

Trends in Zoo and Aquarium Exhibit Interpretation

Oregon Coast Aquarium
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Terry O'Connor Consulting
Linking conservation and education



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Executive Summary

In 2009, the Oregon Coast Aquarium hired Terry O'Connor Consulting to assess exhibit interpretive trends at AZA zoos and aquariums. During November, phone interviews were conducted with AZA zoo and aquarium education directors, exhibit directors, and graphic designers as well as with consultants who work with aquariums and zoos on exhibit design, interpretation and evaluation. A total of 30 institutions and businesses participated.

The interviews gathered information on how the approach to exhibit interpretation has changed, the current major trends, and how influences outside our industry (such as museums, cultural attractions, and the Internet) affect aquariums' and zoos' approaches to messages and to design of exhibit graphics. Those interviewed were asked about current trends in exhibit topics and interpretive messages. We also asked whether the ability to replace graphics more inexpensively influences whether aquariums and zoos prototype graphics, and what kinds of sign material are preferred. Finally, we asked our colleagues what they are keeping their eyes on now – what they believe are future trends in aquarium and zoo interpretation.

Current Trends include a focus on multiple audiences, cultural interpretation, the use of storytelling as a technique, and having exhibits staffed with interpreters. Aquarium and zoo exhibits are becoming much more interactive, using hands-on experiences and animal encounters. We are shifting to a more issues-based approach to content and are discussing conservation at the ecosystem level. Aquariums and zoos are interpreting conservation success stories and promoting specific conservation actions, recognizing that audiences look to us for this leadership. The use of technology is evolving to include touch screens, cell phone tours and apps.

External Influences: Our use of interactives and growing reliance on evaluation is influenced by museums. Media, marketing and the Internet shape the way people receive information and therefore influence exhibit interpretation. Competition from entertainment sources also influences experiences we provide. Technological advances enable our use of computer games, interactive exhibits, and social networking.

Future Trends: Our colleagues are excited about the use of audio and video components using hand-held devices and phone apps in order to provide timely information. Zoos and aquariums need to be experiential and engaging, which will include more interaction with animals and staff, and involving visitors in citizen science and conservation action. Learning how to make technology family-friendly and getting people to engage in dialogue with each other are our current challenges.

Introduction

In November of 2009, the Oregon Coast Aquarium initiated a project to replace its exterior exhibit graphics. The Aquarium contracted with Terry O'Connor Consulting to facilitate an interpretive planning workshop prior to writing the exhibit graphics text. In preparation for this work, Aquarium Director of Public Programs Kerry Carlin-Morgan wanted to assess exhibit interpretive trends at AZA zoos and aquariums.

Terry O'Connor developed a series of questions and sent them via email to aquarium and zoo professionals and consultants, requesting a phone interview. In November 2009, phone interviews were conducted with 30 education directors, exhibit directors, and graphic designers at AZA institutions, and written responses to the questions were received from an additional three staff. Two consultants who work with zoos and aquariums on exhibit design, interpretation and evaluation also participated in phone interviews and a third added to the discussion. In total, responses were received from 36 colleagues, representing 27 AZA zoos and aquariums and three interpretive consulting businesses. A brief report of the results was presented to the Oregon Coast Aquarium in December 2009. Results of these interviews are summarized in this report.

Changes in the Approach to Zoo and Aquarium Exhibit Interpretation

All professionals interviewed indicated that in their experience (which varied in length), there have been several changes in the approach taken to aquarium and zoo exhibit interpretation:

Process

Interpretation is now incorporated in the exhibit design process—not added afterward. Creating graphics has shifted from animal managers to those in education or communications who have expertise on how people learn and are familiar with different learning styles. Zoos and aquariums may work with outside experts to do interpretive planning and design.

Content and Experience

- **Planning:** Exhibit interpretation is more goal and message driven, rather than just basic facts. Clear objectives are used, identifying the target audience and what we want them to take away from exhibits. A lot of work goes into defining outcomes, and interpretation goes beyond cognitive into affective and behavioral outcomes.
- **Focus on Learning and Experience:** There is more thought given to research and trends on how people learn in informal settings, from the work of John Falk and Lynn Dierking. We now write from the point of view of how visitors want to receive information. Connecting to people's emotions is just as important as connecting to their intellect. This is starting to shift the emphasis of interpretation from what an object *is* to its meaning. We are experiential, and provide visitors with interactive animal experiences.
- **Interpretive Content:** We have begun to shift from animals and habitat concepts to a more issues-based approach to content. We are looking at ecosystem conservation—exhibits are moving away from lions of Africa to interpreting instead how the Serengeti is endangered. The use of thematic cultural graphics and using culture with animals is a conservation story. We are using people stories and using the voice of local people. Celebrations of life and stories of hope and success are more effective approaches to changing behavior and inspiring conservation leadership. Accentuate the positive: together we can make a difference.

- **Conservation Action:** We are changing the way we think of ourselves as organizations. People are interested to know how they can change their behavior. They *do* want to know that from the zoo and we are seen as an authority on environmental issues other than wildlife. This suggests that we can push a little harder on action.
- **Staff and Volunteer Involvement:** We rely more on volunteers and staff to initiate discussions and answer visitors' questions, rather than putting everything on a sign. Live interpretation at exhibits is expensive and takes energy to maintain. One of the changes we are making and should be doing is getting the experts to stop hiding behind walls.
- **Evaluation:** Audience research at exhibits has helped educators understand the importance of reaching their target audience, attracting them and, once there, holding them for a short time. We have learned to use evaluation as a tool; however, it is not useful unless it is applied.

Audience

We now incorporate messaging for more than one audience and are using bilingual or multilingual interpretation.

Format of Interpretive Graphics

- **Text Length:** We have shifted from text-heavy graphics to creating an engaging interpretive experience. There is a tendency toward less copy, except for additional copy on touch screens. We try to do less, better, and focus on what is *most* important for visitors to know.
- **Creating more Readable Graphics:** Derived from the work of Beverly Serrell and Judy Rand: the trend is to use less text. Larger point size makes a sign more readable. Use catchy headlines. We learned from evaluation that people look at the headline and make a decision quickly about whether to make an investment of time. Chunk up the copy in investment levels—use a headline and an engaging picture. Layering your messages within graphics is a technique to capture readers' attention. Repeat visitors can discover something new each visit.
- **Visual Appeal:** While graphics were once meant to blend in with the surroundings, now we use color and large color images. The visual should support the concept. The graphic should cause you to look back at the animals. In years past, all graphics

looked the same at the institution. Now we change the theme and the look from exhibit to exhibit. Colors, design and fabrics are themed to indicate different geographic areas and different biomes.

- **Materials:** We used to use indestructible porcelain enamel because it would last. However, it is hard to make the case for updating a graphic when it is in good shape. We are now using less expensive materials that do not last as long and are replacing them more frequently to update content.

Use of Interactives

Exhibit interpretation formerly consisted of a majority of signs; now, more interactive elements are used. These illustrate the concept without using much text and provide another way to engage people who do not read. We are now using more experience-based interactives, rather than high-end elements. Some of those interviewed discussed the difficulty of using interactives/technology that cannot withstand use by the volume of people visiting aquariums and zoos, especially by kids running by and slamming the button. Maintenance remains a concern. There has also been a shift from single-user interactives to a greater use of those that can engage the whole family.

Technology/Media

The advent of electronics was a big change in exhibit interpretation. There is more use of video; however, we now acknowledge that it is unlikely that visitors will stop to watch a 10-minute video program. Breaking it up into shorter segments, and posting a sign indicating that the video is one minute in length enables visitors to know what their investment in time will be. We have also shifted to using other kinds of media, including more digital display. The use of web sites as an interpretive tool was an innovation. More recently, computer games, cell phone audio tours and apps are changing exhibit interpretation. Many of those interviewed expressed that some technology is more effective than others. While we want to engage the electronically connected visitors, we need to use technology appropriately, and not for its own sake.

Major Trends in Aquarium and Zoo Exhibit Interpretation

Zoo and aquarium professionals, as well as interpretive design consultants, identified the following current trends in aquarium and zoo exhibit interpretation:

Audiences

We are using research studies on how people learn in order to inform development of exhibit interpretation. Multilingual interpretation (via signs, Zoo Key recordings, or cell phone tours) is designed to engage a broader audience. We are producing interpretive packages that target different levels of age and conservation literacy. The focus on early childhood education is also a more recent trend. Rather than having a children's zoo, we need to involve kids at all exhibits. Use play to develop young people's skills and attitudes: cooperative play, imitating, taking care of animals, and empathy. A current discussion is that of engaging families to interact together (especially given the use of technology in exhibits).

Techniques

There is a new emphasis on storytelling as a technique. Exhibits are less about natural history of the animal or habitat, and more about telling stories involving people. In written interpretation, organizations are using fewer informative panels and more interpretive panels that appeal to the emotions as much as the intellect. Use something that makes you break the rhythm of how people visit the institution. We can do this with conservation messaging. Make the exhibits into ads to promote the institution's opinion.

Content

- **Issues:** Using "wow" facts as a better hook is a trend in interpretation. However, aquarium and zoo exhibits are now more focused on interpreting issues. The message should move visitors to having a new perspective of the world.
- **Cultural Interpretation:** There is a continuing trend to include in exhibits more about cultures. For example, Minnesota Zoo put a lot of research into the cultural elements of Russia's Grizzly Coast, which provides the exhibit ambience rather than being specifically discussed. Woodland Park Zoo employs Maasai interpreters at the African Village.

- **Conservation:** Beyond presenting conservation information in our content, aquarium and zoo exhibits are now presenting a conservation “ask.” Conservation voting is used to engage visitors. A newer approach illustrates the institution’s involvement in local conservation. For example, Brevard Zoo restores local oyster beds. The Zoo provides an option for visitors to help at the zoo by making oyster mats. Have an option that visitors can do right there.

Interaction with Staff and Volunteers

- **Interpreters:** While we were once caught up in competing with TV and the Internet (using high-tech interactives), what we have learned is that our strength is the human animal connection. Live interpretation is the best way to reach guests: more staff and volunteers are now involved in exhibit interpretation. Spending huge amounts on expensive graphics may not be getting us closer to our desired goals. People like to talk with people, so put some of those graphics dollars into a trained interpretive staff who can present an actionable, relevant message. Vancouver Aquarium is training volunteers to talk effectively about issues and concepts, and is planning to give volunteers tools such as iPod with video on demand.
- **Animal Encounters:** Interpretation is much more than the graphics—these concepts should become more holistic and extend to keeper presentations. The trend toward providing visitor experiences is growing. As examples, the Florida Aquarium offers more animal interactions than ever before, as part of the visitor experience as well as in fee-based programs. Enabling visitors to observe animal training and keepers interacting with animals is a growing trend. Minnesota Zoo interrupted the feel of immersion to introduce visitors to keepers interacting with bears. San Diego Zoo has added a training wall and a mesh screen so that keepers can do behavior training with the polar bear, and all the care for elephants has been brought up front. At Jacksonville Zoo, guests can observe gorilla training, and get a better appreciation of what keepers do and what goes into maintaining an exotic animal.

Format and Placement

- **Diversity of Approaches:** Using a diversity of approaches, including signage, throughout the facility targets different learning styles and thus reaches a greater audience. “Brand” different areas of the zoo with a different look and feel.

- **Color and Text:** Graphic panels are very visual and colorful now — the next generation is used to being stimulated with bright colors. Using fewer signs with shorter blocks of text, pithier content, and more messaging is the trend. Although this is not always followed, we have moved away from big tomes of text and have been able to find different ways of layering content. Signs are written to a very basic reading level. Links may be provided to the Internet or advanced a.v. for more in-depth information.
- **Placement:** Interpretive plans are starting to pay more attention to sign placement in reference to transition zones for guests and their readiness to receive a message. In some instances signs are used to direct attention to the resource by the placement and angle of the sign.

Interactives

The first hurdle is getting people to walk over to the sign, so an interactive serves as an attractor. Having guests participate in the exhibit is becoming a major focus for zoos and aquariums, and these interactive experiences are now part of interpretive plans. Three-dimensional objects are used throughout exhibits to engage visitors of all ages, including hands-on objects, props, and whole body experiences. Yet, there is some concern that while zoos and aquariums are using a lot more interactives, they are not necessarily better interactives. For example, lift flaps can be overdone, too.

Technology

There is a greater trend toward using media in exhibits; we are still learning about how to use it effectively. Technology can be engaging, and is a valuable way of doing that without multiple signs. It is important to start with the message and then use the best media to convey that message. Technology needs to be incorporated more and more as this is how people are interacting with their world and accessing information.

- **Evolution of Technology Use:** While video is frequently used, research at the Columbus Zoo demonstrated that the most popular segments were those that about the zoo's conservation story and/or showed behind-the-scenes animal care. Visitors did not watch National Geographic Society videos. When technology was first debuted, some believe aquariums and zoos went overboard with its use. But our challenge is that now the novelty has worn off for people who have computers, iPods and wii in their homes. People's free time is valuable—we need to do something that they cannot get on line. We should be experiential, interactive and engaging.

- **Newer Uses:** Touch screens are effective for multiple species ID, such as those used in Amazon Rising at Shedd Aquarium. Aquariums and zoos are experimenting with interesting apps. Using cell phone tours is a new trend. Jacksonville Zoo uses a feedback line to enable the zoo to listen to what the guests have to say. Text messaging options are also new. If someone calls in an elephant question, that number gets a text message announcing the time of the next elephant talk. Radio telemetry equipment is also being used along with GPS technology. Two of those interviewed commented on the amazing new technology of the animated “Turtle Talk with Crush” show at Disney’s Epcot Center’s Living Seas, which incorporates live audience interaction with the character.
- **New Challenges:** The newest challenge is learning how to make technology family and group friendly, and to get people talking to each other. We need to continue to find ways to use technology as a tool to benefit conservation and interpretation.

Extending the Experience

Aquariums and zoos are using Web-based connections and social media to extend the message beyond the exhibit experience and to stay connected with people after they leave the institution.

External Influences on Zoo and Aquarium Interpretation

Those interviewed were asked to comment on how influences outside our industry (such as museums, cultural attractions, and the Internet) affect aquariums' and zoos' approaches to messages and to design of graphics. Their responses are summarized as follows:

Norms and Perception

We realized that environmentalism has shifted more toward the center, and therefore it is more accepted to talk about climate change. As we recognize where our audiences are we allow ourselves to go there. Zoos and aquariums are now seen as conservation centers and our audiences are looking to us as conservation messengers. We are now being viewed as equal conservation partners by government agencies and universities.

Museum Influence

- **Interactives:** Without the live animals of aquarium and zoo collections, museums need more interactives to captivate visitors. Aquariums and zoos need to be careful not to use these as distractions: we want to enrich visitor experience—not take away from it. Zoos are emulating science centers and science centers want to emulate zoos. People come to zoos and aquariums to see animals; the signs and interactives are secondary.
- **Evaluation** is one area in which zoos and aquariums are influenced by museums. Grants help to drive this. Museums have to struggle more so they do more evaluation. As grant dollars are more competitive and funders demand evaluation, zoos and aquariums have to play catch up. We have a long way to go, especially in dedicating dollars for evaluation.
- **Authentic Experience and Stories:** Zoos are influenced by museums in using authentic experience. We now interpret the stories of real people, and show real artifacts and biofacts. Museums are effectively involving visitors in a story. The Spy Museum is very story-oriented and experiential. This is a trend we should look at and we should be doing more storytelling and experiential exhibits.

Media and Marketing

There is a lot of nature- and environmental-based programming on TV—it is trendy to be green. Interpreters and designers need to be in tune with marketing trends in order to have a good idea for what visitors will read or not read. TV commercials, songs, cultural references in movies all influence what we do. Design is very important in terms of getting a message across since there is so much information bombarding us all. Color and design are important to convey mood and draw attention to text. The shape of a sign can even help tell a story. In-your-face advertising is also influencing zoos and aquariums. We still want to stand apart, but we need to find a balance—we are a refuge from this ad blast. We look at what trends are in the forefront of society, how product marketing strategies are influencing supply and demand, and then using appropriate techniques to connect with people in similar ways. Our greatest impact is clearly on the Internet these days. Websites with animal information reach a larger audience.

Experiences and Entertainment

We are influenced by competition from amusement, which equals revenue. As examples, we may include a 4-D theater and climbing course that are not connected to the messages in our exhibits. We have to be much more interactive, using interactive elements and live animal interpretation. The experience of seeing animals in the zoo should be a wild, unique, fun and entertaining experience. Aquariums and Zoos are now more involved in the International Association of Amusement Parks and Attractions (IAAPA) and the Themed Entertainment Association (TEA).

Technology

All those interviewed discussed new technology as an influence on aquarium and zoo interpretation, and several referenced museums as having been in the forefront of using this new technology. There was general consensus that we need to use technology to engage a young age group. However, as noted by the Audubon Institute, some kids use computers and are used to recognizing an icon while others are more comfortable using phone apps. We need to use diverse approaches. The following section discusses some new approaches, examples of innovative programming, and the technology-related issues being discussed by colleagues:

- **Web access:** Wireless Internet capability in exhibit areas, as the Florida Aquarium is using, facilitates website access. People are so accustomed to navigating the Internet—how might this influence how they navigate reading interpretive graphics? Our institutional websites provide accurate information to a broad

audience, and this is also a powerful educational tool for SSPs and TAGs. For example, the elephant TAG website receives about 65,000 hits per month.

- **Interactive Graphics/Audio Tours:** Having the technological capability of downloading graphics via podcasts and iPods will change exhibit interpretation and expand the opportunity for us to engage visitors. Vancouver Aquarium discussed the need for more programmable options for interpreters to customize content on touch screens. The Florida Aquarium and Jacksonville Zoo are two examples of institutions doing cell phone tours (which can be offered in multiple languages). Still there is some concern about whether audio tours actually engage people. Northwest Trek referenced the audio tours and iPod apps used by the National Park Service—are these as effective as having a ranger talk?

- **Video Games:** Columbus will be using a large-format, cooperative video game at its new polar bear exhibit, which works for multiple viewers—this allows for family or small group interaction. Players become a polar bear and catch food, but can only eat the seal when on the ice—not in the water. Mini games within enable players to travel through a house and turn off all the lights so that when they get back to the ice it does not melt—connecting simple actions with saving polar bears.

- **Dialogue:** The Vancouver Aquarium’s Canada’s Arctic exhibit has a large touch screen where visitors provide their own opinions. There are interesting questions, live on the Internet, so that guests can go home and comment. Arctic-related conversations are facilitated through an iPhone app. People in the gallery can have conversations with people who submitted comments on iPhone and on the Web. Monterey Bay Aquarium is looking at how to incorporate technology (smart phones, iPhone apps) to create intergenerational conversation about conservation and wildlife. Is technology a good way to tell a story?

Social Networking

Several aquariums and zoos are using social media including Facebook, MySpace and Twitter to engage their communities. Our use of social media has the potential to connect to people and inspire conservation action. The current conversation is about how we will navigate this to use in onsite interpretation.

Current Trends in Aquarium and Zoo Exhibit Interpretive Content

Why Zoos have Animals/Great Animal Care: We need to let our visitors know that we care about the animals. Discuss innovations in animal care and how exhibits are enriching for the animals. Be proactive about animal care by connecting visitors with animal training and work behind the scenes. Zoos should communicate why they have elephants to encourage greater public empathy. A dissenting point of view was that visitors assume that we do take good care of the animals—why are we focusing on that when we have so many messages to communicate?

Conservation and Taking Action

- **Conservation Messages:** Aquariums and zoos are communicating the interrelationship among landscape, animals and people to inspire people to take action. We are also interpreting the concept of environmental sustainability. Species interpretation includes status in the wild, using a scale to indicate the level of threat—endangered, threatened, etc. Messages advocate protecting and preserving habitat.
- **Positive Messages:** Zoos and aquariums used to focus on the plight of animals. But we are moving away from depressing stories revolving around fear of loss, especially with children, influenced by David Sobel's *Beyond Ecophobia*. While we recognize our responsibility to communicate this gloomy information, the trend now is to focus on a less preachy and more positive approach. We are interpreting conservation success and letting people know how they can take meaningful action to make a difference. Oregon Zoo suggested the 80:20 rule: 20 percent of what is wrong and 80 percent of what is going well. Discussing endangered animals that made a comeback because we acted (e.g. bald eagles and alligators) is very powerful. The message is that if we do the right thing, it can work. Conservation messaging includes achievable conservation actions that benefit people and nature (locally and globally) and the importance of working together to make a difference. Aquarium and zoo interpretation is starting to focus more on unity, determination and empowerment in an effort to inspire conservation leadership. We need to give our visitors hope!

- **Taking Action:** To recruit our visitors to help in the effort to conserve wildlife, we need to assist them by providing actions that offer real conservation benefit. Actions need to be achievable without excessive effort. We can demonstrate the impact of these actions with quick facts and statistics. The actions zoos and aquariums advocate depend on institutional priorities, such as sustainable seafood, water conservation, plastics and marine debris. For cash donations, Minnesota Zoo uses a bill collector with a tiger video as a reward. The digital readout enables visitors to see their donation added to the total. As aquariums and zoos, our role is to get people excited about animals and their habitats and to engage them in taking action after we provide them with a good time at our institutions. We need to change visitors' world view and touch their hearts so that they want to change their behavior, or at least not hinder the existence of wildlife. Learning extends to curriculum and the website, where we can suggest ways for guests to mitigate their footprint.
- **Institutional Conservation Involvement:** There is a greater focus now on interpreting the zoo or aquarium's involvement in conservation, either through direct involvement and/or through projects we support. In this way, we connect visitors to conservation in the wild. Zoos and aquariums are talking about their own work, and broadening that to what the conservation community is doing. One person commented that we are not as overt as we should be in telling our own story. Some aquariums and zoos are also interpreting their institutional carbon footprint and sustainable operations.
- **Controversy:** Topics such as climate change, evolution have challenging content that is controversial and complicated. The best way to convey things is through dialogue, as museums do. How do you increase social dialogue around issues? We want guests to have in-depth conversations in their social groups, recognizing that there are many points of view. Zoo Atlanta is working on an exhibit that will feature an Asian wildlife market—there will likely be controversy over images.

- **Climate Change:** Several of those interviewed said that their exhibit content interprets climate change. Oregon Zoo, for example, discusses climate change and its impact on polar bears, and incorporates this content in the Northwest Trail to bring that message home. Monterey Bay Aquarium focuses on climate change and its connection to the ocean. The content is always about animals but they put people in the picture. Some of those interviewed attended the 2008 climate change summit at the Monterey Bay Aquarium and are implementing commitments made at that meeting. Cabrillo Marine Aquarium uses climate change as a unifying thread and makes the messages personal. North Carolina Aquarium indicated that while they need to be careful in the southern market, they are committed and have changed their exhibit graphics to incorporate climate change messages.

- **Additional Content:** There is a lot of variation in what other information appears in aquarium and zoo exhibit interpretive content, with institutions focusing more or less on natural history, animal behavior, diet and predators. Basic information is likely to include scientific names, a range map, brief habitat description, and conservation status in the wild. Biodiversity, ecosystem function, and cultural ambience were also indicated. We should focus on the *most important* information about animals. Three of those interviewed discussed storytelling related to exhibit interpretive content (real stories versus broad interpretation). Sometimes the story is about the habitat. The emphasis is more on connecting people with animals.

Prototyping and Replacing Graphics

Those interviewed were asked if and how the ability to replace signs more inexpensively has influenced what they do. They were also asked whether their institution uses and tests prototypes for new exhibits. While all agreed that the ability to use less expensive materials for graphics facilitates replacement, practices are mixed on whether prototypes and/or messages for new exhibits are tested. Responses are grouped by response and include examples.

Prototyping: Yes

Brookfield Zoo puts more emphasis on the messaging and less on the medium, enabling them to use more focused message points which may not be timeless and change them as needed. They do audience research, some prototyping and focus groups. **Zoo Atlanta** has found that drafting and installing a prototype sign before ordering a more permanent sign is helpful. They tested messages for Wild Like Me and did a front-end assessment for the Reptile building. “We don’t have the money to fail!” **Woodland Park Zoo** uses an in-house printer and mocks up signs for staff review. For new projects, they create cardboard models and their audience research coordinator does formative evaluation. **WCS** prototypes for new and/or big exhibits. They mocked up the Madagascar exhibit Small Wonders area and tested it out at Central Park. **WCS** prototypes both for content and for ergonomics and durability (do people know how to work it? Is it too heavy to lift?). **Point Defiance Zoo & Aquarium** will do even more prototyping with the new red wolf and clouded leopard exhibits. They do audience interceptions to determine if what the institution is attempting to communicate is what people are getting. **Oregon Zoo** prototypes signs and interactives. They used the results of front-end evaluation for Red Ape Reserve to re-write the graphics, incorporating more basic primate information rather than a straight conservation discussion. **Disney’s Animal Kingdom** has redesigned signs to allow for graphic inserts to be easily changed without having to replace the entire frame. This has reduced costs dramatically. **Columbus Zoo** did prototyping when they built My House and Habitat Hollow, which involves local action, and for their Australia exhibit. Prototyping is accomplished through grant funding; if they do not get the grant it then becomes a budget issue. **North Carolina Aquarium** is starting to test messages and content, but does not prototype signs. **Akron Zoo** does test signs but graphics are not formally evaluated. **Cleveland Metroparks Zoo** is selective about what they prototype due to budget limitations.

Frequent Changes Rather than Prototyping

Woodland Park Zoo also has signs placed along the main loop pathway that interpret zoo conservation projects. Designed to change every month or two, these signs augment the conservation story told at the animal exhibit. **Vancouver Aquarium** does not prototype as a general rule—time and money are limited. However, they build the right furniture and change the stories. The whole Canada’s Arctic exhibit is one big formative evaluation! Information does not change much over time, but ideas, concepts, issues and our evolving scientific knowledge changes. **The Seattle Aquarium** does not paint directly on walls or in exhibits, and graphic panels are always installed in a way that will allow them to be moved and removed. They assume that content will need to be updated, if not replaced. Having two large-format printers in house means that they are able to generate signs quickly that last a few years, and for very little cost. **Audubon Aquarium of the Americas** has tested graphics. However, they do not believe in spending a lot of money on graphics when they plan to change the content.

Prototyping—Not Usually

Of the institutions that do not typically prototype exhibit interpretive elements, most indicated that their ability to do this was limited by lack of time and/or budget. Interpretive and exhibit designers have less experience with prototyping and it may not be done as well as it should be, or they may be brought in too late in the process. Prototyping is also expensive if the designer is doing it. While some institutions do not do formative evaluation, they indicated that they do front end evaluation (including focus groups and surveys of visitors or members) and/or summative evaluation.

Future Trends

Those interviewed were asked what they see on the horizon as the next big trend in exhibit interpretation. Here is what zoo and aquarium colleagues are predicting and what they are keeping their eyes on now:

Exhibit Interpretive Content

We will need to provide concise messaging that is timely, so we need to make signs flexible so that data can be changed quickly. Tie content into culture and current trends. We are connected to animals through our society and culture, and we are not separate from that world. Bring people closer to nature by making a personal connection—make it less abstract. Look at the exhibit as an ad—change people’s perspective of reality. We will be delving deeper into emotional content and controversial topics—controversy gets visitors talking. We need to ensure that the institution’s marketing and website messages are the same or at least relate to the interpretive messages. Evaluation will continue to be important in order to track results on the effectiveness of messaging.

Interpretive Experiences

- **Interactive Elements:** Creating innovative signs that engage our visitors will continue to include more real physical props. We also need to incorporate more interactive things that are reliable, such as enabling visitors to use a screen to ask questions. The use of analogy is critical to reach people where they are. Use games so that kids do not just push the button and run. Interpretation has to complement the real animals. Keep it simple! Design sociability in interactives: use technology to enable visitors to interact with each other. In order to complete the activity you have to talk to someone. Engage a different generation.
- **Interaction with Animals:** Design exhibits in which visitors get to participate in the landscape where the animals live. We need to continue to provide animal experiences, having keepers more involved with enrichment and training demonstrations. People will no longer be holding animals on a stage and talking about them. Our animal encounters will not look planned. Animals already in their enclosures will come and work with staff without having to be manipulated.

- **Interpreters:** Perhaps we will see the elimination of signs, instead investing our interpretive money in staff. The effectiveness of having volunteers and staff interact with visitors is an approach that has been validated by the Why Zoos and Aquariums Matter study. We are wired for storytelling—it is an emotional connection. Interaction with exhibit interpreters allows us to share our passion for animals and enables visitors to have unique experience during each visit. Dialogue is important to amplify conservation messages. Well-trained exhibit interpreters connect visitors to the animals and inspire conservation action. This will require a greater commitment to training staff and volunteers.

- **Experience:** One of the big trends is the importance of planning interpretive experiences completely, from the impact the invitation has on guests before they arrive, to the exhibit design telling the story. Another is incorporating more inquiry as a tool in interpretive experiences and exhibit design. Poetry and art are going to be used more and more to promote conservation literacy. We need to purposely think about learning styles to engage our audiences. Providing parallel experiences, as we do in children’s areas, will now spread to other areas of zoos. Having the chance to interact with animals is even better. People are disconnected from nature. We need to connect them through educational experiences such as kayaking and beach clean up. Engage visitors in citizen science, by having guests use technology to contribute their data. Get guests involved in science through behavioral observations and using GPS coordinates in an exhibit. Keepers could use these data to learn more about how their animals use the exhibit, which could result in new exhibit designs. We need to engage the family as well as individuals—get families to play together.

- **Concerns:** How do we embed a deep message in the experience given the volume of visitors? Many visitors mark their occasion by taking photos—are they taking the perfect shot but not looking? We need to enhance their view by helping them look and see the things that are real. In order to survive, zoos are going to have to be less pure about their mission and use more amusement—we are headed to compromise.

Technology

Aquariums and zoo exhibits will incorporate a greater use of technology, using diverse approaches to enable visitors to choose. Incoming generations are technology natives: kids are more adaptable—they get information from different streams. The audiences we draw are coming to aquariums and zoos for the animals, but with expectations. The effectiveness of exhibit videos in meeting those expectations was questioned. Being able to update information is a huge bonus. Visitors have access to so much information—

we need to be ready. Zoo and aquarium colleagues are excited about the potential of audio and video components using hand-held devices. We should also utilize technology to make it possible for visitors to talk to aquarists when these staff cannot be there. A big future trend is how to leverage social networking.

Cell Phone Tours and Apps

There also was a lot of discussion about phones: some institutions are already using cell phone tours or are considering their use. Cell phone technology can also be used to engage visitors in interacting with exhibits and get scientific inquiry into the public experience. Phone apps will provide aquariums and zoos with the mechanism to get updated information to guests.

Monterey Bay Aquarium is also excited about the adaptation of the technology used by magazines, which are inserting bar codes—software can then be downloaded for free. Readers take a photo of the bar code get linked on line to the product. The future trend at Monterey Bay Aquarium will be to use to smaller exhibit labels. These will convey the story, but there may be icons that visitors can scan with a mobile device to see another layer of content, which can be accessed at the Aquarium or at home.

Other Technology Ideas

Dan Belting at Northwest Trek discussed changeable images and messages projected on water wall in Las Vegas, which looked as if it was raining--people touch it and get wet. Steve Dorand at Audubon's Aquarium of the Americas referenced Disney's Epcot Center Living Seas, which has introduced *Finding Nemo* characters into the tanks. The text pops up in tanks, using a Pepper's ghost effect. Audubon is working on how to have voice activated. For example, a visitor could ask, "What's that fish?" and the text would appear in the water. The person is getting the interpretation he or she asks for and then they will read what you want them to know. The interactive program Turtle Talk with Crush goes beyond graphics—this animated turtle can recognize guests!

Appendix: Sign Material

I. Longer-lasting Signs

Material	Users	Notes
Sintra	Akron Zoo, Audubon Aquarium of the Americas, Brookfield Zoo, Cabrillo Marine Aquarium, Columbus Zoo, Florida Aquarium, Jacksonville Zoo, Minnesota Zoo, Seattle Aquarium, Vancouver Aquarium, Zoo Atlanta	Zoo Atlanta says the down side is that Sintra can crack easily in certain applications. Seattle Aquarium uses wrapped Sintra prints on synthetic adhesive vinyl. When sprayed with clear sealant, it will last two years. Minnesota Zoo uses Scotch print on Sintra on the Tropics Trail, a humid, indoor exhibit. Jacksonville Zoo notes that full-color application to Sintra is inexpensive and is high quality. Anything you can put on a computer you can put on Sintra. Results are clean, crisp and professional. They apply a u.v. spray for use in Florida's climate. Florida Aquarium uses printed-on vinyl that is wrapped on Sintra—it is affordable and durable. The vinyl is wrapped rather than cutting it to the edge for outdoor and water protection. The area is pressure washed every day, and the signs hold up for two years. Audubon uses stainless steel inserts in the Sintra and machine screws that fit into the inserts. A screw placed directly in Sintra will come out or it can corrode.
Dibond	Phoenix Zoo, Woodland Park Zoo	Woodland Park Zoo uses Dibond because it is stable in the elements and does not warp like Sintra. It can be peeled off and re-wrapped.
Phenolic resins	Cabrillo Marine Aquarium, Cleveland Metroparks Zoo, Minnesota Zoo, MPR Museum Consultants, WCS	Use phenolic signs outdoors. Phenolic is very expensive and the turn-around time is too long. WCS is looking for something else with greater durability.
iZone cast resin	Point Defiance Zoo & Aquarium, Audubon Aquarium of the Americas, Cabrillo Marine Aquarium, Florida Aquarium, National Aquarium in Baltimore, Point Defiance Zoo & Aquarium, San Antonio Zoo, Tennessee Aquarium	Tennessee Aquarium says that iZone can get wet; does not fade or warp; and can be used in areas with plants, misting, watering and sunlight. Point Defiance Zoo & Aquarium uses Scotch prints on iZone. San Antonio Zoo says it is indestructible, especially half-inch mounted with screws on metal. Installation is easy. There is no need to seal edges; iZone is non porous. Screw into inserts on the back of sign. There is a 10-year warranty. IZone is expensive and takes longer.
Folio	Cabrillo Marine Aquarium, Florida Aquarium	Expensive and takes longer.
Fossil	Audubon Aquarium of the Americas, Audubon Zoo	Audubon uses Fossil process 12 color

Material	Users	Notes
Digital printing on vinyl	Audubon Aquarium of the Americas, Cabrillo Marine Aquarium, Cleveland Metroparks Zoo, Columbus Zoo, Florida Aquarium	Cabrillo Marine Aquarium uses vinyl with acrylic on it—lighting and glare is an issue. Florida Aquarium wraps this on Sintra.
Silk screening	Audubon Aquarium of the Americas, Work as Play	Use for signs expected to last 10 years
Backlit graphics	Disney's Animal Kingdom, National Aquarium in Baltimore, San Antonio Zoo, Work as Play	
Porcelain enamel	Northwest Trek, WCS	Northwest Trek says that this is indestructible, but they have expensive, out-of-date signs. WCS uses it, but cannot afford to do it everywhere
Vinyl laminate on MDO	San Antonio Zoo	This has only has two years in u.v. degradation.
LCD flat screens	Louisville Zoo, North Carolina Zoo	Will be using these in the new Glacier Run exhibit. Flat screens are easily changed and highly visual.
Electronic media	Columbus Zoo	Using mp3 players
3M Scotch print	Audubon Aquarium of the Americas, Brevard Zoo, Brookfield Zoo, Minnesota Zoo, Point Defiance Zoo & Aquarium	Audubon indicates that 3M will last six to seven years—not the 20 years the company promises. None of the inks last that long, even Fossil. Inexpensive, locally available. Minnesota Zoo uses Scotch print in an indoor, humid environment.
Acrylic friction fit	Vancouver Aquarium	Uses friction fit printed in house, an acrylic piece of plastic that sits snugly in a thin edged frame—pull it off with a suction cup. Used for labels, secondary signs.
Direct to substrate	Minnesota Zoo	Can be done well inexpensively and locally.
Digital prints on aluminum	Cleveland Metroparks Zoo, Florida Aquarium, Phoenix Zoo, Vancouver Aquarium (formerly used)	Florida Aquarium has used anodized aluminum, but not much.
Laminate	Florida Aquarium, Zoo Atlanta	Florida Aquarium laminates graphics into laminate and these last three to five years. Better than embedded fiberglass. Zoo Atlanta uses high-pressure laminate because ID signs are touched a lot. This lasts a long time but is very expensive.
Wood	Phoenix Zoo	Audubon Aquarium of the Americas indicated that printing graphics on wood will be used for the authentic look and feel at Dallas Zoo's new African exhibit.

Notes: **Audubon Aquarium of the Americas** uses an HPL system and does some sub-surface printing. **Disney's Animal Kingdom** uses different signs in every location that are themed to each area. In Africa, they use chalkboard-style signs. Laminated pages are used as field guides in aviaries, which guests take at the beginning of the aviary and return to a box at the end. **Jacksonville Zoo** recommends for mounting hardware in exhibits, not to use a system that gives kids a handhold (a rope mounting system cannot stand up to a five year old). **San Antonio Zoo** uses magnetic ID signs under each Aquarium tank. The powder-coated blue sheets are placed at a 45-degree angle and each panel can hold four squares. This system works well for species that may change. **Point Defiance Zoo & Aquarium** uses iZone materials. In a tight budget, they are considering whether it is better to invest in equipment to do this in house or outsource the work.

Temporary Sign Material

Coroplast: Cleveland Metroparks Zoo, Columbus Zoo, Phoenix Zoo, Vancouver Aquarium, Zoo Atlanta

Corex: Woodland Park Zoo

Bioboard: Woodland Park Zoo

Gator foam: Cabrillo Marine Aquarium

Sign foam: Cleveland Metroparks Zoo

Vinyl digital prints: Cleveland Metroparks Zoo, WCS

Sintra: Columbus Zoo uses Sintra for events because it lasts and can be used again.

Epson prints: Seattle Aquarium uses Epson prints on a variety of substrates: paper, vinyl, synthetic adhesive vinyl or polypropylene banner material. These prints are then either mounted on foam core, Sintra, or sent out for 10mm lamination depending on the where the sign goes and its life expectancy.

Note: Woodland Park Zoo prints all event signage without sponsors or dates. These are then added using vinyl—this saves lots of money.

Salvaged and Recyclable Material

Columbus Zoo uses salvaged materials for graphics. Woodland Park Zoo stopped using foam core and now uses Bioboard because it is completely recyclable. Foam core takes 300 years to break down in the land fill! They have also changed to biodegradable banners, which break down in the landfill.