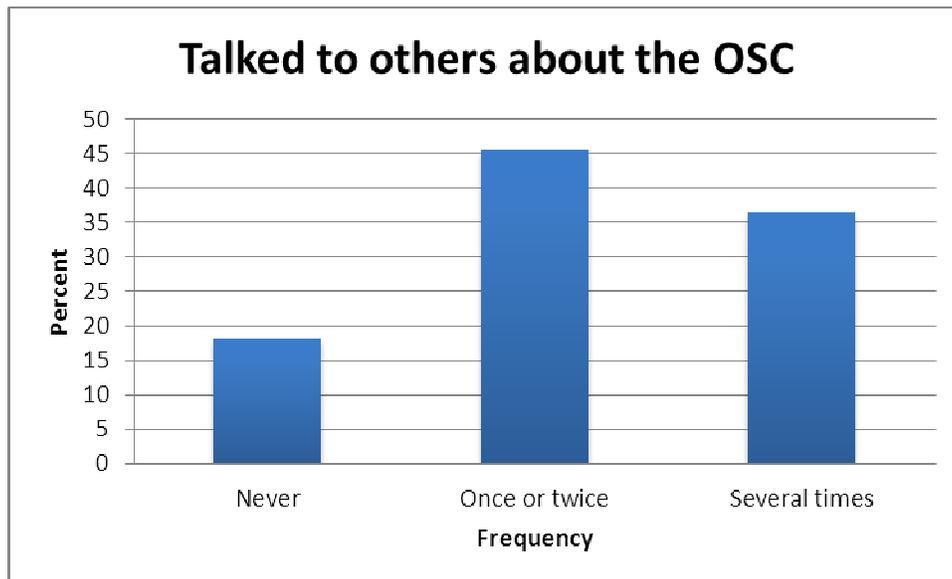
Just over half of those who responded (55%) saw the *Rising Sea* program; just under 20% saw both programs.



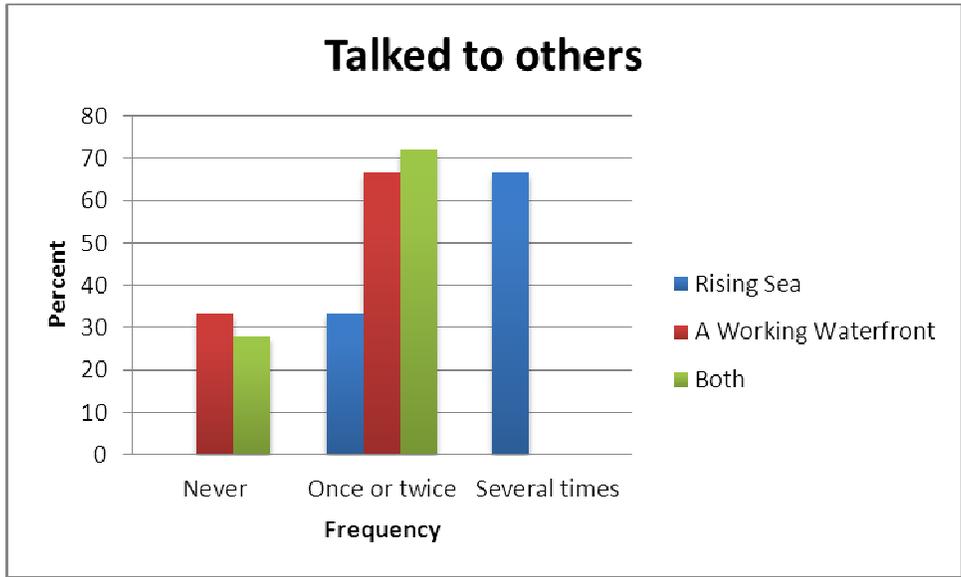
Nearly all (75%) accurately identified the main message of the program they saw. Some were quite detailed as can be seen in examples below from *Rising Sea* viewers.

- *Global warming has great negative implications for the future and humans need to modify their behavior to help minimize their negative effects on the environment.*
- *How global warming is leading to the rising sea levels and endangering lives.*
- *The human race has to work as one unit to preserve the fragile earth we all call home.*
- *Man has to watch what he is doing to the environment or suffer the consequences*
- *The way the earth is being treated is leading to melting ice and making the water rise and destroys coastal communities across the planet.*
- *To try to help keep pollution down in order that the greenhouse effect doesn't get worse.*

Over 80% of respondents stated that they had thought or talked to others about the program, or their experience in the Ocean Science Center since their visit; many of these had done so several times.

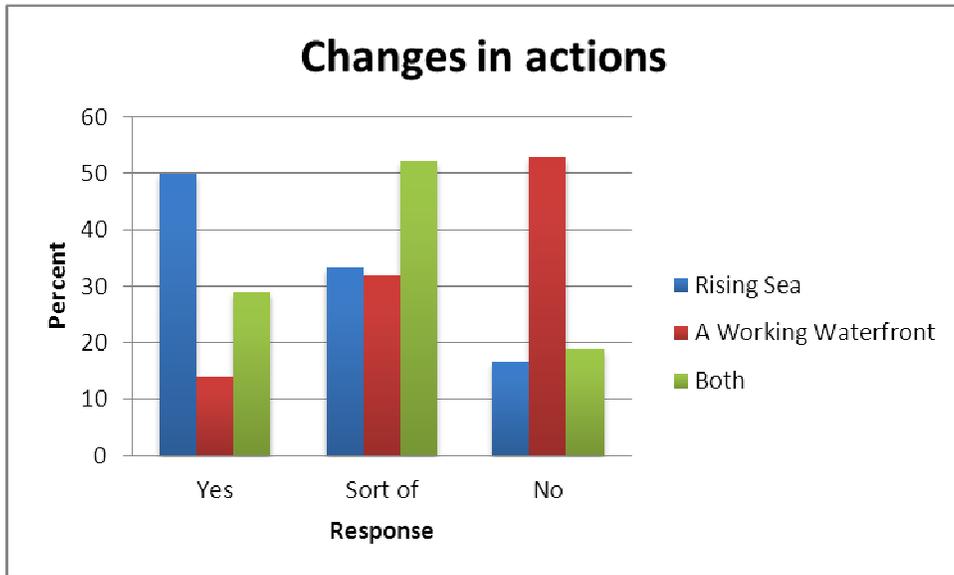
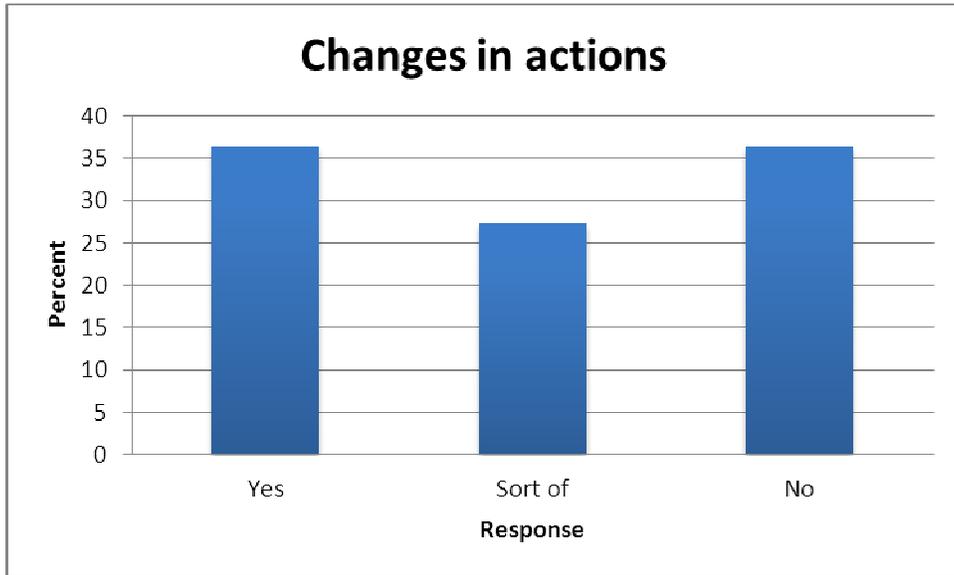


Some reported speaking generally about the program making comments such as “*We talked about how necessary it is for more people to see videos like the one presented at the aquarium*” or discussing with family how informative and fun the experience was. Others noted talking about specific content (particularly with their children), or discussed how they could “do their part” to help the planet and oceans. The percentage of respondents who reported that they had talked to others differed depending upon the show they saw. Overall, more of those who saw *Rising Sea* reported talking to others and did so more frequently than those who saw *Working Waterfront*.



Similarly, about 80% said that they had shared something about the program with friends or family. Examples of what they shared include: how they can work to minimize the effects of sea level rise - reduce energy use, recycling, reducing waste, carpooling, etc. (43%), recommendations to go see the show (33%), and their enjoyment of the globe (22%).

When asked if the information presented in the program lead to any changes in their actions as a result of what they learned about global climate change, respondents split nearly equally across the three responses of *Yes*, *Sort of* and *No*. Not surprisingly, a greater percentage of those who saw *Rising Sea*, or both programs reported that what they learned would impact their actions. Further, of the six who saw *Rising Sea* and said *No* to this question, four of them elaborated saying that they already do all they can to reduce their impact on global warming. When asked in what ways they were changing their actions, those who said *Yes* gave examples such as: increasing their composting, recycling, carpooling, buying organic and local produce, walking/public transit where possible instead of using the car and cutting back on power usage at the house. Comments from those who said *Sort of* were of two types: first, those who felt that their awareness has been raised and had good intentions, but had not yet made significant changes, or second, those who already did a lot and were now trying to find new ways of helping.



## Conclusions

Data from the follow up surveys indicate several very positive conclusions. First, the information presented in the Ocean science Center programs is memorable and retained by viewers. Guests who visited the Ocean Science Center remember their experience and can provide a detailed description of the main messages even three months after their visit. Second, the topics presented encourage discourse with others. Most guests talked about their experience with others; reiterating messages to their children, encouraging others to see the programming or discussing implications of the topic. Finally, Ocean Science Center programs, specifically *Rising Sea*, impacts guests' actions after they leave the Aquarium. Information provided in the program regarding global climate change inspired many to make more of an effort to reduce their carbon footprint and be more environmentally responsible.