



Increasing Public Ocean Awareness and Understanding

An Aquarium Model

The results of a Workshop Sponsored, Organized & Facilitated by the
Aquarium of the Pacific's Marine Conservation Research Institute

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INTRODUCTION

“Every member of the public should recognize the value of the oceans and coasts, supporting appropriate policies and acting responsibly while minimizing negative environmental impacts.”

From Guiding Principles in USCOP Report 2004

The average American has little knowledge of ocean and coastal ecosystems and how we humans affect them. And the gap between science and the public is increasing. It is clear that our oceans are in trouble and that any effective efforts to restore and protect them must be rooted in strong support by a well-informed public. This has been the driving force for placing a much higher priority on public ocean education at the Aquarium of the Pacific. This theme of ocean awareness and literacy will be an integral component of both existing and future exhibits and programs inside and outside the Aquarium. The public’s ocean awareness, literacy, and stewardship must increase if we are to make strides in protecting and conserving our marine resources.

Background

In the past 13 months the Aquarium of the Pacific has organized, facilitated, and reported on three workshops related to ocean literacy: *Public Ocean Literacy: What Residents of Southern California Should Know* (June 2005); *Public Ocean Literacy: Making Ocean Science Understandable* (October 2005); and *Summary of Maritime Literacy Planning Meeting: An Activity of the Marine Board* (February 2006) . The Aquarium also convened and hosted the western regional conference that was part of the June 2006 national Conference on Ocean Literacy (CoOL). The report from this meeting, *Summary of Conference on Ocean Literacy Aquarium of the Pacific–Long Beach, California* (June 2006) is included in national conference’s report. These efforts were all undertaken as a result of our belief that aquariums, because of their relevance to ocean-focused informal education and their audience of more than 20 million annual visitors, have the potential to be major forces in improving the understanding of the general public about the state of the ocean’s health.

The titles, primary goals, and sponsors of the Aquarium of the Pacific’s three ocean literacy workshops are summarized below.

Workshop 1:

Title: Public Ocean Literacy: What Residents of California Should Know

Goal: Focusing on the region of the California coast and ocean from Santa Barbara to the Mexican border, develop a summary of what scientists think the general public needs to know to be “ocean literate.”

Sponsors: Consortium for Oceanographic Research & Education (CORE) and Aquarium of the Pacific

Workshop 2:

Title: Public Ocean Literacy: Making Ocean Science Understandable

Goal: Using the output from the scientists' workshop, identify and describe the best strategies, methodologies, and modern technologies that would engage the public to want to learn about the ocean, come to understand it, and embrace stewardship of it.

Sponsors: NOAA's Coastal Services Center; Consortium for Oceanographic Research & Education (CORE); National Marine Fisheries Service, and Aquarium of the Pacific

Workshop 3:

Title: Maritime Literacy Planning Meeting: An Activity of the Marine Board

Goals: Explore ways to enhance the public's awareness and understanding of the nation's maritime industries and integrate this effort into some of the ongoing initiatives in ocean literacy, which thus far have largely ignored the maritime industries. Develop an exhibit (and collateral materials) on maritime industries in the United States focused on the present and the future, with only enough history to provide context and perspective.

Sponsors: Marine Board of the National Research Council (part of operating arm of National Academy of Science), and Aquarium of the Pacific

These workshops laid the foundation for the Aquarium of the Pacific's fourth workshop reported here.

WORKSHOP 4

Increasing Public Ocean Awareness and Understanding: An Aquarium Model

How the Aquarium of the Pacific can best provide experiences that will help us guide our visitors from ocean awareness to ocean literacy to stewardship of Planet Ocean was the subject of this workshop, *Increasing Public Ocean Awareness and Understanding: an Aquarium Model*, the fourth in our series addressing general public ocean literacy.

Goals of the Workshop

Primary: Develop the results of the previous three workshops into a comprehensive program that integrates the major findings and recommendations of the scientists, educators, web and exhibit designers, and communication professionals into visitor experiences both within the Aquarium of the Pacific and also in its external programs so that our visitors progress from ocean awareness to ocean literacy to stewardship of the Planet Ocean

Secondary: Do this in such a way that the strategies and methods can serve as a model for other aquariums and science centers.

Pre-Workshop Preparation

The participants were Aquarium staff members and invited guests with expertise in oceanography, information technology, and exhibit design. Each was asked to submit five to ten statements prior to the workshop that documented principles, concepts, issues, factoids, etc. that he or she felt every person should know about the ocean, how the ocean affects them, and how they affect the ocean. These were sorted into the seven principles identified in *Ocean Literacy: The Essential Principles of Ocean Science K-12*, a document developed by the Centers for Ocean Sciences Environmental Education (COSEE) and the National Marine Educators Association (NEMA)

Essential Principles Developed by COSEE-NMEA

- 1. The Earth has one big ocean with many features.*
- 2. The ocean is a major influence on weather and climate.*
- 3. The ocean and life in the ocean shape the Earth.*
- 4. The oceans make Earth habitable.*
- 5. The ocean supports a great diversity of life and ecosystems.*
- 6. The ocean and humans are inextricably interconnected.*
- 7. The ocean is largely unexplored.*

Participants were also encouraged to submit individual conservation actions they believed would make a difference if acted on by enough people. These became number eight titled “Take Action: Help Heal Our Ocean” and number nine “Cross-cutting Essential Principles 1 through 7.” The latter was added for statements that were applicable to most, if not all, of the seven Essential Principles.

Additional “Principles” Developed by Aquarium of the Pacific

- 8. Take Action: Help Heal Our Ocean
- 9. Cross-cutting Essential Principles 1-7

Each statement received was typed on a single sheet of paper to allow space for input and posted in the meeting room under the relevant Essential Principle heading. How the statements were used in the workshop is described in the section of this report titled Using the Submitted Statements. The statements with inputs are included in Appendix 3.

The Opening Session

At the opening session of the workshop, Jerry Schubel described some of the opportunities available in and outside of the Aquarium for delivering messages to visitors. Below is an expanded list of these venues.

**Presenting Ocean Literacy Principles
Within and Outside the Aquarium of the Pacific**

Signage	Lectures/Programs	Mobile Offsite Exhibit
Website	Art Work	Café Scuba
- Ocean Learning Center	On-Floor Presenters	- (Placemats/Napkins)
- iPods	Outdoor Experiences,	Breaking News Station
- News Events	- Encounters with Nature	Airport Monitors
Oceanpedia	Improvisational Theater	Speakers’ Bureau
Films	Animal Encounters	Pacific Collections Apparel & Souvenirs
Great Hall Experiences	Street Banners	Bumper Stickers
Magic Planets	Virtual Reality	Text on Complimentary Tickets
Games	- (MUSE concept)	Guest Services Greeting
Books, Pamphlets	Virtual Tours	Partnerships with & Links to Other Organizations
Aquarium Trails	Pacific Currents (Member Magazine)	Aquarium on Wheels
PSAs	Sustainable Coastal Communities	Cultural Festivals
Ocean Science in The News	Member Monthly Email	
Beach Cleanups		

Following remarks by Jim Baker, former Administrator of NOAA, about the state of the ocean and the need for such a workshop, the participants formed small groups for guided tours of the Aquarium. This was done to familiarize our guest participants with the Aquarium's physical plant and infrastructure, and to provide opportunities for them to experience venues available to the public such as films in the theater, live presentations, and animal encounters.

Using the Submitted Statements:

After the tours, participants were encouraged to remove posted statements that held the most interest for them, form small teams of three to five people with similar interests, and describe how those concepts could be delivered in internal and external Aquarium experiences. Completed sheets were reattached and participants not on the team were invited to expand on them.

Team members reported to the group on their observations and recommendations at general sessions held throughout the three days of the workshop. As a result of these interactive group sessions some statements were combined and team input of others enhanced. By the end of the workshop some form of input had been made on all statements.

MAJOR CONCLUSIONS AND RECOMMENDATIONS

The conclusions and recommendations contained in this section represent a subset of all of the ideas presented. They are based on the input of participants resulting from workshop discussions about how to achieve public understanding of the statements submitted pre-workshop. Also included are the onsite ideas resulting from presentations by Aquarium staff workshop participants and group brainstorming.

Ecosystems Instead of Galleries

The spatial organizing principle in the Aquarium building is the “gallery.” There are three major galleries—Northern Pacific, Tropical Pacific, and Southern California/Baja. In addition there is a changing exhibit gallery and outdoor exhibit areas at the entrance to the Aquarium and within the physical plant. Participants felt that the Aquarium of the Pacific’s physical platform is an architectural gem. Everything should be designed to complement its graceful features and maintain its architectural language and integrity.

- The organizing principle should be the “ecosystem” instead of the “gallery.”
- Ecosystems should be made to look and sound like the ones they are supposed to represent so as to create moods that reinforce the different ecosystems concept. It is also important that visitors exit the Aquarium with the impression they have toured the Pacific Rim ecosystem, not just a series of separate ones.
- There should be an exhibit that provides context and perspective of that ecosystem at the beginning of each one so visitors know where they are.
- There should be a conservation exhibit with a call to action at the end of each ecosystem.
- Human activities need to be integrated into ecosystem programs and exhibits to emphasize that humans are part of the ecosystems and that in many ways, they dominate them. With dominance comes responsibility and responsibility can translate into conservation through stewardship.

Accentuate the Positive. Tone Down the Negative.

Efforts should be made to create programs that are not all negative stories or that emphasize “don’t do this”. Surveys have shown that the public wants to be told what to do, not what not to do. A program that focuses only how bad the health of the ocean is can leave visitors with the belief that things are in such bad shape, nothing they do as individuals can have an impact. Result? They choose to do nothing. Publicize positive events to balance the negative ones. Some good is happening, believe it or not!

Making the Aquarium's Ocean Awareness/Ocean Literacy Campaign Visible

The Aquarium's ocean awareness/ocean literacy efforts need to have a coordinated identity inside and outside the Aquarium's walls for both visitors and staff. The binoculars signage along roadsides and highways points to wildlife viewing locations. Highway signs identify scenic viewpoint pullouts. Both remind the public about the value of wildlife and where to get "out into nature." Smokey the Bear gave identity to the national effort to curtail forest fires. Campaigns have a defined ending so using such a word in this effort carries the impression that saving the ocean has a stopping point. If the Aquarium had multiple ways to label our ocean awareness/ocean literacy efforts, they would both remind us how the ocean helps us and how we can help the ocean, and serve as multiple trails leading to stewardship.

- Design a logo.
- Adopt a poster child. A graphic, somewhat humorous octopus holding Planet Earth in its arms was suggested.
- Assign an easily remembered oceanic name to the effort.

People Come To Aquariums to See Live Animals

At times live animals can be an ocean literacy hook. They are what Jack Welch refers to as an aquarium's unfair competitive advantage. Few of these animals can be kept live in homes, and most people do not have opportunities to observe them in the wild. And while animals may be watched on the Internet, in videos, or on television, these venues are not live viewing. The challenge is to use animals to tell stories that appeal to visitors, are powerful, make visitors' experiences engaging, provide emotional experiences, and at the same time induce visitors to travel the road to ocean stewardship

- Increase relevancy by showing that many of the animals on exhibit are found locally or regionally, and that some can be observed in the wild. Demonstrate how they can be impacted by our actions.
- Create more quiet contemplative spots for people to sit and watch the beautiful animals to enhance emotional connections.
- Utilize as many of the various information and communication tools that are available as possible. Keep current with and adopt new technologies. Two major changes in communication include: (1) access to information electronically, and (2) the makeup of society. An example was given of using the Internet or a computer with a touch screen next to an exhibit to create a newspaper. (This was in reference to use of a moving newspaper with photos in a Harry Potter film.)

On Signage—the Past, the Now, and the Recommended Future

Over time aquarium and museum exhibits and collateral materials drift and the unique branding of the institution is lost. Also signage tends to be collected like barnacles and not always of the same species. Although the Aquarium is only eight years old, it is time for it to reaffirm its “brand” and remove the barnacles.

Participants made these observations as a result of their Aquarium tours. Existing signage has very different and conflicting personalities: different graphic styles and color schemes, is presented on different materials, and different framing styles are used. The result—degradation of the visitor’s experience and the aesthetics of the exhibit.

The participants were generous in their specific ideas about what the Aquarium could and should do.

- In deciding on textural material and how to present it, the design should always be from the perspective of the visitors. What do we want them to know? What will they respond to? What will engage them? What will motivate them to care about the ocean and become its stewards?
- Re-purpose the original Aquarium design that included some very attractive sign holders that picked up on the architectural language of the building. Update their content to reflect changes in the exhibits and the messages the Aquarium wants to convey about ocean literacy.
- Re-purpose the attractive wavy panels near the entrance to each of the three major ecosystems (galleries) to provide context and perspective on the ecosystem the visitor is about to enter (mentioned previously).
- Orient the visitor to the ecosystem about to be toured with a platform near the entrance to each ecosystem that tells the visitor where he/she is going.
- Match, don’t mix, different rail graphic hardware holders, and styles. Stay with the original model—it is elegant.
- Create headlines that convey the most basic messages so that even those who read little will come away with at least a fundamental message.
- Remove the overhead textual messages or substitute a simple graphic without text that represents the ecosystem. Most of the overhead messages are trivial, difficult to read, and only add to the clutter.

Summary: The Aquarium should develop a uniform style and approach to signage. Sufficient time should be invested and as many people involved as necessary to get a style and color scheme that achieves a new and higher standard of excellence in

graphic design. It should be kept in mind, however, that color is personal and input from too many can be troublesome.

Adding to the Visitor's Aquarium Experience

Brainstorming sessions and additional independent small team tours of the Aquarium resulted in ideas that have potential for enhancing the Aquarium experience.

- There was a strong consensus that the Aquarium of the Pacific should create some simple introductory exhibits to provide context and perspective.
- Efforts should be made to expand the visitor's vocabulary of important words in ecology, marine science, oceanography, etc. This could be achieved through a "Word of the Day, Week, or Month" that could be on signs, on large buttons worn by the staff, and/or featured in other venues. Such a strategy could help visitors build up a minimalist ocean vocabulary and provide motivation to learn more. Special opportunities such as events in nature (El Niño, red tides, etc.) that find their way into the news should be exploited so as to motivate visitors to ask questions.
- Let visitors know that the beautiful coral exhibit in Tropical Pacific contains live coral so they will examine it more closely. This is not pointed out with a label currently. Why not? Compare the size of the corals now to when they were installed eight years ago to tell a story about coral growth. Explain that the corals came from a propagation program, not from collection in the wild. Use the opportunity to inform visitors that there are corals in our temperate waters and in Alaska's cold water. Tell the coral conservation story—health of coral reefs; purchasing live coral for home aquariums, global warming and aquaculture impacts (mangrove forest clearing resulting in silting), development, methods of tropical fish harvesting.
- Study whether the joy stick interactive at the live coral exhibit conveys an ocean literacy message and if not, either improve it or get rid of it. (The exhibit was subsequently removed on July 13, 2006.)
- Find ways of telling stories that don't rely on text. Many people don't or won't read and it tends to lead or add to clutter.
- Enhance and expand the plankton corner. Change the impression that it is an after-thought. Make it more exciting, more interactive. When appropriate, tell plankton stories such as one about red tide. Talk about plastic nurdles and their impact on plankton and animals that feed on plankton. Have activities for seasonal interactives when attendance is light. Example: have the visitor pour a water sample into a Petri dish and examine the sample through a pre-focused, fixed in place microscope. Telling a plankton story can be a way to convey a conservation message.

Making the Aquarium Experience More Interactive

In general participants felt that the Aquarium visit could be improved if more interactive immersive opportunities were available through layering of experiences with different dimensions for visitors —visual, aural, tactile, RFID, podcasts, trail guides, etc. Input on many of the ideas about how this could be achieved is detailed in the submitted statements in Appendix 3.

- Turn visitors into explorers by giving them a mission. If they have one, they may learn more and have a more satisfying experience. An example was given of the use of stamps in the Passport. Children consider stamping a mission and get very upset when an embosser is out-of-order.
- Have the explorers visit ecosystems instead of galleries. Ask them to contrast the differences.
- Consider using bar-coded tickets and kiosks that incorporate software to welcome the visitor, track and know what interests the explorer has, and e-mail a portfolio about the exploration. (Similar to programs at Indiana State Museum developed by Cortina Productions.)
- Explore the use of scavenger hunts as an experience for family groups and as a way to provide multi interest level trails.
- Capitalize on the allure of the ocean.
- Tell stories about the ocean’s natural and anthropogenic sounds. The use of sound could be an emotional experience.
 - Form a partnership with Sidney Harmon/Harmon Industries to create acoustic environments.
 - Install low frequency speakers in the floor to create whale sounds that are actually felt as well as heard.
 - Use cell phones to create “nature” rings that have an aquarium theme, e.g., whale calls with images, factoids, etc.
- Partner with other aquariums to develop “Top 10 Lists” of actions people can take to make a difference.
- Put action messages on the different levels of the parking garage.
- Stamp action items on visitors’ hands that are visible under special lighting, the explorer theme.

Talking the Walk: Making the Aquarium's Commitments to the Environment More Visible

What is the Aquarium's "Green Team" program? Are environmental efforts shared with the public? If not, how can the efforts be publicized as "this is what **WE** do", not the traditional "This is what **YOU** should do"? The participants had several creative ideas. And since some of these involved Aquarium's operations, John Rouse, Vice-president of Operations and Jeff Spottford, Director of Retail Operations, were invited to join the discussion. John commented that 30 percent of the Aquarium guests visit Pacific Collections, our gift shop. Jeff shared information about what is currently being done in Pacific Collections

- Create a special section of Pacific Collections to sell environmentally responsible materials: recycled, energy-efficient, sustainable, etc.
- Explain why the Aquarium does not sell certain items or substitutes manufactured for real—e.g., shells and coral jewelry.
Immediately after the group session Jeff met with several participants and a plan was devised to start implementing the above two recommendations.
- Use Café Scuba and other eating areas to tell a story. Transform them into environmental settings by featuring sustainable seafood, corn starch plates, no Styrofoam, etc. Put messages on trays, cups, tent cards, and laminated table tops. Try to get SMG to deliver these same stories at all of its locations.
- Tell our visitors about the Aquarium's water and energy conservation efforts; water conservation in the form of waterless urinals and controlled faucets, and energy conservation with the co-generator.
- Install more visually attractive recycling containers, and provide more opportunities for visitors to recycle.
- Don't forget the emotional, spiritual side of an aquarium experience. Spirituality has facets other than those of organized religions. Participants commented about their emotional experiences resulting from experiences at the sea jellies, seadragons, and shark exhibits.

Some Recommendations on Use of the Magic Planets

Earlier this year the Aquarium's Board of Directors purchased two Magic Planets as gifts to the Aquarium. It has been difficult to determine the best uses for them and to select locations where they could be most effectively used to engage our visitors while at the same time protecting the equipment from rough handling. Asked to think about locations and uses of this medium, the group viewed a Magic Planet presentation and then made these recommendations.

- Possible locations
 - Large Magic Planet:** Near the railing in the landing area outside of the exit of Tropical Pacific.
 - Small Magic Planet:** “Bump out” area in the “Big Tropical” exhibit area, breaking into the wall to recess the Magic Planet. Install a black background with stars behind the globe.
- Programming
 - Input for extensive use of Magic Planet programs is given in many of the statements in Appendix 3 such as timely stories about El Niño and La Niña, global climate change impacts on coastal California waters, impact of sea level rise, currents in the southern California bight, June gloom, etc.
- Telling the stories
 - To give visitors the best experience possible with interactive elements, programs utilizing the Magic Planets should include interpreters who are knowledgeable about the content and able to respond to questions.

Some Thoughts on Shifting Baselines

Stories about shifting baselines need to be an engaging part of the Aquarium experience—fewer large fish, impacts of invasive species, changes in food webs, etc. A strong interactive connection can be made with visitors by getting them to examine their own personal shifting baseline experiences involving the natural world. It should be kept in mind that staff education is critical to the success of this experience. This idea is further developed in Appendix 3, Essential Principal 1, Statement 28.

Some Thoughts on Lights and Lighting

Lighting is very important. It contributes to or detracts from the visitor’s experience, can create the desired mood, and encourages or discourages visitors to read graphic panels. Participants had many valuable ideas on ways the Aquarium could enhance ecosystem lighting. Among them:

- Use lights to create moods, being careful not to degrade the mood with improper lighting.
- Focus lights on the areas where illumination is desired such as signs and graphic panels.

A three level lighting rehabilitation program was agreed to and the first two levels are already being implemented (July 17, 2006). A list of actions for each level was prepared.

Level 1: The easy and inexpensive level —replace burned out bulbs, adjust lights that need adjusting, etc.

Level 2: Add colored gels to create moods. Repair or replace moving lights in Southern California/Baja ecosystem that no longer work, etc.

Level 3: Add a lighting grid system in the Changing Exhibit Gallery. Cost estimates will be obtained with a plan to have the grid installed at least in time for the spring 2008 changing exhibit.

Some Thoughts on an Exhibit on “The State of the Ocean”

There was support to begin now to explore creation of an exhibit for spring 2008 tentatively titled “The State of The Ocean”. A number of Aquarium staff and other participants expressed strong interest in being involved. Design could be a traveling exhibit or have a traveling exhibit component. From the outset a collaborative team that includes people involved in this workshop should be included in the conceptualization and design process with a small group formed first to begin development of a white paper and to explore sources of potential external funding.

The exhibit must not only rely heavily on technology, but must also make clear and compelling connections to live animals. Some marketing studies will need to be done to determine how best to position the exhibit to continue to attract traditional aquarium visitors, add new audiences, reach out to non-technical visitors while at the same time, attracting and exciting this generation of technologically immersed teenagers because of the “high tech” features of the exhibit.

Several participants observed that the exhibit should focus on the future and the unknown and that it should convey the excitement of exploration and discovery right here on Earth. Others cautioned that it should focus on the positive by stressing the benefits that would result from exploring the world ocean.

Some Thoughts on Big and Little Games as Aquarium Experiences

Internet, computer, and video games pose a challenge and an opportunity for institutions interested in promoting environmental literacy. They command increasing time and attention of a growing segment of the population, but few of these games deal with real world ocean and environmental issues in any way, and fewer still with these issues in accurate and balanced ways that appeal to “gamers”. They also reduce the amount of time that individuals who play them spend outdoors exploring nature and engaging in structured and unstructured games that involve physical activity.

The Aquarium of the Pacific has teamed with leaders in game design to develop a new generation of games that have a strong environmental focus, encourage authentic as well as virtual interactions with nature, and are collaborative while still retaining the features that appeal to so many players. Primary partners are the GamePipe Laboratory in the University of Southern California Viterbi School of Engineering, the Big Game Program in USC’s Interactive Media Division of the School of Cinema-Television, Interactive Entertainment Corporation, and the University of California at San Diego’s Center for Functional MRI. We will work with our partners to create games focused on

the ocean environment a part of the ocean literacy experiences of our visitors as recommended in this workshop.

Some Thoughts on Sending Unified Messages

The public hears, reads, and is exposed to conflicting opinions from scientists, environmentalists, governmental agencies, and political leaders about the state of the world ocean. Environmental organizations do not always speak in the same voice or they focus on only one segment of its health. While stories and messages about the state of the ocean that are part of the Aquarium's ocean awareness/ocean literacy program may be delivered in a variety of different venues; the content must be uniform

- As soon as possible establish an Aquarium ocean awareness/ocean literacy communications network that will ensure that everyone who needs to know knows the content for what is to be said. The result will be that the Aquarium speaks as one voice. Participating departments should be the decision makers on how their venue delivers the message.
- Use the California Aquarium Collaborative (Aquarium of the Pacific, Birch Aquarium, Cabrillo Marine Aquarium, and Steinhart Aquarium) in joint ventures that deliver uniform messages about the state of the ocean and positive actions needed to save it. Nurture and expand the collaborative.
- As appropriate, incorporate the "California Ocean Awareness Campaign" messages into the Aquarium's delivery system and provide linkages to the Aquarium's website for public access to information that enhances the messages.

Some Thoughts on Trails

The use of Aquarium trails within the ecosystems designed around unifying themes was included in inputs in several statements and in the team discussions. The Aquarium explored the idea several years ago and now with the added potential for using such a venue to convey ocean literacy messages that are ecosystem focused, the idea will be reexamined.

- Create trails with varied themes or goals and designed to satisfy different levels of interest. The trails can loop within an ecosystem and focus on a single or several ocean awareness/ocean literacy messages. They can be simple for visitors in the 30 second category and more complex for those in the three minute category. They can be designed for family groups of different age levels.
- Identify the trails with different colored icons to reinforce an explorer with a mission theme.

- Design a series of carefully crafted thematic and interest layered trails for visitors to explore. Provide the explorers with tools for exploration, tools to document their encounters and experiences. Build in quiet stops that encourage contemplation.
- Consider creating a “tranquility or serenity trail.”
- Incorporate nature through outdoor experiences into the trails.
- Explore the use of scavenger hunts for family trails.
- Provide a means for visitors who want to explore in greater depth to do so with one page “fact sheets”, links to websites, iPod programs, etc.

Some Big Ideas!

- Be positive...SHOW people how they can make a difference...SHOW them the results of specific actions if taken collectively. SHOW them collective actions have had positive results. Example: the Bolsa Chica wetlands story.
- Use humor. About fifteen years ago Gary Larson’s cartoons were the most popular exhibit at the LA County Natural History Museum. Another participant cautioned that while humor is good, it is difficult to use well. Care is needed if used.
- The Aquarium has different audiences with at least three levels of interest. All levels need to be catered to.
- Seek commercial and industrial partners who have a conservation ethic with whom to develop programs that advertise the commitment of both partners to an ocean awareness/stewardship program.
- Capitalize on the endless allure of the ocean by creating immersive experiences that stimulate as many of the senses as possible. Rely less on text.
- Extend experiences beyond the walls of the Aquarium—to the parking structure, to peoples’ homes, yards, parks, etc. Encourage visitors to get out into the natural world.

ROUND TABLE DISCUSSION:

If I Could Do One Thing Or Have The Aquarium Do One Thing...

At the closing session, each participant was asked to recommend the one action he or she would take or like to see taken to make a difference in the Aquarium of the Pacific's efforts to enhance public awareness and understanding of the ocean. This list captures their wishes—the one thing above all others each participant felt most strongly about. Many are described in more detail throughout this report and in submitted statements in Appendix 3.

Our Visitors

- Give information to visitors about how people and the ocean are interconnected, Show them **how to be** involved and give them opportunities **to be** involved.
- Tell visitors some local success stories, e.g. the Montrose Settlement, DDT and recovery of Pelicans and Peregrine Falcons, local eradication of *Caulpera*, etc. Also regional, national, and global success stories, connecting these locally.
- Make it obvious to our visitors that we are serious about environmental issues—recycling, energy, and water use. Celebrate what we do and give visitors more visible opportunities to participate in recycling onsite, e.g. bring in a shopping bag for Pacific Collection purchases.
- Create experiences that surprise visitors, experiences they wouldn't expect to find in an aquarium, that add new dimensions. Punctuate and reinforce important messages and emotions.
- Be careful of visitor sensory overload—museum fatigue and/or, boredom.
- Be very careful in choosing what we want the public to know. Select things they can relate to and that are personal. Hone the messages.
- Make the stories told to visitors and the messages delivered consistent throughout the Aquarium's various venues. Speak as one voice.

The Aquarium's Ecosystems

- Transform the three galleries into three ecosystems, the exhibits into habitats, etc.
- Convey strong conservation messages at the end of each ecosystem (gallery). Don't rely on text alone, however, and use text sparingly when it is used.
- Incorporate global climate changes into all three ecosystems. Integrate it seamlessly and make it relevant to and understandable by visitors.

- Add environmental lessons, conservation messages, and success stories to each ecosystem.

Visitor Experiences

- Create small hands-on experiments that the visitor can do and integrate them into the experience.
- Create an experiential chamber using new technologies so visitors can see the ocean in new and different ways and at different temporal and spatial scales.
- Emphasize the diversity and abundance of life in the ocean.
- Develop exhibits and programs to raise the awareness of what's happening to the ocean now—over-fishing, global climate change, shore erosion, nonpoint source pollution, etc.
- Develop something that tells the story of Southern California beaches—their economic importance, origins, processes that form, maintain, and destroy them; beach recreational activities.
- Differentiate the Aquarium of the Pacific experience from other venues in Southern California.
- Focus on the future, the unknown, on questions instead of answers.
- Integrate conservation into the entire Aquarium of the Pacific experience.
- Create an “Ocean Introduction” area outside of the Aquarium to provide context and perspective.
- Investigate and adopt games as a venue in and outside the Aquarium, on the website, and in other venues.

Mission Driven Explorers

- Increase the visitors' sense and awareness of the Aquarium's mission.
- Convert visitors into explorers with a mission. Give them explorations to complete, and goals to achieve.
- Define ocean awareness and literacy with a set of behavioral changes for visitors to commit to.
- Give visitors something to take home that further enhances their mission.

Reaching Out

- Continue development of the Aquatic Forums to make them an important interface among scientists, stakeholders, and decision-makers on environmental issues.
- Use the California Aquarium Collaborative (Aquarium of the Pacific, Birch Aquarium, Cabrillo Marine Aquarium, and Steinhart Aquarium) in joint ventures that deliver uniform messages about the state of the ocean and positive actions needed to save it. Nurture and expand the collaborative.
- Reach out to new audiences beyond families and children.
- Incorporate messages part of the “California Ocean Awareness Campaign” into appropriate Aquarium experiences.

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IMMEDIATE RESULTS FROM THIS WORKSHOP AND NEXT STEPS

Changes in Progress

Having “outsiders” team with staff brought fresh perspectives to the Aquarium scene. The result was that even before the workshop ended, changes were agreed to and one week later some have started to take place or are “in the works”.

- Shifting baseline lenticulars removed
- A “green” shelf in Pacific Collections in the works
- Conversion of Café Scuba to a “green” restaurant in the works
- Research on a subject to be announced for the first Breaking Waves display undertaken
- Level 1 improvements in lighting occurring
- Joystick at live coral exhibit removed.
- Immediately following the workshop the recommended locations for installation of the two Magic Planets were evaluated. The location recommended for the smaller of the two Magic Planets within the “tropical ecosystem” will work. The location recommended for the larger of the two Magic Planets (landing outside of the end of “tropical ecosystem”) is less desirable because the too high ambient light levels wash out the colors of the Magic Planet images degrading the visual impact. A near-by site was identified within the “tropical ecosystem” that will not interfere with other uses of this space recommended by participants.

The Next Steps

As pointed out above, several of the needed actions identified by the workshop participants have already been taken or are underway. Others will require more organized efforts. Still others will need to be assessed for seasonal feasibility, crowd traffic control, space availability, and funding. A preliminary assessment of actions that will be taken and when follows.

- Word of the Day/Week/Month Program: By August 22, 2006 a team will be formed to develop the working plan for this program. The team will be charged to launch the sustained program Aquarium-wide by October 1, 2006 or before. Team representation is under discussion.

- Breaking Waves Post-workshop Proposal: The same team identified above will be responsible for the development and implementation of the “Breaking Waves” program. The target date for publication of the first issue is also the same; however, steps will be taken to be ready to publish an earlier issue should there be an unanticipated need. The detailed proposal is included in the Breaking Waves statement at the end of this report.
- Transformation of “Galleries” into “Ecosystems”: This will be an evolutionary process, but one that will start immediately. New color pallets and graphic design will be selected for signage in each gallery and tested before being adopted. The emphasis shall be on clarity of message, elegance of design, and contribution to creating an appropriate mood, look and feel for each particular ecosystem. New ocean science and conservation messages will be developed and tested for each ecosystem. All of these messages will be developed in collaboration with experts on the particular ecosystem. The Vice-President of Marketing and Communication will be responsible for incorporating the ecosystem theme into the summer 2007 Passport should the conversion be completed by that time.. Plan drafts will be distributed to workshop participants and other experts for comment before being adopted.
- “The State of The Ocean” Exhibit: By August 15, 2006 a brief white paper will be prepared outlining the rationale for such an exhibit and the themes that might be covered. This paper will be circulated to workshop participants and to other leaders in the ocean community for review and comment. A working group will be formed by September 1, 2006. The goal is to have an exhibit in place by the spring or summer of 2008. Creating this exhibit will require sponsorship and extramural support. The effort to secure funding will begin no later than November 2006.
- Magic Planets: The Magic Planets will be installed by October 1, 2006 with appropriate interpretive signage. Software will be selected that can be used to tell state of the ocean stories. Staff education for presentations will be an integral part of the planning.
- Enhancing the Plankton Corner: A plankton laboratory team will be formed by August 15, 2006 to begin to develop a detailed plan to implement the recommendations made by workshop participants.
- Telling the Aquarium’s Conservation Story: A team led by the Vice-president of Operations, the Vice-president for Special Projects and Governmental Relations, and the Director of Exhibits will develop the text and layout for an exhibit that describes the Aquarium’s initiatives in water and energy conservation, its commitments to environmentally responsible purchasing, reuse and recycling, and its commitment to LEEDs in all future projects. The text and layout will be available for review by October 15, 2006.

- Revising “10 Tips for a Healthy Environment: The Director of Education will led a team that includes the Vice-president of Marketing and Communication to redesign the 10 Tips to correct the Aquarium name, provide a new graphic appearance that is more marine, and present fresh tips. The new content will speak with the same voice as used in a similar document given to Pacific Current members. The new 10 Tips will be available when the supply of the current version is exhausted.
- Establishing the Aquarium’s Ocean Awareness/Ocean Literacy Identity: A team led by the Vice-president of Marketing and Communications will develop a case statement and graphics feel and look that will make the Aquarium’s program uniquely visible to visitors, staff, funders, and the “outside world”. This may include a program name, logo, and poster child. Because of the amount of research necessary on copyright issues an implementation date needs additional input and study.
- Speaking as One Voice: Incorporating the “California Ocean Awareness Campaign” into Aquarium of the Pacific Experiences. Following the formal launching of this campaign at the September 2006 “California and the World Ocean ’06 Conference”, a team led by the Vice-president of Marketing and Communications (a member of the California Ocean Communicators Alliance) will begin development of a plan to incorporate the campaign messages into Aquarium programs. Finalization of the plan is dependent on availability of campaign details about release dates, messages, delivery of messages, how they will be communicated to members of the Ocean Communicators Alliance, website linkages, etc.
- The Rest of the “Ideas”: A team selected from the Aquarium staff will study workshop recommendations not addressed above such as trails, including spiritual experiences, shifting baselines, providing for levels of interest, Aquarium field guide, etc for feasibility, priority setting, and scheduling. A report will be due November 1, 2006.

**“Knowledge of the oceans is more than a matter of curiosity.
Our very survival may hinge upon it.”**

President John F. Kennedy

APPENDIX 1:

AGENDA

AQUARIUM OF THE PACIFIC
**Increasing Public Ocean Awareness and Understanding:
An Aquarium Model**

Agenda and Strategies
10-12 July 2006

July 10, Day 1

- 8:00 am** Meet in classroom in Aquarium for overview of desired outputs and outcomes, discussion of what it means to be an ocean literate person. This will be followed by a walk through of the Aquarium looking for places and ways to incorporate components of ocean literacy. Continental breakfast will be served.
- 10:00 am** Resume in plenary in Suite 100 conference room. Discussion, clarification of issues, goals, etc. and formation of SWAT teams around issues and modalities (films, signage, exhibits, programs, encounters with nature, offsite, etc.).
- 12:00** Working Lunch
- 1:00 pm** The first wave of SWAT teams makes their rounds or stay put to do their work.
- 4:00 pm** Plenary in Suite 100.

Teams report out. First draft of the “frames of reference” for ocean literacy at the Aquarium of the Pacific formulated.

July 11, Day 2

- 8:30 am** Meet in Suite 100 to review and revise the “frames of reference” for ocean literacy at the Aquarium of the Pacific. What’s missing? Reform SWAT Teams around revised/new issues/modalities. Continental breakfast will be served.
- 10:00 am** SWAT teams work independently.
- 12:00 pm** Working lunch in Suite 100. Identification and exploration of success stories in ocean literacy in Aquarium of the Pacific and in other institutions. Lessons learned. New SWAT Teams formed.

- 1:30 pm** SWAT Teams meet independently.
- 3:30 pm** Break
- 3:45 pm** Facilitated discussion of other dimensions (other than science) of ocean literacy—spirituality, art, history, political science, etc.)
- 6:00 pm** Working dinner at KYL. Identify important examples of books, exhibits, films, posters, programs, websites, etc. that promote ocean literacy.

July 12, Day 3

- 8:30 am** Meet in Suite 100 conference room.
- Putting it all together. Revisiting, reviewing, and refining the “frames of reference” for ocean literacy at the Aquarium of the Pacific. Facilitated discussion.
- 10:00 am** Break
- 10:20 am** Continued discussion. Next Steps.
- 12:00 pm** Working lunch
- 1:30 pm** Adjourn

APPENDIX 2:

LIST OF PARTICIPANTS

Name	Organization	Email
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APPENDIX 3:

SUBMITTED STATEMENTS WITH INPUTS

Essential Principle 1: *The Earth has one big ocean.*

Statement 1: *The ocean covers the majority of earth.* It has more diversity and abundance of species than those found on land, and yet it is still a finite resource. In regard to topics such as commercial harvesting (fishing) both the reliance of people on seafood, and extinction of this resource because of over-harvesting need to be addressed.

Input:

- History of fishing
- Loss of big animals
- Importance of fish to culture

Statement 2: *Is the well drying up?* The public, like many politicians and developers, does not understand that we have all the water we will ever have on earth and what we do have is constantly being recycled. It has been said wars of the future will be fought not over religion, but over water. Visitors who understand where our water is, how limited a recourse it is, and how the water cycle works, will be stronger advocates of water conservation.

Input:

- Tell the water cycle story graphically and in presentations. Show illustrative numbers between salt water (huge) and freshwater (tiny).
- Start the story outside the Aquarium entrance by tying in the Long Beach Water Department's graphics and the River of Life fountain.
- Engage visitors in a Q&A interactive section about how much water they use, where does it come from in nature, etc. Then move to water conservation.

Statement 3: *How can we learn from our actions of the past to make a difference for the future?* The earth's continents and islands, atmosphere and oceans are not separate elements, but are interlaced components of a finely-tuned global system. Whatever we do to the land affects the oceans. Changes to the ocean affect the atmosphere and in turn, changes to the atmosphere affect global weather patterns.

Input:

- Historical fisheries
 - Atlantic Cod, salmon, etc.
 - Contrast of equipment, fishing methods
 - Economical impact
- Tuna—Tuna Club of Catalina
- Historical photos—shifting baselines
 - Records of Long Beach Yacht Club, other local groups

- Locations: area between North Pacific entrance and exit
 - Harbor Terrace a possibility?
 - Check out the Marine Museum in Victoria, Oregon

Statement 4: *The living ocean is finite.* Oceanographers and others are fond of saying the world is 70% water; however, relative to the mass of Planet Earth, the ocean is a thin, delicate film making up less than one percent of the mass of our home planet. The vast majority of the world ocean supports very little life. The regions of the ocean that support greatest diversity and abundance of life are under the greatest pressure from over-harvesting.

Input: Satellite images—show where chlorophyll is globally, overlay with maps of fishing pressure

Statement 5: *How can we learn from our actions of the past to make a difference in the future?* Historically, access to the ocean was important for trade, and a safe harbor was a valuable asset. Major cities subsequently grew up around the best harbors and near river estuaries. Cities were built on rivers that provided links to the sea and to the major traveling routes. Considering that more than one-third of the human population lives within 37 miles of the coastline, what can we do to lessen our impact on the ocean?

Input:

- Program/exhibit/take-home idea: Pollution scenario simulation
- Scenarios and computer game

Statement 6: *The public should be helped to understand that every water body is somehow connected to the ocean, and any chemical or pollutant can affect the lot of ocean and freshwater sources.*

Input:

- Watershed exhibit
 - Display trash found in Long Beach that definitely came from somewhere else (point source pollution)
 - Small display of products actually lost from cargo ships (shoes, LEGOs, etc.)
 - Currents

Statement 7: *The ocean is not limitless, neither is it a “bottomless” resource.*

Looking out from shore, the ocean appears almost limitless in its physical powers and dimensions; to contain interacting, finely tuned, unalterable ecosystems with ancient origins; self-sustaining in its ability to absorb, dilute, and dispense our wastes; and perpetually bountiful in its supply of fish to feed us. It is **none** of these. Every aspect of the ocean has limits and delicate balances.

Input: Various sustainable seafood messages—see Café Scuba ideas

Statement 8: *The ocean is rife with patterns and rhythms, that once better understood, will make us much more aware of our connectedness to the ocean.*

Achieving a deeper understanding will allow us to be more effective ocean stewards. We need to seek knowledge and understanding regarding:

- Water—it's a “non-renewable resource” and the ocean gives us our water supply.
- Waves—local waves and from distant parts of the planet affect us daily.
- Tides—lunar patterns seem almost mysterious compared to our solar perspective. And, can we use or harness the tides?
- Weather and cloud patterns—the ocean moderates our climate and allows us to live on this fragile planet.
- Clouds and wave patterns—The Polynesians seemed to “get around” a lot better than we do when it comes to living in harmony with the ocean. Why and what happened?
- Earthquakes, tsunamis, tides, currents, and

Input:

- Magic Planet
- History of early navigation such as Polynesian bamboo current mentioned in Pacific island expo
- Demonstrate how the Polynesians used currents and wave patterns with stars and sun to find their way
- Tsunami experiments—show how tectonic uplift and subduction affect water column. Display on the website.
- Wave terminology—rogue wave vs. tsunamis
- Safety on jetties

Statement 9: *The general public does not widely use nor understand the one world ocean with basins, seas, bays, lagoons, estuaries Essential Principle.*

To understand and accept “How the ocean affects me and how I affect the ocean” individuals need to understand and internalize the one world ocean and its connectivity concepts.

Input:

- A virtual journey on the conveyor belt
- Walk around Ocean (p.10) and the Bobby the Duck story (p.61) in the educator's workbook
- A virtual walk of the world ocean and its basins that includes the predominant marine inhabitants
- Trail idea that travels an ecosystem, drawing connections from how the ecosystems are similar and how they are different.

Statement 10: *The topography of the ocean floor looks similar to that of the continents.* However, looking at a chart of the seafloor, it is evident that its topography

is even more varied than that of the continents. Under the deceptively flat ocean surface are tall mountain ranges, deep trenches, submarine canyons, and broad valleys.

Input: Magic Planet—with water in the ocean and with the ocean drained

Statement 11: *Why is the ocean salty?* The salt (sodium chloride) found in the ocean comes from rocks/minerals in the land mass transported by run-off to the ocean. Rain or water run-off can erode rock or soils rich with chlorides. The water breaks down the soil or rocks and carries the material along in a dissolved state as ions. The ions in the run-off are carried to the streams and rivers and then to the ocean.

Dissolved ions are either moved from the ocean by organisms or remain for long periods of time. The result? Their concentrations increase over time.

The two ions most often present in seawater are sodium and chloride. They make up over 90% of all dissolved ions in seawater. Salinity, the concentration of salt in seawater, is about 35 parts per thousand, or about 35 of 1,000 (3.5%) of the weight of seawater comes from the dissolved salts. The weight of salt as sodium chloride is about 120 million tons in a cubic mile.

By some estimates, if the salt in the ocean could be removed and spread evenly over Earth's land surface, it would form a layer more than 500 feet (166 m) thick, about the height of a 40-story office building.

Input:

- Working model showing water cycle
- Facility for giving visitors opportunities to taste filtered and sterilized mid-ocean salt water and brackish water from a river mouth or estuary. See if they can taste the difference.
- Demonstrate the differences in specific gravity in salt, brackish, and fresh water.

Statement 12: *The supply of seafood in the ocean is not endless, so we must consume wisely and support sustainable seafood practices.* Whether it is fresh or farmed fish, fried shrimp, imitation crab, or frozen fish sticks, nearly all Americans in every part of the country consume some seafood in some form and can help conserve it.

Input:

- Fish are animals. Fish include animals that don't look like typical fish do.
- Fast food includes seafood. Imitation seafoods are usually made from fish.
- Highlight that "fresh" doesn't necessarily mean the most healthy or the best for the environment (sustainable)
- Partner with supermarkets, restaurants to highlight sustainable seafood choices
Example: Wild Oats at Santa Cruz marks red, yellow, green seafood
- Define sustainability in an exhibit at the aquarium or simulation game on website
- Develop labels equivalent to USDAs for sustainability – would you buy this if you were depleting?

- Have an exhibit about bycatch, economic costs
- Incorporate sustainability messages into Blue Cavern presentations
- At shrimp exhibit, highlight the entire habitat, other animals affected by shrimp fishing
 - Positive story example, shrimp fishermen have taken steps to reduce by-kill (save more turtles, etc.)

Statement 13: *Why is the water off the southern California coast colder than water at the same latitude on the U.S. east coast?* An opportunity to talk about ocean circulation.

Input:

- Graphic showing the currents in both the eastern Pacific and western Atlantic coupled with a 3-5 minute presentation
- Use Magic Planet to illustrate not only ocean circulation, but also the one ocean concept.

Statement 14: *There is one global ocean consisting of several basins.* The Earth has one interconnected world ocean divided into several basins: the North and South Atlantic Ocean between Europe and the Americas, North and South Pacific Ocean between Asia and the Americas, the Indian Ocean between Africa and Asia/ Australia, the Arctic Ocean surrounding the North Pole, and the Southern Ocean surrounding Antarctica.

Input:

- Stories about rubber ducks or Nike shoes
- Story about plastic nurdles and the North Pacific gyre
- Magic Planet presentation

Statement 15: *Most of the world's populations live along the coast.* Occupants in many cases have spent centuries building infrastructure on the land where sea levels will have impacts that will not only be felt on the coasts but also worldwide. It will be impossible for coast dwellers to just “move inland” to escape from the effects. Long term plans must be taken to address the issues that rising sea levels will have on coastal populations.

Input:

- Use images such as the night lights of Planet Earth to show population density
- Use the Magic Planet to illustrate historic, present, and anticipated coasts

Statement 16: *The ocean covers 71 percent of the Earth's surface and contains 97 percent of the Earth's water.* Less than 1 percent is fresh water, and 2-3 percent is contained in glaciers and ice caps

Input:

- Review the “wet and wild” program currently used in schools for applicability to Aquarium visitors.
- Although this fact is fairly well known to most people, showing them an example that has some familiarity to them will lead from ocean awareness to ocean literacy
- Display a graphic such as a poster near a model of the planet or Magic Planet
- Create a presentation for the Aquarium’s Marine Life Theater as part of the Aquarium’s overall ocean literacy project

Statement 17: *What is the ocean conveyor belt, how does it work and is it important?* It can be described as the ocean’s deep water current that moves cold water to warm water and warm water to cold water locations, involving both the Atlantic and Pacific Oceans. The ocean’s conveyor belt allows water to move from one ocean to another, causing cooling or heating of the ocean’s mass and aids in weather movement, ocean currents, and availability of food supplies to the animals (including humans) who occupy the basins and seas.

Convection probably best describes the conveyor belt momentum. Water temperature and salinity are the primary drivers of the conveyor. Simple events like large draining of fresh water lakes can slowdown or halt the conveyor and cause serious weather events to the surface of the earth, which could seriously harm the ocean and animals living within.

Input:

- Activities in discovery classrooms or at mobile carts
 - Make solutions of water with different densities and dye with food coloring, mix together and see what happens (e.g. Pour down a layer of warm, fresh water, and then pour cold, salty water over this to see overturn)
 - Use Magic Planet or maps/posters of ocean circulation as instructional aids to talk about how this relates to ocean circulation. Explain difference between wind and thermohaline and how climate is driven.

Statement 18: *Most of the world’s population lives in coastal areas.* More than half of the US population lives in coastal regions and in addition, approximately 180 million people visit US coasts in a year. Therefore, it is important to stress the connections of people, the ocean, the coast, and population densities.

Input:

- Use an aerial satellite photo of the coast and the houses that are built along it. Along with the photo, share information about the impact of humans on the coast.
- Outreach—equivalent of Audubon citizen scientists, but with Yacht Clubs
- Integrate into an Aquarium display at So Cal/Baja or Harbor Terrace

Statement 19: *From the Mountains to the Ocean White with Foam.* Everyone should have a basic understanding of the watershed, how it affects them, and how they affect it. The Los Angeles River actually begins on the San Fernando Valley side of the

mountains behind Malibu, winds through the Valley, downtown Los Angeles, and empties into the Pacific Ocean in Long Beach. The San Gabriel River begins in the San Gabriel Mountains meeting the Pacific in east Long Beach and Seal Beach. The volume of water discharged into the ocean from each of the rivers differs substantially. The San Gabriel is run through a series of settling ponds to replenish the aquifer. These ponds can be seen from both the 605 and 60 freeways. The L.A. River has no settling ponds.

Input (prior to workshop, submitted with pre-workshop statement):

- 1) A computer with a large screen mounted on a rolling cart. A staff member could give a 3-5 minute presentation on watershed with the L.A. basin watershed depicted on the screen. At the end of the presentation, the local visitors could check out the map to see where they live in the watershed. By being able to point the spot, they may take more ownership of the watershed and accept the fact that no matter where you live you live on the ocean and take steps to eliminate their contributions to nonpoint source pollution.
- 2) Presentations on various topics such as watershed in Marine Life Theater between the children's game show. Marine Life Theater is not fully utilized, in fact, it is unused a great deal of the day
- 3) Presentations at River of Life fountain
- 4) Watershed game in which players manipulate the water flow to the ocean for good and bad results
- 5) A virtual journey through the water cycle
- 6) Plan for integration of pending watershed exhibit into ocean awareness, preferably with interactive activities.

Input (at workshop):

- Nature tours—driving, iPod and bike, PSPs—downloads from aquarium's website
- Small watershed model (marbles with different sets of pegs) for community outreach

Statement 20: *What are the different types of water bodies such as ocean, basin, bay, lagoon, and oceanic land masses such as atolls, islands, etc.? How do they differ? What wildlife calls them home?*

Input:

- List and illustrate in applicable ecosystems. Make the display interactive enough for the public so people to learn what parts make up Planet Ocean. Example: Show what lives in different water bodies and in well known places such as San Francisco, Santa Monica, and Chesapeake Bays, and the Channel and Hawaiian Islands.
- Show how islands were populated by wildlife and how exotic species reach them. Also include conservation issues.
- Passports—glossary— "ocean terms"
- Investigate use of the European ocean passport as something for visitors to carry around and use as several California aquariums are doing. (Not used at Aquarium of the Pacific)
 - Gain status, privileges, access to ocean activities

Statement 21: *The Ocean has limited homeostatic resiliency.* The ocean's biogenic sediments and environmental history are testament to the world ocean's homeostatic resiliency, plasticity, and ubiquity. Biogenic sedimentation influence atmospheric and oceanic environments by acting as sinks for the nutrient elements that drive biogeochemical cycles.

Exploration

Human activity may be overwhelming the ocean's self-regulating environmental system. The ocean's homeostatic governance of atmospheric temperature, chemistry and other oceanic factors deriving from the geosphere, hydrosphere, biosphere and atmosphere may not be able to restore equilibrium before significant disruption and damage to the ocean's critical habitats has occurred.

Conclusion

The Ocean has evolved and continues to function as a self-regulating environmental system. Biogeochemical transfer of matter and energy among the geosphere, hydrosphere, atmosphere and biosphere constitutes a readily measurable aspect of ocean's self-regulatory processes.

Input: Passport, glossary

Statement 22: *While the world ocean is vast it is not unchanging or unchangeable.* The ocean has changed in volume and shape over the course of Earth's history. It will continue to gradually change independent of the influences of people. However, it is an unavoidable fact that people are changing the ocean faster now than ever before in its human history through over fishing, coastal development, pollution, and the production of greenhouse gases.

Input:

- Over-fishing: Harbor Terrace
 - Commercial fishing
 - Recreational fishing
 - Community outreach to citizen scientists
 - Yacht Club
- Pollution: 50K lbs of trash out front
- Greenhouse gas: climate change with Magic Planet

Statement 23: *The Ocean in Motion: Will the surf be up today? Will the grunion run?* Look out on a calm day and you see a uniform flat blue sea. But even in its most serene state the ocean is in motion, moving because of the forces of the sun, moon, and the rotation of the earth. Tides, currents, sea level changes—all can be brought into a presentation.

Input:

- Magic Planet

- Current events. Be a part of the beach community. Show surf reports and weather mapping.
- RSS feeds, automatically update top lines
- In ocean sciences exhibit or on the website show how data buoys work, relaying data and/or how tides work. Let visitors know where buoys are located locally.

Statement 24: *What is the water cycle?* Scientists, environmentalists, and some political leaders are all concerned about where the water will come from to supply a growing population that at least in the United States does not have a water conservation mind set. If people had a better understanding of the water cycle, where our water comes from, what happens to the water that isn't allowed to percolate into the ground replenishing the aquifers, etc., they may be motivated to become water conservation stewards.

Input:

- Illustrate the southern California region in a graphic to make it relevant to the majority of our visitors. Some means to reach non-locals should be provided. Take home messages should definitely be included.
- Illustrate the Aquarium's Clean Water Act by contrasting the Aquarium's water cycle (filtration system, water treatment, etc) with that of water districts
- Highlight the Aquarium's water testing lab by demonstrating at the mobile cart how some of the tests done
- Produce an interactive game about what saves or wastes the most water
- Give short presentations at a dedicated water cycle mobile cart in the Great Hall or in Marine Life Theater.
- Website
 - Information on ocean from oceanography to animals
 - Current topics
 - Surf data—Why and where swells come from
 - Weather—What is causing it?

Statement 25: *The ocean environment is three dimensional, offering the largest living space on Planet Earth.* The ocean has diverse habitats from the surface through the water column to the seafloor. Most of the living space on Earth is in the ocean. The future of the living ocean depends on our understanding of its potential, resiliency, interdependency and limitations.

Input:

- The Ocean Learning Center animal database
 - How animals interact with habitats game
 - Visitors match animals to habitats including where in the water column they live. Interactions rather than just reading

Statement 25: *It's one global ocean.* Earth's "oceans" are actually a single interconnected body of water, with air, water, sedimentary currents, and migratory

animals that create a complex interconnected global ecosystem. Thus local and regional marine practices and activities can have global consequences.

Input:

- Map, Magic Planet, Jim Baker's shark data
 - Link to NOAA tracking—real time
- Narrative experience more than overview (often confusing)
 - Example: the movie, *March of the Penguins*
- Also political story
 - Example: Migration of gray whales covered by international and local regulation (Mexico, Canada, and US west coast states and Alaska.
- Incorporate into OLC's online animal database
 - Have photos of currently tagged and tracked specimens, link to real-time location data, accumulated path data
 - Feature a story about a migratory marine fish, anadromous fish, or sea bird.

Statement 26: *If Planet Ocean is so large (over 70% of Planet Earth), how can the melting of the glaciers and ice caps cause such a large increase to the sea level? Wouldn't it be more a few inches of increase?* The year 1998 was called "The Year of the Ocean." In a report issued that year scientists predicted that by the year 2100 the sea level would rise a high of 89 cm (3 ft). The study indicated the change in sea level would occur at 5 mm per year. The sea level impact has begun and small Pacific islands or atolls have begun to disappear or shrink from the rising of our oceans.

The largest impact to be concerned will be storm surge. Mixed with the increase of sea level, large tidal cycles and storm surge could force sea level to extreme heights. Recent storm surges recorded some events to be 10 to 20 feet in height.

So yes, the melting of glaciers and ice caps will have a sizable impact to the population living at or near the sea level of our oceans or seas.

Input:

- Basic question in a message: "When you hear someone mention a three feet sea level rise, what do they mean?"
- Website
 - Current events—Oceanpedia project
 - Localized models of what a three feet sea level rise means at significant locations (Long Beach, NYC, India, Middle East)
 - Point out areas such as some Pacific islands and Alaska coastal villages already affected

Statement 27: *How can a tide be so high in one place and so low in another place at the sometime?* Tides are large swells or waves with long wave lengths that can rise and fall, due to the dynamics of the earth, the moon and the sun gravitational pulling of

the large water mass (oceans and seas) by creating a bulge.

Based on the physical location, gravitational and atmospheric events, these tides can be very high or very low. And the tidal effect can be different from one location to another just a few hundreds of miles apart. Tidal events occur twice a day; two high and two low tide cycles. Each cycle can be different in height or drainage depth.

Sr. Isaac Newton (1642 -1727) was the first person to explain tides scientifically. His explanation of the tides (and many other phenomena) was published in 1686, in the second volume of the *Principia*.

Input: Magic Planet—something to visualize movement of gyres

Statement 28: *Shifting Baselines and the Shifting Baseline Syndrome.* “Shifting baseline syndrome” is shorthand for stating that overtime people have narrowed their perspective and lowered their standards with regard to ocean health and the abundance of ocean resources. Gradual changes go unnoticed in contrast to rapid ones that can energize the public to take action. The storylines to connect the public to sustainable fishing and protection of diminishing ocean resources need to engage visitors in a personalized activity in which they think back to their connections with nature and the ocean and the different experiences of younger generations—the “I remember when.”

Input:

- Story time/storyline—for adults and kids
 - Involve audience as a part of story
 - Connect to shifting baseline
 - A change/recovery story
 - Conversation/story telling area including puppets and props
 - Children’s corner
- Need a way to explain past-present-future
 - Maybe a “peak into the past-present-future”
 - Different future scenarios
- Choose your own adventure—touch screen next to exhibit
 - Different future outcomes
 - Historical photographs of Long Beach, what it is now, what it will look like in 50 years
 - Shifting baseline—word of the week

Input as a result of the aquarium tour

What is needed for storylines about kelp or coral? What happens when kelp disappears? What happens when coral disappears? This is what needs to be done to prevent this from happening.

Storyline

- Describe problems with visuals of shore (beaches, coral)
- Get guests to go back and look at live exhibit

- Map of global coral distribution (past and present). Global warming message
- Jewel boxes—bleached coral
- Series of questions: what will happen to the fish? What will happen to the fishermen?
- What is being done?
- Management success stories: NW Hawaiian Islands archipelago national monument, propagating coral (e.g., Philippines)
- What can be done?
 - Think twice about touching, collecting, or buying coral or coral products
 - Control pollution, coastal over-development, erosion and runoff
 - Reduce green house gases. Mangrove story.
 - Ban worldwide dynamite or cyanide fishing
 - Support sustainable agriculture and development:

Kelp

- Description of problem: Pollution, over-fishing, climate change
- What will the impact on sea otters be? On the economy? On the fish?
- What is being done? Otter success story at Monterey Bay, LA Harbor breakwater planting, reforestation
- What can be done? Sustainable fishing and development, protect existing kelp forests, reduce greenhouse gases

North Pacific climate change and conservation issues

- How does climate change effect x,y,z?
- Can species shift habitats?
- How will the weather change?
- What will happen to our coastal town's indigenous populations?
- What will happen to fresh water supplies?
- What will happen to marine mammals and birds?
- What is being done? Alternative energy such as wind farms (San Francisco: solar panels on all municipal buildings)
- What can be done?
 - Encourage legislation to reduce greenhouse gases
 - Reduce your carbon footprint: Take ecological footprint quiz
 - Educate yourself and others

Essential Principle 2: *The ocean and life in the ocean shape the features of the Earth.*

Statement 1: *The ocean and life in the ocean shape the earth.* An amazing fact to share: When Sir Edmund Hilary first scaled Everest; he retrieved basaltic rock at its peak. The conclusion? Material on top of Everest was formed underwater!

Input: Magic Planet demo—show the formation of plates and movement

Statement 2: *The beach is disappearing!* To understand how their actions can affect the coast and especially beaches, the public needs to understand how the coast was created, what sand is, what causes beach erosion, what the seasonal changes in beach sand are and why, and what the cost is for preventing or “curing” beach erosion?

Input:

- Have overlay photos of Long Beach 50 years ago and today so people can see how the landscape has changed. This would make it real for people by giving local examples
- Use stories to lead into lessons
- Tell the economics story about beach replenishment
 - Local examples: Venice and Santa Monica beach are not natural; they are replenished sand
- Utilize page 28 of the CORE report (Workshop 1)

Statement 3: *Limits & balances of the marine ecosystem.* The Earth's enormous ocean has relatively small habitable areas for marine animals. This has led to the evolution of complex symbiotic relationships and ecosystem balances that marine organisms depend on for survival. Human activities can imperil or even destroy these delicate systems, harming our resources, economy, and protection against natural disasters.

Input:

Ideas to convey

- Ecological interactions
- Each species necessary
- Humans are changing the food webs
- We don't fully understand most marine ecosystems, so we can't anticipate all the effects of our actions. Ties in with “the ocean is largely unexplored.”

Food web display for younger children

- Position different organisms on different parts of the web according to their roles. Remove one species – have players guess how that will impact the whole web. Make connections by asking which species will increase/decrease?
- Add a new exotic species (i.e., zebra mussels in the Great Lakes, Asian shore crabs, etc)

- Have players guess what that organism’s ecological role would be by comparing it with native organisms (i.e. Native mussels filter feed plankton so zebra mussels probably do too) and tell kids that species has no predator and tell them to predict the effects

Incorporate with existing exhibits

- Have people go on path or through aquarium looking for ecological interactions in tanks. What would happen if you changed organisms

Statement 4: *Explore southern California’s coast, seafloor, and our chain of islands—a local and regional approach to understanding the geology of the ocean floor and coast.* What is under the water right off our coast? Not many people know about Monterey Canyon, few know about our southern California canyons, Montrose, Redondo, and Santa Monica. How does the Pacific Coast compare to the Atlantic Coast? How were the Channel Islands formed?

Geology is not a science that is well understood by the general public. Providing venues to help our visitors understand more about how the coast, seafloor, how the Channel Islands were formed, and why all continue to change would open up avenues for expansion to the DDT story and the Montrose Settlement, beach erosion, sea level rise, and unique features of the Southern California coast and ocean.

Input:

- Install a large floor map featuring the Southern California bight outside the Aquarium’s front area so people can see the “land” under the water
- Install a sign at the “shorebirds exhibit” showing the success story of the comeback of Pelican and Peregrine Falcons from DDT contamination. Tell the Montrose settlement story.
- Explain why it is still not safe to eat some fish species caught in certain areas along the coast

Statement 5: *The positions of the continents and ocean basins are always changing.* The movement of the Earth’s plates continually restructures the continents and ocean basins. About 250 million years ago, there was one super continent surrounded by one super ocean. This super continent broke apart, eventually forming Earth’s present day configuration. Currently, some ocean basins are closing (e.g., the Pacific) while others are widening (e.g., the Atlantic).

Input:

- Magic Planet, could be 2D
- Provide a puzzle or website game that allows players to arrange the continents
- Demonstrate tectonic plate movements

Essential Principle 3: *The ocean and life in the ocean shape the Earth.*

Statement 1: *Oceans play a major role in managing carbon dioxide.* Increased emissions of carbon dioxide are responsible for the warming of our planet. Reversing the rate of these emissions appears to be a nearly impossible task. In the last century the human population quadrupled, power consumption increased 16-fold and atmospheric carbon dioxide increased from about 275 to 370 parts per million. The demand for power is rapidly accelerating. Serious environmental consequences will result unless carbon dioxide emissions can be managed. Can ocean organisms capture the carbon and store it for long geologic time periods? Oceans absorb carbon dioxide naturally in ongoing processes.

The oceans' capacity for carbon dioxide is large. Oceans already take up 2 billion metric tons carbon emitted by human activity each year. Accelerating the rate of carbon sequestration may involve adding nutrients such as iron to the surface of the ocean to stimulate the growth of phytoplankton, which takes up additional carbon from the atmosphere. When these tiny ocean plants and animals eat nutrients and then reach the end of their lifecycles and die, they, and the carbon inside them, drift down into the ocean's depths. Carbon dioxide from the atmosphere enters the surface ocean to replace the carbon that sinks.

Input:

- Show the various ideas people have of counteracting global warming: big mirrors in the sky, ships that put mist in the air to make more clouds, adding iron to stimulate growth

Statement 2: *The world's beaches are not only polluted, they are disappearing as well.* Beach cities are fighting to save their coastlines by dredging and dumping millions of cubic feet of sand on their shores. San Diego dumped 54 million cubic feet of dredged sand on 12 badly eroded beaches, the biggest beach-replenishment project ever attempted on the West Coast. Most of the sand was gone in less than two years. Dredging sand for beach replenishment inevitably fails because the waves will simply wash it away again. There is no money to dump millions cubic feet of sand every year (at a cost of \$15 million).

As global warming raises sea levels and powerful storms sweep sand from shores, pumping and dumping sand onto beaches is a temporary multi-billion-dollar fix. Between 1995 and 2006, 17 states spent \$1.25 billion in federal taxes on beach nourishment. Ever more-powerful ocean storms will pound beaches in the future, according to study results reported by Purdue University's Climate Change Research Center. As sea levels rise, erosion rates in the greater New York City and Long Island region are projected to increase six times by 2050. About 62 percent of the Texas coastline is actively eroding, with some areas losing five to 10 feet every year.

Beaches have their own mechanisms for maintaining sandy shores, but sea walls and jetties have blocked those processes. Natural erosion dumps millions of tons of sand into rivers that eventually carry it to the sea. But dams, particularly in Southern California, have cut off this flow of sand. Shorelines are dynamic, and without a chance to retreat there will be a lot fewer beaches in the future. There are 30 miles of armored shoreline in North Carolina, 110 miles in California and more than that in Florida. Today's powerful storms can move a shoreline back up to 20 feet in a day.

Input: This is a very complex issue with conflicting science and political views but Californians love their beaches and because they do, telling about beach erosion may be a stewardship motivating story.

Statement 3: Ocean and Beach Pollution—What and who causes It and whose problem is it? Results obtained in the *Public Policy Institute of California Statewide Survey: Californians and the Environment (February 2006)* revealed that overall only 52% of those surveyed believed that ocean and beach pollution from streets and storm drains was a big problem. The rest thought it somewhat (35%), not a problem (10%), and don't know (3%). This 48% is alarming considering the efforts and funds spent on the "No matter where you live, you live near the ocean" message. The challenge is to develop more effective ocean awareness messages that create better understanding and stewardship of the 48% grays and blacks.

Input:

- Physical pollution exhibit: Three panels
 - Turtle vision—distorted lenses to simulate turtle eyes which cannot tell the difference between sea jellies and plastic bags. Compare with human vision to see what it actually was
 - Map—Where did these bags come from? Push buttons on a map to see watershed influence
 - Quilt of plastic bags
- Demonstrate area of 10 bags with beach cleanup stats of Styrofoam, cigarettes, bottles, bags, etc
- Amazing fact: If you use 10 less bags per year, pollution will be cut down x%.
- Exhibit thought flow
 - Start with personal impact on animal (turtle vision)
 - Work backwards (map)
 - See physical visualization of influence (bag quilt)
 - Learn personal agency (beach stats, changeability stats)
- Notion of pollution as something that's put where it doesn't belong

Statement 4: Why Do We Have June Gloom? While June Gloom interferes with recreational and social planning along the central and southern California coasts, why it occurs is not well understood by the public. This lack of understanding presents opportunities to engage the public in learning about ocean circulation and the marine layer on a personal level, i.e. in my backyard. How to make the subject interesting to non-locals would be a challenge.

Input:

- Why seasonal?
- Use Magic Planet—software program focusing on Southern California bight to explain June Gloom.
 - Explain local water circulation, page 3 of CORE report
 - Show air-land connection
- Weather station for children
 - Provide data feed—weather station in aquarium
 - Moving screen—TV station
 - Get prominent southern California weather person to do video about processes
- Look at other local weather events, i.e., flash flood
- Public access to aquarium weather station and data. Make it an exhibit itself

Statement 5: No matter where you live in the United States, weather patterns and climate are affected by the ocean. The public needs to understand that the local fire, hurricane, flood, drought, etc were at least partially driven by the ocean, and how we have impacted it.

Input:

- Weather and climate change messages
 - Have guests predict weather. If...we see...then the weather will be...
Comment: This may not be what we do best as an institution. Are there
Other areas of climate to focus on where our energy would be best spent?
- Once the ocean starts heating, it heats for years to come
- Consider connecting migration of animals in relation to changing weather patterns. What are the barriers to migration?
- In order to protect coastal towns from rising sea level, sea walls impede wetlands, etc.

Statement 6: The ocean biosphere affects the Albedo of Planet Earth. Plankton in the surface of the ocean utilize the dissolved carbon dioxide for photosynthesis. This establishes a flux of carbon dioxide, with the ocean effectively "sucking" down the gas from the atmosphere. Primary productivity in the ocean results in the emission of dimethyl sulphides (DMSs). In the atmosphere these compounds oxidize to form sulphate aerosols called marine non-sea-salt (nss) sulphate. These nss sulphates act as condensation nuclei for water vapor in the atmosphere, thus allowing the formation of clouds. Clouds have a highly complex effect on the energy budget of the climate. Changes in primary productivity in the oceans can affect the global climate system.

The salty sea smell near the ocean is caused in part by the salt spray tossed from wind-driven white caps and breaking waves. But the smell isn't from the salt alone. Gases diffuse across the air-sea interface, many of which are synthesized and emitted by micro algae. One of these gases is a sulfur based compound that has a strong

characteristic odor. Variations in algal production of these natural gases play an important role in moderating our climate through their aerosols effect on backscattering solar radiation and in cloud formation.

Learning more about this crucial gas will enhance our understanding of food chains and global scale climate processes, and allow for more intelligent environmental management. In the ocean dimethylsulfide is produced through a web of biological interactions. Certain species of phytoplankton, microscopic algae in the upper ocean, synthesize the molecule dimethylsulfoniopropionate (DMSP) which is the precursor to DMS. When phytoplankton cells are damaged, they release their contents into the seawater. Bacteria and phytoplankton are involved in degrading the released algal sulfurous compound DMSP to DMS and other products. A portion of the DMS diffuses from saltwater to the atmosphere. Once it is transferred to the atmosphere the gaseous DMS is oxidized to tropospheric aerosols which act as cloud condensation nuclei. These clouds affect the Earth's radiation balance and thereby greatly influence its temperature and climate. Marine phytoplankton lives in the sunlit waters of the world's upper oceans, an ecosystem covering about two thirds of the planet.

Input:

- This statement needs to be reconciled with Essential Principle 1 Statement 11 Essential “Why is the ocean salty”.
- Could be a part of California more/acid/ocean discussion

Statement 7: The tropical ocean’s warmth helps create rain across the mid latitudes, spreading from 25-30 degrees north and south. You can see a pattern that all rainforests are within this zone, and almost every desert is just outside of this zone.

Input:

- Trivia question pre-movies or at entrance
- Show global map of deserts and wet areas (rainforests, temperate forests, etc.). Ask what controls the location of these

Statement 8: The ocean has a tremendous influence over weather and climate.

The hydrologic cycle in which heat and moisture are transferred from one region of the world to another greatly affects weather and climate patterns. Ocean currents, evaporation, and precipitation moderate patterns and changes in Earth’s climate and influence the formation and movement of fronts, storms, and hurricanes.

Input:

- Display similar to that at Birch Aquarium: ping pong balls demonstrating water cycle—going up into the atmosphere and falling down onto land or ocean
- Incorporate this into the 3 main ecosystems in aquarium—what sets up climate in each of these environments
- Incorporate into the “ocean explorer” mission idea—passports
- Have a map of world and global winds and surface currents

- As visitors enter each of the three main ecosystems, challenge them to figure out why the climate in those ecosystems is the way it is. Ask visitors to go look at the Magic Planet demonstration of weather and currents. Dots on planet show location of each of the three ecosystems

Statement 9: *The wind circulation over the Pacific is slowing down.* An important wind circulation pattern over the Pacific Ocean has begun to weaken because of global warming. This change could alter climate and the marine food chain in the Pacific. This change may reduce populations of tiny plants and animals up through the fish that eat them because of reduced nutrition welling up from the deep in a recent issue of the journal Nature. It appears the slowdown is largely due to the buildup of greenhouse gases. The result lends more credibility to computer models that trace global warming to greenhouse gases. The study focused on the Walker circulation, a huge wind pattern that covers almost half the circumference of Earth. The pattern traces a huge loop. Trade winds blow across the Pacific from east to west. The air rises in the western Pacific and then returns eastward at an altitude of a few miles. Then it sinks back to the surface and starts the loop again.

Input: Magic Planet

Statement 10: *Ocean currents transport water, heat, and many substances around the world.* Surface currents, which are driven by winds and the rotation of the Earth, and deep currents, which are driven by temperature and salinity differences, are all connected. They form a global conveyor belt that transports water, heat, oxygen, carbon dioxide, minerals, organic matter, nutrients, and pollutants around the world.

Input:

- Magic Planet demonstration
- Have short movies with subtitles on a 42" screen so that it could stand on its own or with an interpreter
- Use the eight Journey with Giants screens to project video about this topic (ocean systems, conveyer belt)
- Have videos or open ended questions/factoids that guests can discuss while waiting in line at the aquarium or Honda Theater.
- As a timely story about the new Northwest Hawaiian Islands Archipelago National Monument designation, tell the story about Midway Islands Albatross and the pollutants they acquire by eating objects they mistake for squid in their North Pacific feeding grounds. Also an opportunity to tell a story about long line fishing impacts.

Statement 11: *The ocean has an enormous effect on global weather and climate change.* Global warming is a trend that will upset sea level, air and water currents, marine habitats, and storm patterns.

Input:

- See light bulb idea for Pacific Collections
- Show some model results on Magic Planet

Statement 12: *The ocean affects both coastal and inland climate.* The statement, "The cycling of water is intimately linked with energy exchanges among the atmosphere, ocean, and land that determine Earth's climate and cause much of natural climate variability," is very confusing for the average public, but if explained simply it can be a direct link between people and the global world ocean.

Input: Show El Niño's affect on mid-America and globally

Statement 13: *To understand climate changes look at the ocean.* Most climate change models based on air temperatures are weak because most of the evidence for global warming is not there. Greenland's ice cap, which contains enough ice to raise sea levels globally by 23 feet, is starting to melt and could collapse suddenly. Freshwater is percolating down, lubricating the base and making it more unstable. Melting Arctic ice is taking with it algae that provides an important base of the food supply for a range of animals. The disappearing ice shelves mean big animals such as walruses, polar bears and seals are losing their homes.

Input:

- The melting Arctic ice cap and glaciers can be an effective story with a plot that is occurring now. Use satellite images to show melting and potential impact on Atlantic sea level when Greenland ice melts and what has already happened in Alaska where indigenous people have had to move inland.

Statement 14: *Aquarium of the Pacific's Weather Station.* Interest in the Weather Channel has intensified over the past several years because of hurricane tracking, tsunamis, etc. There is also increasing media attention being paid to global climate changes. The Aquarium needs to capitalize on these changes with venues that would provide the public with insights into how important the ocean is determining Earth's weather, what are the impacts of global climate changes, sea level rises, etc.

Input:

- Use of data from on site weather station. (Is it possible to make it a visitor stopping point on a trail?), timely projections of pending hurricane tracking (perhaps utilizing Breaking Waves).
- Disaster preparedness information, etc.
- Whatever there is an unusual weather pattern in Southern California, the aquarium should talk about how the ocean played a role. Program Magic Planet seasonally to illustrate: June Gloom, Santa Ana's, California monsoon season, rainy season, Pineapple Express, El Niño, /La Nina, September heat waves, water spouts over ocean, flash floods

Statement 15: *Global atmospheric carbon dioxide and the Southern Ocean.* It now appears that the planet's critical means of regulating levels of carbon dioxide in the atmosphere may primarily depend on Southern Ocean circulation in the waters near the Antarctic coast. The waters in the Southern Ocean below 60 degrees south latitude that hug the Antarctica play a significant role in regulating atmospheric carbon. Waters north

of this region do comparably little to regulate it. Cold water that wells up from the depths of the Southern Ocean spreads out on the ocean's surface. While the water north of this region spreads nutrients throughout the world's oceans, the southward-flowing stream soaks up carbon dioxide from the air.

Input: Magic Planet presentation

Statement 16: *El Niño, a periodic shift of warm waters from the western to eastern Pacific Ocean, has dramatic effects on climate worldwide.* In 1982-1983, the most severe El Niño of the century created droughts, crop failures, fires, torrential rains, floods, and landslides—total damages were estimated at more than \$8 billion.

El Niño has affected the population greatly. Everyone makes comments about the weather being too hot or too cold too soon and blames it on El Niño but no one is really clear about how it is affecting the weather.

Input:

- Magic Planet presentation
- Provide interactive opportunities to control weather, simulating El Niños and other weather patterns

Essential Principle 4: *The oceans make Earth habitable.*

Statement 1: *The Oceans make earth habitable.* The Gulf Stream, a current responsible for transporting warm water toward the Azores, Spain, France, and Britain, is slowly braking to a halt. The result could mean snow and frost, conditions most of these areas have not seen in over 50 years.

Input:

- Show either in a short film, or on the Great Hall multi-screens
- Same as weather climate

Statement 2: *The ocean makes Earth habitable.* Most of the oxygen in the atmosphere originally came from the activities of photosynthetic organisms in the ocean, making the ocean the “lungs of the planet.”

Many people do not know that the ocean is active in oxygen production. It’s important for the public to understand that marine plants help remove carbon dioxide during photosynthesis and when the ocean’s harmed, harm to these marine plants ensues and harm to humans could result.

Input:

- An exhibit that shows oxygen production of plants with the amount of oxygen shown in a bag. Visitors could control the amount of plants in the demonstration and see how the level of oxygen changes when the amount of plant life changes. Might take a while—could possibly be simulated in time lapse video/computer demonstration,
- Work into kelp exhibit

Statement 3: *The ocean produces more than half of the oxygen that we breathe.* Most people are taught that tropical rainforests produce oxygen but are unaware that the ocean is also a significant contributor. Ocean conservation efforts, similar to those focused on the rainforest, could benefit from a general understanding of where our oxygen is produced.

Input: See Statement 2 input.

Statement 4: *Humans could not survive without the ocean.* The ocean creates much of the air we breathe. Without it, life on Earth would not be possible.

Input: See Statement 2 input.

Essential Principle 5: *The ocean supports a great diversity of life and ecosystems.*

Statement 1: *The ocean contains an incredible diversity of life.* Life originated in the ocean, began evolving there, and eventually colonized the land. Today's ocean contains an amazing diversity of species that vary greatly in different regions. Certain marine ecosystems such as coral reefs, hydrothermal vents, and the deep sea have especially unique organisms.

Input:

- Make connections to “place”
- Label exhibits with specific places in Southern California
- Have maps that show these places

Statement 2: *How the ocean impacts climate change.* Possible topics to include are:

- a. The role played by ocean's mass (inertia) in stabilizing global temperatures
- b. The long term impact of warming oceans on the climate system
- c. How the oceans circulate heat around the planet, and how these patterns may change in a warming world (e.g., the potential impact of massive fresh water infusion into the North Atlantic)
- d. The impact of climate change on the coasts (storm surge, storm frequency, salt water contamination of fresh water aquifers, rising sea level)
- e. The natural El Niño oscillation and its impact on global climate
- f. The impact of climate change on the ocean food chain
- g. Possibly, the complex role played by the ocean in maintaining the natural climate balance, although this is a very complex issue

Input: Magic Planet and the website

Statement 3: *The ocean and humans are inextricably interconnected and every human is affected by the ocean.* May have great potential for connecting the Aquarium, visitors, and the concepts to the upside down triangle illustrated in Section EP 9. The top third of the triangle (the largest portion) would be information we are presenting to the public. The middle third of the triangle (a smaller portion) is the number of people that would make a personal connection. The bottom third of the triangle (the smallest portion) is the number of people that will take action.

- a. The ocean supplies fresh water, moderates the climate, and influences the weather. (These are addressed in depth in Key Concept 3 and briefly in Key Concept 1).
- b. From the ocean we get foods, medicines, and mineral and energy resources. In addition, it provides jobs, supports our nation's economy, and serves as a highway for transportation of goods and people.
- c. Is a source of inspiration, recreation, rejuvenation, and discovery. It is an important element of our cultural heritage.
- d. Most of the world's population lives in coastal areas.

- e. Humans affect the ocean in a variety of ways.
- f. Coastal regions, where most people live, are susceptible to natural hazards such as tsunamis, hurricanes, cyclones, typhoons, storm surges, flooding, and landslides.
- g. Everyone is responsible for caring for the ocean. The ocean sustains life on Earth and humans must live in ways that sustain the ocean. Individual and collective actions are needed to effectively manage ocean resources for all.

Input:

Possible stories

- Part a—Magic Planet
- Part b—ports exhibit
- Part c—connection to current info, surf report
- Part d—local community info, website, surf report
- Part e—yes
- Part f—website, ocean info
- Part g—50,000 lbs of trash out front of aquarium

Statement 4: A Healthy World depends on a Healthy Ocean. Nearly all major watersheds on Earth drain into the ocean. Rivers and streams transport nutrients, sediments and pollutants from watersheds to estuaries and into the ocean. Our beaches have become increasingly polluted. Sewage overflows are creating a growing public health crisis. Sewage treatment facilities treat only percentage of raw sewage and “blend” the rest. Aging sewer systems and rollbacks of environmental laws are compounding the problem. Giant livestock factory farms that house thousands of cows, chickens or pigs produce staggering amounts of animal wastes. These wastes end up in the watershed, exposing people to dangerous bacteria and other hazardous substances. Giant plumes of toxic river pollution are damaging the life in the ocean. Heavy metals from pollution are now found in virtually all sea life and seafood.

Input:

- Use the watershed exhibit to link to larger problems regional like the Colorado River dead zone and nationally, that of the Mississippi River.
- Tell stories, perhaps Breaking Waves news, when beaches are closed because of breaks in sewer lines.
- Use maps to illustrate where various water districts discharge outfall.
- Tell stories with graphics about beach and ocean trash resulting from upstream runoff after the first rain storm of the season.
- Tell the DDT story.

Statement 5: Humans are part of marine ecosystems. More than 75% of the world’s population lives near coasts. Even for those who live in inland areas, the ocean is a major part of all our lives—it affects our climate, food supply, health, security, transportation, and the ways we work, play, and live. We in turn greatly impact the ocean.

Input:

Where

- Interactive map—before each exhibit (showing local examples and global examples of different ecosystems)
- Magic Planets at each gallery entrance to show locations of different ecosystems, Issues effecting ecosystems, Local issues, what comes from each ecosystem, and how humans affect the ocean.

What

- Enter into another world—put people in that place, what does it feel like when you are there, i.e., different temperatures of water (Put your hand in acrylic panel/project an image)
- Personal lesson—at each exhibit
- Restrooms—lessons there, running water, littering – displays showing your impact
- Exhibit—calculate ecological footprint
- Entrance area—into aquarium and to each exhibit - tailor exhibit to individuals with technology
- Eco-tour—each exhibit
- Website: Pre and post visit materials, Downloadable information, teacher training and classroom lessons, follow up actions
- Technology
 - Scan /tickets at each exhibit to tailor exhibits to local issues, etc. How does this exhibit effect them
 - RFID tour: personalized tour to collect info, printout, email, request more info
- The naturalist tour
- Current events exhibit
- How do you effect the ecosystem, how does it effect you.
- At each exhibit something interactive such as push button, tell a story at each exhibit (i.e., divers—abalone), on opposite wall large pictures of shells (touch screens, etc.)
- Specific entrance—introduce ecosystem, exit to exhibit—what can you do, issues, pollution
- Titles over each exhibit within sections to tell what ecosystem it is
- At the ecosystem, take a journey through it, what are differences between each main ecosystem, theme each ecosystem (i.e. mangroves, round ray touch),something local—local ecosystem of round rays, power plant or water temperature—lots of round rays
- Label tidepool touch area as an ecosystem. Install better graphics. Give visitors a tidepool take home message—how to act at a real tidepool
- Behind the scene exhibits
- Trials—different levels in aquarium, beginner/intermediate/expert
- Sign that talks about threatened or endangered species at each exhibit
- Set up “pace” account for the ocean/aquarium—links to different species, etc.

Statement 6: *Fish and shells are dead animals.* Some Aquarium visitors lack an understanding of basic biology. Before oceanography can be part of the ocean literacy trail, visitors need to understand that animals include fish, sharks, corals, and sea jellies and what a marine mammal is and is not.

Input:

- Show kingdoms (phylum, etc.). e.g., Disney’s Turtle Talk with Crush—digital puppeteering
- Create relationship with slimy/scaly/”cold” creatures
- T-shirt campaign with humor
 - “Hug a fish today” cartoons (Far Side, etc.)

Statement 7: *The Ocean is teeming with life and all the life forms of the ocean are in a carefully interwoven balance, relying essentially on all the parts interacting in a harmonious dance.* Looking out from the shore to the horizon, the ocean can appear somewhat lifeless in that: not much life is readily apparent other than an occasional bird flying by. There is only an occasional sea shell on the beach and/or hole in the beach sand caused by a crab. Yet, as a memorable emotional incident, a dolphin or fish jumps or glides by in the waves or a sunset. Infrequently, a commercial or sport fishing boat can be seen in the distance.

But in fact, the ocean is full of life—and at all depths and on all shoreline types—in communities and habitats that easily exceed the imagination of those unfamiliar with marine ecosystems.

Input:

- Eliminate the disconnect between the everyday view of the ocean (flat surface) and aquarium view (side view)

Possible transitions

- Mural of surface view to Catalina painted on outer wall by grassy area
- Image of surface view landscape on entrance window/doors
- Great Hall projection show—slowly submerge audience
- Entrance area in Great Hall for introduction imagery

Statement 8: *The Ocean contains an incredible diversity of life.* It originated in the ocean, began evolving there, and eventually colonized the land. Today’s ocean contains an amazing diversity of species, which vary greatly in different regions. Certain marine ecosystems, such as coral reefs, hydrothermal vents, and the deep sea have especially unique organisms.

Input:

- Tie in with the “ocean explorer” mission—visitors try to count how many different species they can find in each exhibit/ecosystem
 - Maybe even compare the number of species in different exhibits/ecosystems
 - Diversity tour

- Different tours/paths give visitors opportunities to change direction each time they visit the Aquarium, re-charging their interest and enthusiasm.
 - Trivia questions—number species on land vs. ocean
- Tie in with the ocean is unexplored (essential Principle &)

Statement 9: *The ocean is not homogeneous.* Properties such as salinity, temperature, and the amount of nutrients, light, and oxygen can vary greatly throughout the ocean. Even within one location, these characteristics often exhibit great changes with depth or season and these variations affect the types of organisms present at different locations, depths, and times of year in the ocean, and even within one location

Input:

- Exhibits usually showing physical oceanography such as wave tanks, dye experiments in tanks, density, etc.

Statement 10: *Difficult environmental and marine policy decisions must incorporate the best science available.* With increasing use and exploitation of marine resources, basing policy on sound science is crucial in designing effective ecological management strategies for the future.

Input:

- Breaking news component highlighting important legislation or management decisions (MPAs, critical habitat, EEZ, no-take zones, etc).

Statement 11: *The Ecosystem Trail.* Visitors need to understand ecosystems so as to lead them to an understanding of the importance of creating marine protected areas and ensuring sustainability of ocean wildlife. Visiting the Aquarium could be a catalyst if visitors came to believe that after touring the Aquarium, they had visited not a series of disconnected galleries, but three ecosystems that together are part of the Pacific Rim ecosystem and the world ocean ecosystem.

Input:

- Displays in each ecosystem—Temperature of water, Texture of substrate, Salinity (salty, brackish, fresh)
- Pocket theaters
- Eco-booths in each ecosystem (dial ecosystem code)
 - Immersion booth with video screens—feels like the climate of that ecosystem
- Name exhibits (large signs) with something catchy, tells the visitor something.
- Use titles that lead to discussion and questions.
- Trial guides—tour leaders, i.e. school groups
- Have take home kits or information available

Statement 12: *Green, brown, and reddish colors in the ocean water usually indicate a soup mixture of plankton providing the base of the food chain.* Plankton is the base of the food chain for the marine ecosystem, providing food for larger

animals, and therefore indirectly for humans. The type and quantity of planktonic organisms can often be used as an indicator of habitat health and the future viability of larger animals.

Input:

- The plankton lab should be enhanced and better utilized to tell the plankton story beginning with "What is plankton?"
- Invisible world of plankton
 - Life size plankton painted on the wall
 - Show how much plankton is needed to fill a teaspoon
- Use current and an additional monitor to:
 - Illustrate a plankton bloom
 - Bioluminescence of dinoflagellates in crashing waves
 - Interactive touch screen
 - Upwelling, what is it? Show how it works
 - Effects of demonic acid
 - Invisible pollution, liquids—think about it!

Statement 13: *Seize the opportunity when the red tide comes in.* Seasonal red tide occurs off Long Beach's shoreline. The public smells it, sees the water coloration, and at night, the magic of the phosphorescence.

Input:

- When there is a red tide right outside the door, utilize it in the plankton lab as a presentation venue to tell the story of the invasion of the dinoflagellates, the demonic acid story, human impacts, etc.
- same as Statement 12

Statement 14: *Coastal environments are some of the most important marine ecosystems.* 95% of the ocean's biomass (including the fish harvested commercially) occurs between the shore and continental shelf. Coastal regions are also important for recreation, shipping, and oil and gas production. Estuaries and wetlands are particularly invaluable. They are breeding grounds and nurseries for many species, protect coasts against waves and storms, and remove pollutants from water.

Input:

- Tell the California wetland story, where local wetlands still exist and where they once were, the history of Long Beach mudflats
- Baby board upfront—what species in the Aquarium currently have babies? In the wild which would have been born in wetlands.
- Waste management exhibit
- What you can do components to each exhibit
- Calculating personal coastal ecological footprint
- Shifting baseline exhibit
 - What it was like, what it is like, what it would be like

- Visual exhibit—tunnel
 - Best scenario to worst
 - Slow shift in tunnel (i.e. Coral healthy to dead polluted)
- SIMS earth
- Connect each exhibit personally to the visitor
 - Show materials that come from it: products, drugs, energy, food
- Species of the month
- Keystone species
 - Games identify in each exhibit
 - What would happen if you take it out
- Build wetlands interpretive center—see different processes
- Provide website link to wetlands that have public tours

Statement 15: *How actions can we take to protect and help heal the ocean?* While people may profess their love for the ocean, many remain on the shore of understanding about how their own actions affect the ocean’s health. We have opportunities to help visitors understand their environmental role no matter where they live. Ocean literacy is “understanding the ocean’s influence on you and your influence on the ocean.”

We all have a deep responsibility to do something to reverse pollution; stop over-fishing, the extinction of species, and the disruption of delicate food chains, etc. We must find a way to live without using up all the marine resources that future generations will need to live their lives

The ability of our planet and its inhabitants to survive into the next millennium will depend on how much we care for the air, land, and sea. Earth as a whole is truly more valuable than the sum of its parts. The future of the ocean rests in our own hands.

Input: Link the website to other organizations that do ocean conservation. Provide a list of stewardship opportunities

Statement 16: *Ocean zonation: Relationship to Ecosystem-based Management and Marine Protected Areas.* Understanding spatial relationships is difficult for many people and most of the general public has not had opportunities to explore the underwater ocean. If we are to gain support for ecosystem-based management and the creation of marine protected areas as ways to conserve biodiversity and ensure sustainability, we must find ways to help our guests become “three dimensionally ocean literate.”

We need to provide a trail—a connection from zonation to understanding critical habitat designation, what marine protected areas do, and the California program regarding MPAs (especially since funds are being allocated to study MPA designations in Southern California). We especially need to provide connections for our visitors that will enable them to understand that the Aquarium is a Pacific Rim ecosystem with a series

of ecosystems, not galleries, within which there are exhibits that are small ecosystems called habitats providing homes for different animals.

Input:

- Incorporate the Todd Anderson trail concept for visitors to explore ecosystems in which they are given opportunities to experience what happens when the ecosystem is altered, learn about the Channel Islands MPA, and the central coast designation of different levels of protection. Provide experiences for different levels of exploration for minimal, average, and want to know more interests.
- SIMS earth—virtual reality
 - Different options, different outcomes
 - i.e. Look at the world with and without MPAs
- Point out difference between galleries/ecosystems at end of exhibits
 - Interactive push buttons
 - Free choice learning
- treasure map (ecosystem map) in passport
 - Scavenger hunt activity, find x in this habitat
- Explore links to NOAA marine sanctuaries' underwater cameras
- Establish a telepresence—3D real time booth, virtual reality experience

Statement 17: *Why Should We Care that Coral Reefs Are in Trouble?* Global climate changes, development, diseases, fishing methods, over fishing, natural disasters—all are impacting the health and sustainability of coral reefs. Most of the public thinks tropical when coral reefs are mentioned, yet there are such reefs in cold and temperate waters. A storyline about coral would provide venues to take the public from local temperate waters to a global outlook. Opportunities are great for take home messages.

Input:

- What does a coral reef mean to us globally? What does it do for us? What should we do for it?
- Map showing where corals live in tropical, temperate, and cold waters

Statement 18: *The Ocean supports a great diversity of life and ecosystems.* There are more organisms in the ocean for each cubic mile (an area one mile wide one mile long and one mile deep), than for the entire terrestrial earth combined.

Input:

- Touch screens next to exhibits if feasible in low attendance seasons
Take children/adults a trail to find out more about a particular species in an exhibit that they find interesting
 - Similar to fish or tree ID books
 - Start with a simple question (i.e., it's a bird, fish, plant, etc.) and then pictures of different fish
 - The visitor touches one they want to know more about
 - Can also have conservation issues with each species
 - Could also be available on website

- Create better transition between different habitats/ecosystems
 - Example when entering kelp forest ecosystem, have kelp streams hanging from ceiling to floor, or visually change theme/colors

Statement 19: *Ecosystem-based management helps plan for and manage human activities and needs as part of the ecosystem.* It incorporates ecosystem structure and function, and accounts for the interconnectedness within and among different systems and the range of activities affecting them, including ecological, political, social, commercial, and economic factors.

Input:

- Top 10 most wanted list for species
- Pacific salmon or steel-head trout exhibit
 - Ocean connected with rivers
 - Important local conservation issues
 - Sustainable fishing, aquaculture
 - How they are important to the ecosystem
 - Trophic interactions
 - Economics/fishing
 - Critical habitat designation—Cultural issues
 - Wildlife needs vs. human
 - Involve public—vote on different scenarios
- At Aquarium entrance or in front
 - Litter/sewage sign—understand what happens, what’s up the watershed ends up downstream
 - Crate with 50,000 lbs of garbage—Coastal Cleanup Day
- Large visual
 - Put pictures along river fountain showing locations so people can see where they are from
 - Show exhibits as living ecosystem themselves
 - Birds—something at breeding, resting
 - When there is a baby/egg
 - What is threatening the in the wild
- Tell stories about the coastal Chumash and the way they practiced ecosystem management
- In the Great Hall: highlight local success stories, local people doing good things
 - Local steward of the month

Statement 20: *Behind the Scenes Tours*

- Visitors on Behind the Scenes Tours are a captian audience, providing excellent opportunities for small group interaction. Ocean literacy should be an integral part of the tours.

Input:

- Aquarium as an ecosystem
- Water filtration system

- An example of earth's natural water cycle
- How the water you use everyday, where it comes from and where it ends up
- Compare Aquarium's water cycle to a local water district
- Food production
- Different salinities and temperatures with different animals
- Facts about operating the aquarium
 - How much salt water purchased
 - Water testing—different indicators
- Monitors showing behind the scene activities
- Backup generators

Statement 21: *The ocean supports a great diversity of life and ecosystems.* Most members of the public are unaware of the diversity of organisms in the ocean and how they relate to land animals. Most major groups of organisms have many representatives living in the ocean. The ocean doesn't just contain fish.

Input:

- A chart that shows the different types of representatives in the ocean, for example, the chart would list how many phyla the ocean represents versus on land only.
- Increase the number of benthic exhibits.

Statement 22: *The ocean supports a great diversity of life and ecosystems (i.e. kelp forests, coral reefs, and hydrothermal vent communities.*

- a. Most life in the ocean exists as microscopic organisms; however, ocean life ranges in size from the smallest virus to the largest animal on Earth, the blue whale.
- b. Most major groups of organisms have many representatives living in the ocean
- e. There are examples of life cycles in the ocean that are not often seen on land
- j. Coastal estuaries (where rivers meet the ocean) provide important and productive nursery areas for many marine species.

Input: May have potential for connecting the Aquarium, visitors, and the Fundamental Concepts to the upside down triangle illustrated in Section EP 9 by being shown with live animals. (The top third of the triangle (the largest portion) would be information we are presenting to the public. The middle third of the triangle (a smaller portion) is the number of people who would make a personal connection. The bottom third of the triangle (the smallest portion) is the number of people who will take action.

Statement 23: *Environmental stresses affect both species diversity and ecosystem health.* They can also negatively impact local economies, fisheries, and human health. Increased occurrences of hypoxia, toxic algal blooms, invasive species, eutrication, and decreased commercial fish stocks are being reported throughout many of the world's coastal waterways.

Input: Use Magic Planet, Breaking Waves, Word of the Day, and statements from other Essential Principles to tell these stories.

Essential Principle 6: *The ocean and humans are inextricably interconnected.*

Statement 1: *Explore Southern California's coast, seafloor, and our chain of islands – a local and regional approach to understanding the geology of the ocean floor and coast.* What is under the water right off our coast? Many people know about Monterey Canyon, few know about our southern California canyons, Montrose, Redondo, and Santa Monica right off our coast. How does the Pacific Coast compare to the Atlantic Coast? How were the Channel Islands formed?

Input:

- Geology is not a science that is well understood by the general public. Providing venues to help our visitors understand more about how the coast, seafloor, how the Channel Islands were formed and why all continue to change would open up avenues for expansion to the DDT story and the Montrose Settlement, beach erosion, sea level rise, etc.
- Highlight local geological landmarks and habitats
 - Example: Redondo Canyon
- Connect to land-based tectonic awareness (earthquakes, volcanoes, etc.)
 - Film about underwater tectonics, earthquakes, underwater landslides, tsunamis

Statement 2: *Our ocean plays a role in and is affected by global warming.* The public is listening to the debate on global warming and the media is telling more stories what is happening. Now is the time to talk about how it the ocean is affected by global warming, and how the ocean will then affect us.

Input: See Magic Planet and other recommendations suggested in other statements

Statement 3: *The ocean has aesthetic, almost spiritual qualities that we take for granted or miss as we hurry along.* Looking out at the ocean one is drawn in almost unexplainable ways to its ability to relax us, inspire our imaginations, nurture our souls, entertain us with its ever-changing colors, wave and cloud patterns, and sea life, and terrify us in terms of: the unknown, the “Jaws” factor; and the unpredictable storm and tsunami incidents and deviations.

Input:

- Provide contemplative spaces in the aquarium such as alcoves with sitting areas. , alcoves. (Original planning and architecture may make this a difficult thing to do. Need to have alcoves with sitting spaces. Aquarium now is full of corridor and tight, crowded and cluttered)
- More benches to sit and appreciate (the jellies in the former Open Ocean held appeal for many)
- Ideas to be played out **now**
 - Darkening spaces
 - Removing signing from areas (to keep from cluttering the mind)

- Unclutter the Great Hall (takes away from the beautiful Blue cavern exhibit)

Statement 4: *The ocean and humans are inextricably interconnected and every human is affected by the ocean.* From the ocean we get foods, medicines, and minerals. The Aquarium's animals could provide ties to our dependence on the ocean. Aquarium fish would be nicely represented as an important topic in the ocean.

Input:

- Incorporate sustainable seafood. Maybe next to each exhibit name tag of fish, we could state whether or not it's edible or served in restaurant, or what countries eat that particular fish.
- Café Scuba—have foods and goods available for purchase (i.e. Samples of seaweed for people to try "just like the fish," chips flavored with natural sea salts, etc)

Statement 5: *What have humans done that impacts the ocean?* We must consider the many ways in which human populations cause changes in the marine ecosystems. By drawing attention to the problems of over-fishing and exploitation of marine resources, and the impacts of pollution visitors can become informed decision makers capable of making better choices that will improve the ocean's health.

Today, the oceans of the world are under threat from many different sources; not just direct pollution by sewage and trash but also from indirect changes. Atmospheric pollution is causing global warming, and raises ocean temperatures. In addition, marine life has to cope with natural changes, such as the El Nino effect that produces an unusually high sea surface temperature.

Input: Covered extensively in other statements

Statement 6: *Everyone is responsible for caring for the ocean.* The ocean sustains life on Earth and humans must live in ways that sustain the ocean. Individual and collective actions are needed to effectively manage ocean resources for all. The relationship between the coastal environments and population as compared to "inland" population is a concept not easily recognized but demonstrates how intimately tied to the ocean the population is.

Input: See Pacific Collections ideas as well as SMG ideas in other statements

Statement 7: *The ocean's health is the combined responsibility of all humans. It is a global responsibility.* Citizens of first-world countries account for much of the world's pollution, but also have the least resources to improve the environment. The average American CAN make feasible choices and take actions that will support and protect the global marine ecosystem.

Input:

- Illustrate and explain EEZs showing the extent zoned by the US. Take the opportunity to explain the area of the ocean under California’s control.
- Illustrate and explain the Ramsar Convention and Wetlands of International Importance pointing out those on the west coast.
- Illustrate and explain international and national flyways for migratory birds and international treaties. Ask visitors to identify migratory birds they have seen and when.

Statement 8: *The ocean is the end of the water trail.* Storm drains lead to the ocean. And anything that ends up in storm or household drains, and sewers has the potential to end up in coastal waterways, such as harmful chemicals, oils or strong detergents, litter in the street, and nitrogen-rich fertilizers applied to lawns. Excess nitrogen can be harmful to many coastal estuaries and may be contributing to hypoxic or anoxic events.

Input:

- Pacific Collections section featuring biodegradable soaps and bath products
- Graphic art student posters
- Partner with Surfrider and local cities to get more effective labeling of storm drains, e.g., using the octopus, sea turtle, or clam designed by a student.

Statement 9: *A shell once contained a live animal.* Many people do not know or have not thought about how a “seashell” is produced. Harmful collecting practices, such as those used on corals, can be very harmful to heavily impacted and fragile ecosystems. Knowing that a shell once housed a living creature may lead to improved protection for these animals and their habitats.

Input:

- Ever wonder why we don’t sell shells and coral items in Pacific Collections?
 - Alternatives: well made plastic, ceramic, etc. pieces (artificial options)
 - Have books like “house for a hermit crab”
 - Verify that shark teeth are sustainably collected
- Change gift at end of Behind the Scenes tour to be artificial shell or coral
- Have displays in which visitors guess which shell is real

Statement 10: *Our greatest opportunities rest with our ability to provide visitors with empowering messages on conservation to help them embrace their role as stewards of the ocean, its inhabitants, and ecosystems.*

Concepts and issues to explore:

- How does the ocean affect us?
- Why should we care about the ocean?
- What have humans done that impact the ocean?
- How can we help protect the ocean?
- How can we learn from our actions of the past to make a difference for the future?

Input: Ideas presented in many statements

Statement 11: *The pollution we generate on our streets ultimately ends up in the ocean, which impacts all of us.* The public needs to understand the connection to the pesticides they pour on their lawn to local beach closures and fishing restrictions.

Input: Pacific Collections options:

- “Pick up after your pooch” bags
- “Keep the ocean squeaky clean” biodegradable soap to clean car
- “Earth friendly alternatives” let the lady bug take it away
- Oil collection containers
- Compost kits
- Cloth grocery bags
 - percent discount connection with store (Ralph’s, etc.)
- Book/pamphlet created by the Aquarium of the Pacific with Green Choices
- Light bulbs, batteries, bag dryer, grocery bags, coffee mugs, water bottles, bath products, t-shirts with funny mottos, trash with treasures – hang tags with each product with environmental message, cloth bag upgrade and end of purchase

Statement 12: *What impact does the maritime industry have on California, the nation, and the world?* Shipping: far-reaching pollution and movement of species to new locations, overfishing on ocean health and the human food supply are examples.

Input

- Port exhibit—Long Beach and Los Angeles setting the environmental standards example for the world
- Tell stories about the economic impacts.
- Question visitors about where the clothing they are wearing comes from, articles in their homes, etc.
- Show graphically where a series of home items or clothing comes from, using name brands.
- Tell the history of the US maritime industry.

Statement 13: *The ocean is threatened by many human activities.* Humans over harvest natural resources such as commercial fish species. We alter marine habitats by building coastal properties, diverting rivers, or deforesting and eroding upland areas. We produce many kinds of pollution (oil, metals, pesticides, industrial waste, pharmaceuticals, fertilizers, sewage, debris, eroded sediment, heat, noise, etc.) that negatively affect marine life and human health.

Input:

- Communicate this general message throughout Aquarium venues to guide visitors to Pacific Collections) —What we do has a major affect on the ocean and we have choices that would make a difference.
- Making wise choices can help protect the ocean and animals. Check out some easy options in our Pacific Collections “help save the ocean starting today” section.

Statement 14: *Dollar Signs: the Ocean Economy.* The *Public Policy Institute of California Statewide Survey: Californians and the Environment (February 2006)* included questions on the perceptions of Californians about the importance of the ocean and beach conditions to the state's economy. Sixty-three percent of Californians view the condition of the ocean and beaches as important and 30% as somewhat important to the state's economic vitality. The USCOP and Pew Commission reports addressed the US marine economy. How can we improve the ocean economic value awareness of 37% of Californians and, most important, our visitors who do not live in coastal states using Aquarium venues?

Input:

- Port exhibit
- Discuss economic/reach of port commercial
- Point out that Long Beach/Los Angeles port complex is the largest in the US
- Weigh economic versus environmental concerns
- Ask visitors about impact on their life if a common shipped item were not delivered.

Statement 15: *The ocean may be supplying your household with fish even if fish its self is not on your shipping list.* Much of the seafood caught is converted to fishmeal, which is then used in feed for cattle, swine, poultry, and for food pellets fed to farmed fish. A large quantity is also processed into imitation shellfish. Some agricultural crop fertilizers are also produced from sea life such as krill. Used in a sustainable manner, the ocean has a tremendous capacity to provide people with sustenance in a number of diverse ways.

Input:

- Sign by plants between Lorikeet Forest and Shark Lagoon at the stairs
 - "This garden uses organic fertilizers obtained from the ocean.
 - Does the Aquarium use recycled water to water plants? If it is used, advertise the use.
- Message somewhere
 - Did you know everything from your domestic pet to the cattle that produce the milk you drink and the meat you eat is sustained by the ocean?

Statement 16: *While humans depend on the oceans for many resources and services, our activities are threatening the continued health and productivity of the ocean.* Not only do we depend on the ocean for recreational and commercial activities (e.g. fishing, transportation, energy, manufacturing, and waste disposal), but the coastline also provides important buffering benefits.

Input: Port exhibit—depend on port/ocean for transport of goods

Statement 17: *Local influences on Marine Ecosystems.* California depends on the ocean for a major contribution to its economic health. And California is also one of 32 international hotspots and one of two in the US. It is home to more species in need of protection than anywhere else in the contiguous 48 states. Small actions by individuals

or businesses can have an enormous effect on the coastal environment which in turn can be beneficial economically to the state.

Input:

- Port exhibit
- Economic benefit vs. environmental impact
- International and past national regulations
- The EEZ

Statement 18: The ocean, through scientific understanding and sustainable management practices, has the ability to continue to feed us and provide us with and medicines to cure our ailments, recreation, and transportation.

Input:

- Something on maritime history
 - Lecture series/book series on maritime literature
 - Ask people questions. Get them to think about where and how personal and household items got here.
 - Where did the shoes on your feet come from? Where was your cell phone made?
 - How did it get here?
 - Incorporate into “ocean footprint” idea
- Games on website

Statement 19: The ocean provides us with many economically valuable resources. In the United States alone, ocean resources provide almost 2.5 million jobs and \$120 billion in revenue per year. The most valuable marine industries include recreation, transportation, mining of mineral resources such as oil and gas, ship and boat building, harvesting of living resources for food and other products, and construction.

Input:

- Port exhibit
 - Look out at port of Los Angeles/Long Beach shore history and show economic value
 - Have audio presentation to help connect what the visitor sees to importance
- Incorporate throughout the aquarium
 - Anytime an exhibit is already showing a marine resource that is economically valuable, highlight it.

Statement 20: The ocean and humans are inextricably interconnected and every human is affected by the ocean. From the ocean we get foods, medicines, and mineral.

Input:

- Grocery store
 - Ocean products which visitors can scan to find out information about the product's connection to the ocean
 - Some kind of surprise is in the answer
 - Food, toothpaste, medicine
 - Non-facilitated exhibit
 - 1st screen gives basic info and “more info” button
 - Additional screen gives story, factoid, more info, conservation message
 - Big sticker showing vertical map/space of ocean with products placed on where they are found—question marks for what is to come
- Grocery cart with products and messages
 - Facilitated experience
 - Volunteer pushes grocery cart filled with items into Great Hall or around Aquarium
 - Ask visitors what is not from the ocean? What's in these?

Statement 21: *We use marine resources every day.* Americans consume more than 4 billion pounds of seafood per year. Marine products are also widely used in food additives, toiletries, industrial or building materials, and as medicines (e.g., antibiotics, anti-viral, painkillers, osteoporosis treatments, and cancer drugs). Much of the ocean remains unexplored, and researchers believe that there are many useful resources waiting to be discovered.

Input: Shopping cart—scan items and see what they contain that came from the ocean, with or without guidance from volunteers

Statement 22: *Over the last century, increasing population density and development along our coasts have placed continued environmental stresses on our estuaries and marine ecosystems.* Human activities including over-fishing, commercial exploration and development, dredging, and underwater construction, can negatively impact local marine resources.

Input:

- Watershed exhibit
 - highlight importance of buffer zones (watersheds, estuaries, etc.)
- Box of 50K lbs of “garbage” from beach cleanup set up outside the Aquarium
 - positive point about biofuels (San Francisco trash digesting)
 - or represent how much pollution one person produces each year, or amount of CO₂ produced
- Say “thanks for recycling,” as visitors exit. Have more and more attractive trash bins decorated with marine animals patterned after the Los Angeles Department of Water's humorous stickers

Statement 23: *Everything we do has an impact on the ocean, especially on those living on the coast.* Every little bit counts for good or for bad. Non-point source

pollution, such as trash, oil, and chemicals, can make its way through storm drains and rivers into the oceans and result in contamination of the ocean water and illness in recreational users—surfers, jet-skiers, and swimmers. Personal wise environmental choices, from the light bulbs that used to the car driven can have a cumulative, positive effect on the ocean.

Input:

- Good for the watershed exhibit
- Huge pachinko board (each ball represents water and drops down hitting various elements and finally makes it to the ocean), ball knocks other things loose, i.e. oil, trash, etc. and all items make it to the ocean
- Where does trash go?
 - Bring up all of the trash floating in the north pacific gyre, the northwest pacific islands, starvation by a full stomach for beached whales
- Future watershed exhibit needs more interactives such as an “It All Flows to Me” video game.

Statement 24: *Humans impact coastal ecology, including destruction of wetlands*

Input:

- Focus on sustainable development
 - Wetlands, etc. are coastal buffers, nurseries, etc.
 - In wetland exhibit, have wave machine and show how plants and roots absorb the water

Statement 26: *Humans are part of marine ecosystems.* More than 75% of the world’s population lives near coasts. Even for those who live in inland areas, the ocean is a major part of all our lives—it affects our climate, food supply, health, security, transportation, and the ways we work, play, and live. We in turn greatly impact the ocean.

Input: Covered extensively in other statements

Essential Principle 7: *The ocean is largely unexplored.*

Statement 1: *We have made great advances in marine technology, but there are many answers that elude us and many mistakes we cannot fix.* We need to invest more resources in ocean exploration and research so that we can make informed choices about how to modify human interaction with the ocean and still maintain a balance between environmental and human needs.

Input: Show all the ideas that people have come up with to counteract global warming, such as evaporating surface waters to make clouds

Statement 2: *Ocean Power—Working with the Environment*

Engineers and scientists are investigating the possibility of placing underwater turbines in Cook Strait to produce electricity. Scientists believe they can harness the tidal currents to produce electricity with far less environmental impact than the current state of the art.

Input: Using the existing Northern Pacific surge exhibit, make small scale wave power or “wave talk” to power a light bulb. Visitors use a lever that lowers the generator in water.

Statement 3: *The ocean, a place of adventure and exploration.* The ocean is the largest unexplored place on Earth. New technologies will expand the ability to explore and investigate uncharted habitats and undiscovered new life. Exploration in the future will be more interdisciplinary, requiring new collaborations, new ways of seeing, and new ways of thinking.

Input:

- Consistent with the idea of going on a mission at the aquarium
 - Observing cleaner stations, make and post observations
- Deep sea diving suit with a LCD that gives you a mission
 - Perform tasks, etc (like virtual reality, video game)

Statement 4: *According to the Census of Marine Life (COML), 1700 new marine species are discovered every year or an average of 4-5 new species each day!*

Input:

- Provide pictures through an accessible database.
- Use Breaking Waves to report about new unusual species discovered.

Statement 5: *The ocean which contains the largest habitats on the planet is mostly unexplored.* Conceivably, we know more about outer space than we do about the deep sea. Because we know so little about the ocean, we have little information about a large portion of our own planet. New organisms and new forms of life stall awaiting discovery.

Input:

- “We still don’t have many of the answer, but you should still care”. Explain why.
- Tell stories about deep sea creatures, their habitats, and how they have adapted to survive in a hostile world.
- Change visitors into explorers. Take them on the Challenger Deep expedition down into the Marianas Trench.

Statement 6: *The ocean is a vast, unexplored frontier.* We need to excite our visitors and ignite a fascination with ocean exploration, especially deep sea. We need to provide experiences that will make them want to know more about the 3D wet world.

Input:

- The “ocean explorer’s” program certification
- Computer games—exploration
- Shockleton story
- Show the development of underwater breathing equipment and remote controlled vehicles
- Go back in time—show what it was like to be in an ocean exploring expedition
Instruments used, what life was like, drawings, species collection, time lines, etc.

Statement 7: *The next miracle cure may be found in the ocean.* The public should be aware of common medications that were developed from adaptations of marine creatures and something about those that are in development.

Input:Messages

- Use opportunity to tell a story about a drug derived from as ocean animal or plant, the research, clinical trials, time for each step, etc.
- Provide concrete examples of medicines already being used such as drug synthesized from venom of a cone snail.
 - Provide example of applications in development, i.e. SNTI-HIV
 - Stress unlimited potential of ocean for future applications

Modes

- Create poster for distribution to doctor offices, “the next miracle cure could be found in the ocean”
- Post breaking news on website whenever a new medicine that originates from sea animals is approved with a link to learn more.
- Displays/exhibits could show researcher, marine organism, and person who has benefited
- Have lecturers who are researchers tell their stories

Actions

- Conserve and explore the ocean. The next miracle drug may be from a coral, sea snail, or venomous fish

Statement 8: *In addition to food resources the ocean contains medical and mineral resources that are largely untapped.* Many ocean organisms contain medically useful compounds and it is likely that most have not been identified. Some of these organisms may live in threatened habitats or are being over-harvested. There may also be mineral resources other than oil that could provide energy.

Input: Same as previous

Statement 9: *We need a new generation of marine scientists—molecular biologists, oceanographers, biochemists, etc.* We need to spark a new wave of interest in pursuing careers relating to the ocean. We need a new generation (and one right now) of adults and young people who understand the ocean to become the next leaders on a local and national level.

Input:

- Tie in 1700 species found each year
- What life is like as an oceanographer
- Movie showing deep sea exploration
- Film series: old programs and movies on outlook to future of ocean exploration
- Teenage nights where teens do mini-research projects with field component, etc.
 - Myspace pop ups and advertisements

Statement 10: *The ocean which contains the planet's largest habitats is mostly unexplored.* We know more about outer space than we do about the deep sea. Since most of our ocean is unexplored, we know little or nothing about a good portion of our own planet. New organisms and new forms of life wait to be discovered.

Input:

- Show how space is utilized. Terrestrial life only lives on the surface and just below; ocean life occupies 3D space.
- Show flat, small plate of sand and a larger area and volume tub of water to convey difference in colonizable volume.
- Compare number of space expeditions and costs to those of the deep sea.
- Ask a trivia question: "Which do you think we've visited more, the moon or deep sea?" Ask in Honda Theater pre-movie and waiting lines at the entrance.

Statement 11: *Suggested New Fundamental Concept: Despite pressure, the ocean depths are filled with life.*

Input:

Link to COML database.

- What mysterious animals live in the abyss? How have they adapted so as to survive in a hostile world? Can their adaptations benefit humans?
- What is chemosynthesis?

Essential Principle 8: Take Action: Help Heal the Ocean. (The Aquarium's Take Home Messages.)

Statement 1: The Mobile Booth Exhibit (Offsite) as a Venue. It is the personal goal of the volunteers who manage this venue to include more ocean awareness messages in the booth program in addition to marketing the Aquarium. We have many opportunities to have one-to-one interactive exchanges with people who are at a site where we are tabling, but who for some reason do not come to the Aquarium.

Input: In designing programs the workshop participants should include ways to deliver ocean awareness/literacy messages not only within the walls of the Aquarium, but also out in “nature”. Booth programs often occur in natural settings such as parks or at a festival or fair celebrating a specific topic such as a whale festival.

Statement 2: We may find these are not new concepts. In fact, is there anything new under the sun? Pursuing ages-old concepts and deeper understandings does not make this pursuit any less important. One could look at this as being almost “Biblical” in scope:

- Psalms 104:25-26: “There is the sea, great and broad, in which are swarms without number, animals both small and large. There the ships move along, and Leviathans, which Thou hast formed to sport in it.”
EP 3: The greatness and importance of the ocean has always been recognized in human history. Have we lost this pursuit?
- Job 41:31: “He makes the depths boil like a pot; He makes the sea like a jar of ointment.”
EP 6: Even the oldest book of the Bible recognized the existence of deep-ocean thermal vents and volcanoes, or at least the potential for the ocean to be both tumultuous and healing and restoring; and it also recognized the existence of medicines from the ocean.
- Job 38:16-17: “Have you entered into the springs of the sea? Or have you walked in the recessed of the deep?”
EP 7: Who today can say they have walked on the deep ocean floor? How many astronauts have walked the moon by comparison?

The ocean nurtures us. The ocean restores us.

Input: Religion, like political issues, is a delicate subject for aquariums to handle because of the diversity of their audiences. There are a few possibilities for using such messages as those above to make connections with religious groups at applicable offsite such as Speakers Bureau or Mobile Booth Exhibit.

Statement 3: How can visitors help protect the ocean? Take home messages.

While people may profess their love of the ocean, many remain on the shore of understanding about how their own actions affect its health. We have opportunities to help the public understand how we can protect the ocean collectively and as individuals whether we live on the coast or in Middle America.

We all have a deep responsibility to do something to reverse pollution and stop over-fishing, the extinction of species, and the disruption of delicate food chains etc. We must find a way to live without using up all the resources that future generations will need to live their lives.

The ability of our planet and its inhabitants to survive into the next millennium will depend on how we care for Earth's air, land and sea. The future of the oceans rests in our hands.

Input:

- Program/exhibit/take-home idea: The Aquarium can show visitors ways to heal the ocean by taking actions itself.
 - Signage spray painted in parking structure and the elevators.
 - Give families something to take with them that is “green”.
 - Display (almost like an exhibit) and sell “green” items in Pacific Collections such as fluorescent light bulbs, bamboo products.
 - Sell cloth bag with Aquarium logo on it. (For \$3 you can take this home with you and avoid a paper bag. You can use it for your other shopping. Add a message about how many trees are saved.)
 - Publicize the Aquarium's green efforts and where the efforts are—carpeting throughout, wooden shelving in Pacific Collections, waterless urinals and water saving faucets in rest rooms.
 - Promote use of environmental friendly products in all Aquarium locations where food is served—glass, no Styrofoam.
 - Create a take home project for departing visitors: Each person takes home an “assignment”. Could be structured like a James Bond mission. Make the assignment using glow in the dark stamps.
 - Provide “Blue/Green Passports” with check off lists for visitors to make commitments about what they will do. The reward—special privileges at the Aquarium.

Statement 4: *You can help protect the ocean and its resources.* There are many ways to help heal the ocean, some easier to adopt than others. Dispose of garbage and motor oil properly and minimize your use of harmful cleaning products and fertilizers. Conserve fuel, electricity, and water. When visiting the ocean, don't harm or remove any natural objects or leave anything behind. Educate yourself and others about the ocean and encourage your political representatives to support legislation promoting the sustainable use of marine resources.

Input:

- Aquarium conservation mascot such as Smokey the Bear
- Trivia question game of conservation messages developed by the Aquarium that could be played at home or on the website
- Take home challenge
 - A machine at the exit that spits out a take home environmental challenge and exiting visitors sign a commitment to take some action.

- Provide for feedback for both adults and children via the website. I
- incorporate ways to reach different conservation levels:: shark—picked up someone else’s trash; whale—organized a cleanup
- Issue an ocean protector badge to children who pledge to take action on a, b, c, etc.

Statement 5: Famous reflections

- “In the end, we will conserve only what we love. We only love what we understand. We only understand what we are taught.”
– Baba Dioum, Senegalese ecologist in 1968 speech in India
- “All that we do is touched with the ocean, yet we remain on the shores of what we know.”
– Richard Purdy Wilbur, American poet, b. 1921

Input: Quotations can be very useful as introductions to venues.

Statement 6: How does the ocean affect us? Why should we care about the ocean? A series of take home messages.

- EP 6: Every other breath you take comes from the ocean. Half the oxygen in the Earth’s atmosphere is produced by photosynthetic organisms in the ocean.
- EP 3, 5: The ocean influence Earth’s climate and is a source of food. Millions of tons of marine life are harvested each year and many people still rely on the sea for their livelihood.
- EP 7: The oceans may have vast reserves of commercially valuable minerals such as nickel, iron, manganese, copper and cobalt, while pharmaceutical and biotechnology companies are already financing exploration for substances that may someday be a source of disease fighting drugs.
- EP 7: Compared with land, this watery world is hardly explored, yet is more complex than any land-based ecosystem. The ocean’s intricate food webs support more life by weight and a greater diversity of animals than anywhere else on the planet. Nature has managed to fill every possible salty watery niche with a creature admirably adapted to a wet home.

Input:

- Take home messages need to be selected that will match the interest level of the visitor. These are excellent as starters but need to be tailored for different interest levels.

Statement 7: Some Take Home Amazing Facts

- At the deepest point in the ocean the pressure is more than 8 tons per square inch, or the equivalent of one person trying to support 50 jumbo jets.
- At 39 degrees Fahrenheit, the temperature of almost the entire deep ocean is only a few degrees above freezing.
- The largest waterfall on Earth is actually underwater. Found in the Denmark Strait, it slowly cascades downward for 2.2 miles. This is over three times as tall as Angel Falls in Venezuela, the tallest land waterfall.

Input:

- Use in a fact of the day or week activity.
- Use in an Aquarium-designed trivia game, as fun messages for behind the scenes tourists, in Marine Life Theater presentations, etc.
- Flash these and similar “facts” in the Honda Theater between film showings.

Statement 8: *The California Education and Environment Initiative (EEI) Model Curriculum: Is it of any value to general public environmental literacy?* The EEI curriculum is grade specific, not grade range as many other education models are. Objectives have been developed for K-12 and activities are in the development stage.

Input:

- In an effort to avoid re-inventing the wheel, look at the various grade level objectives and activities to determine usefulness in meeting the need to provide experiences for the multi-layered interests of the general public.

Statement 9: *Taking home the message “What you can do.”* The aquarium currently has a handout that points out 10 things that can be done for the environment. While the messages have been somewhat changed over time, the format and graphics are worn out. Also the Aquarium name is incorrect. A take home message has recently been designed for Pacific Current members and a selected mailing that is more up-to-date and graphically ocean related. However, take home messages from the Aquarium should be voiced as one. (References: *10 Everyday Tips for a Healthy Environment* and Aquarium of the Pacific new mailing for Pacific Circle members)

Input:

- As part of the Aquarium’s OA/OL campaign, develop a new handout that presents fresh messages in an engaging format that will motivate the reader to take action. The current 10 Tips holds little interest for returning guests since they have seen it many times previously and we are embarking on a new effort that needs help from the public.
- Coordinate such media so there is agreement both textual and graphic among various delivery systems.

Essential Principle 9: *Essential Principles 1-7*

Statement 1: *Making the Aquarium’s Ocean Awareness/Ocean Literacy Campaign Visible.* This campaign can suffer from lack of coordinated identity. It needs to be visible to visitors onsite, outside the Aquarium walls, website surfers, the staff, etc. An icon, “poster child,” and a catchy name to identify the effort other than campaign are needed. The binoculars signage along the roadsides and highways points to wildlife viewing points. Highway signs identify scenic viewpoints. Both remind the public about the value of wildlife and where to get “out into nature.” Smokey the Bear gave identity to the national effort to curtail forest fires. Campaigns have a defined ending so using such a word in this effort carries the impression that saving the ocean has a stopping point. If the Aquarium had multiple ways to label our ocean awareness/ocean literacy efforts, they would serve to remind all of us how the ocean helps us and how we can help the ocean. They would serve as multiple trails leading to stewardship.

Input:

- **Icon:** Preliminary ideas were (1) a yellow triangle depicting caution with the ocean in the center and (2) a circle of concentric rings with the ocean in the center. There was not time to refine these and additional input needs to be sought for other ideas.
- **Poster child:** The final product needs to be a graphic rendition that is somewhat humorous, recognizable as an ocean creature, and charismatic. A giant Pacific octopus with outstretched arms holding Planet Ocean was suggested.
- **“Campaign” name:** The name should be linked to public actions contributing to stewardship of the ocean, short, memorable, engaging, and broadly appealing. The word literacy is elitist and should not be part of the phrase. Something similar to the currently used “Defying Ocean’s End,” “Seas the Day,” or “Heal the Ocean.”

Statement 2: *Our greatest opportunities rest with our ability to provide visitors with empowering messages on conservation to help them embrace their role as stewards of the ocean, its inhabitants, and ecosystems.*

Input: Concepts and issues to explore:

- How does the ocean affect us?
- Why should we care about the ocean?
- What have humans done that impact the ocean?
- How can we help protect the ocean?
- How can we learn from our actions of the past to make a difference for the future?

Statement 3: *Ocean Awareness: The Essential Principles of the Ocean Environment for the General Public.*

Statements for this workshop are being submitted based on the brochure “Ocean Literacy: The Essential Principles of Ocean Sciences K-12,” a collection of facts. Yet we are targeting the general public. The Aquarium should develop a document that addresses what the general public needs to understand and embrace to become ocean aware stewards, not necessarily “ocean literate” individuals which has the negative off-putting connotation—illiteracy. What needs to be done for change attitudes not

concentrate on knowledge; to develop feelings, not share facts; to utilize what is real to the general public, not what is abstract to their lives.

Principle: a basic generalization that is accepted as true and that can be used as a basis for reasoning or conduct;

Concept: something conceived in the mind: thought or notion. An abstract or generic idea generated from particular instances.

Input:

- The California Aquarium Collaborative may be a group to develop a general public set of principles and concepts.
- It is not necessary to create a new publication. Modify the current EPs and FCs to be applicable to the general public which does not have to pass a standards based test.
- The people who are going to read the publications will be people who are capable of reading pre-existing text. They are already looking for information.

Statement 4: Concepts everyone should know about the ocean (regardless of language or race)

Input: The messages below constitute just a small portion of what everyone should know about the ocean and their effects on it. Working at the Aquarium has made me aware of the role we play as an institution and the responsibility we have to the public to provide it with accurate information they can turn into action. However, the overriding issue currently has been that there are many institutional voices speaking out as individuals or on one environmental need that the public does not know which way to turn. Facilities like ours and across the nation need to work together to provide a collective and consistent message about the ocean and its future.

1. "How inappropriate to call this planet Earth, when clearly it is ocean."
-Arthur C. Clarke
2. The ocean covers approximately 71% of the Earth's surface. And of all the water on Earth, 97% of it is found in the ocean.
3. Ocean plants produce more than half of the Earth's oxygen and in the process remove carbon dioxide (a greenhouse gas that contributes to global warming) from the atmosphere.
4. The ocean absorbs heat from the sun. The energy absorbed is redistributed around the planet affecting weather and temperature. Most of our rainfall is from the ocean. Without the ocean, Earth would be unbearably hot during the day and cold at night. Humans would not survive.
5. The ocean is a major resource for food. The fish in the ocean provide protein for nearly 1/6th of the world's population and plants such as kelp are used in commonly manufactured products.
6. Most of the ocean has yet to be explored. It has endless possibilities as it already provides us with food and medicine.
7. The ocean plays a major role in the economics of the world (trade, tourism, recreation, jobs, etc.). In the US alone, one out of six jobs is marine related.

Statement 5: *Field Guide for the Aquarium of the Pacific Ecosystem.* Modeled after guides for birding, wildlife refuges, and nature trails, such a guide could feature the Aquarium animals, habitats, ecosystems, while at the same time incorporated both conservation and ocean awareness messages.

Challenges: A detailed cost-benefit analysis would be necessary before embarking on such a large project. There are also the issues of staff time to develop such a guide, problems of changing exhibits and animals, etc.

Input:

- Could provide the basis for or utilize information developed for virtual tours and trails within the Aquarium.
- Should consider something that is not factual but full of frequently asked questions that could be answered by signage and interpretation or by asking other visitors, or in an answer key.
- Trials
 - Diversity tour, Ecology tour, Conservation tour, Serenity tour, Spiritual tour, etc. animals, cycles
 - Could lead to an “Aquarium Explorer” title for guests who travel the trails
- A single reference with three sections or three guides, (one for Northern Pacific, Southern California/Baja, and Tropical Pacific).

Statement 6: *Our strength with this project lies in getting our visitors engaged with the subject matter so they can make a personal connection and then take action or care about our ocean.* But the only way to get them to take that action is through personal connection. When I've worked on other environmental projects, we thought of it as an upside down triangle. The top third (the largest portion) would be information we are presenting to the public. The middle third of the triangle (a smaller portion) is the number of people who would make a personal connection. The bottom third of the triangle (the smallest portion) is the number of people that will take action.

Input: One of the criteria established for prioritizing the statements from the workshop, should be the bottom portion of the inverted triangle, i.e., which have the greatest potential for reaching the percentage of people who will take action.

1. We all have choices to make that affect the future of the ocean. So far as a race, our choices have led to damages such as pollution and overfishing.
2. Become actively involved in decisions made for the ocean. Vote and make your will known to leaders and politicians. A collective voice is much stronger. Teach those around you and lead by example.

Statement 7: *Word(s) of the Day/Week/Month.* An ocean literacy vocabulary is not one of common usage. The public does not know what words such as ecosystem, riparian, non-native species, MPA mean. Our goal should be to make words necessary to understanding the ocean more familiar to the general public. This needs to be done in an entertaining but informative way, almost as a game. The effort should not be one of a

single focus, that is, within the Aquarium. It should extend to the website, publications, etc. There can even be applications for the mobile booth exhibit offsite.

How, when, and where need to be determined. In addition, education of onsite volunteers to respond to guest questions needs to be addressed.

Input:

- As a start, develop a glossary of 50-100 words that will be the most common needed. References for selecting words could be analysis of recent ocean reported events, The Ocean Learning Center glossary, signage presently in the Aquarium, Essential Principles and Fundamental Concepts K-12.
- Determine venues to “play the game” and how the game will be played.
- Form a temporary committee to plan the effort and establish an implementation date.
- Have a different ocean literacy word each day/week/month.
 - Integrate into each exhibit (post on each exhibit—make a game out of it)
 - Children learn word, going in and define the word exiting.
- Put on website, classroom interactive component, teacher training, Pacific Currents, Topaz Times, etc.

Sample words: riparian, ecosystem, habitat, raft, schooling, global warming, sustainability, marine protected areas, archipelago, invasive species

Statement 8: *Becoming an Advocate for the Ocean and an Ocean Steward.*

According to the Ocean Literacy document one of the three aspects of an ocean literate person is “being able to make informed and responsible decisions regarding the ocean and its resources.” The Aquarium’s mission statement includes wonder (the inspirational), respect (the understanding), and stewardship (the action). The EPs and FCs should be analyzed in an effort to determine how best each fits the mission statement and efforts concentrated on how to develop venues that will result in guest commitment to stewardship. Unique Aquarium of the Pacific principals and concepts should also be developed that fit the mission statement.

Input:

- Take home messages that are original, compelling, and at times emotional, should be a part of each venue. They should not be the usual messages that a jaded public is tired of hearing. Ways for the messages to be incorporated into the Mobile Booth Exhibit should be included in the plan.
- The seven summary topics lack a balance between what’s the ocean and its processes and the human development impacting them. The facts need to be linked to stories of adventure and discovery about changes over time, not presented in the abstract.
- The first principle should link natural resources and uses with their impacts on the planet’s and ocean’s ability to accommodate the uses (oceanography). What commercial fishing does today and did in the past does to future supplies of seafood.

- The second principle is that literacy changes overtime and there are no easy quick fixes. We must remain attentive to new aspects of changes in the ocean, its ecosystems, processes and its future.

Statement 9: Venue ideas

Input:

Interactive trails:

1. The current scorpion and stonefish exhibits demonstrate the venomous spines found on the back side of the fish; however, the aquarium should also demonstrate the successful camouflage techniques. We can make the exhibit a game which kids and adults can enjoy; something along the lines of “how many fish can you find in this exhibit” the same can probably be done for the halibut and flounders.
(Note: camouflage was one of the adaptations featured two years ago in our Weird, Wild, and Wonderful themed year)
2. The current passports are a wonderful tool, but in addition to signage, we should also consider giving each guest a checklist for fish, something they can fill out as they walk through the aquarium. These new passports can include games such as: who eats who (similar to the shark exhibit the aquarium currently has), who lives where (matching habitats), games where they can trace the source of pollution in the watershed (especially with the introduction of the new watershed exhibit).

Website:

1. The aquarium website can and should feature a few games. For example, to counter-act the increased coastal development, the Aquarium website can feature a game that lets visitors create their own “dream home” along the coast. However, no matter what, the house falls into the ocean, even if seawalls become a choice, the ocean wins. We can emphasize educational points during the game.
2. A virtual marsh walk-through can show how pollution is ruining the most valuable resource on the planet, the wetlands. The walkthrough can show nature's way of keeping pollution in order also demonstrate how they are vital to our own survival

Statement 10: *Breaking Waves*. In the PNN era we had a feature called “Breaking Waves” in which we focused on timely issues that affected the ocean and its resources without getting political. Since that time, the Aquarium has begun taking a more proactive role on conservation issues (within the constraints of its 501c3 restrictions). Reactivating the PNN concept in one or several of the ways now available to communicate would form a venue for providing information to the public that would enable it to make informed decisions to help heal the ocean. Ocean awareness and stewardship could result.

Input:

- Be more aggressive about informing guests about current ocean events, e.g., NW Hawaiian Islands archipelago designation as a national monument
- Possible venues within the Aquarium—large screen monitor, cartoon newscaster, signage in part of aquarium applicable

- Other venues—Pacific Currents, members’ email newsletters, mobile booth exhibit, Topaz Times, lecture series introductions, Speakers Bureau, website, etc.
- Utilize the trail concept. For those who want little information the website “Breaking News section with a link to the Ocean Learning’s Center Topics section for those who want more information. Example, the OLC could explain national monuments as opposed to national sanctuaries if the NW HI islands archipelago were featured.
- Place signage in applicable ecosystem such as the PacificCare whale station for the designation of Puget Sound orcas as threatened species
- Tie “Breaking News” Aquarium events to conservation messages. Example: Horned Puffin egg laying: how Aquarium breeding helps diminishing wild populations, how aquarium ecosystems can be healthy ecosystems
- Consider using lollipop stands to deliver current news stories. Place them in the visitor path near the exhibits they relate to most closely. Make efforts to tell “smiley” news or success stories so visitors do not get the impression that all is gloom and doom when it comes to the coast and ocean.
- A team submitted a post-workshop proposal July 14, 2006:

Proposal: The Aquarium re-institute the PNN feature “Breaking Waves” as a media delivery system in several different venues with all telling the same story.

The Aquarium needs several venues for bringing news features, issues, glad tidings about the environment, etc to our guests whether on or off site. This proposal outlines a suggested procedure for doing so.

Background

Several years ago the Aquarium attempted to bring timely information to our guests via an oversized graphic in the Great Hall titled Breaking Waves as part of what was called the Pacific News Network (PNN). Another part of PNN was to also publish these events on the website. At that time the Aquarium was less aggressive about taking positions on environmental issues and the State of the Ocean was not a hot topic. The effort lasted only a few months until staffing issues, cost, and other uses for the panels took precedence.

In 2004 a temporary display was established in the Great Hall to give information about and give guests opportunities to complete postcards addressed to their federal elected representatives. The postcards provided space for comments and also the opportunity to either support or not the legislation. Postcards were mailed and also hand delivered to the official’s Washington office.

Suggested venues that might be included:

1. temporary signage in the applicable ecosystem (gallery) as close to a applicable habitat (exhibit) as traffic allows;
2. feature as part of the website;
3. Quarterly summary as applicable in Pacific Currents in a new Breaking Waves;

4. A “Did you know” paragraph in the monthly members’ e-mail and Pacific Circle members’ e-mail;
5. Topaz Times section;
6. Publish an expansion of the ocean awareness/literacy aspect of the event in the Topics section of the Ocean Learning Center. This could not be done simultaneously because of the time needed to prepare the article and go through the review process.

Examples of applicable events occurring in past two weeks

- Designation of NW Hawaiian archipelago as a national monument (Tropical Pacific)
- US Navy’s revision of sonar testing protocol that would better protect whales (Tropical Pacific)
- Reported success in eradicating *Caulpera taxiforma* in Huntington Harbor and Aqua Caliente (Southern California)
- Action by NOAA in closure of 370,000 square miles of Aleutian Islands waters to bottom trawling to protect deep water coral and extensive benthic wildlife (North Pacific)
- Political: Support for instituting improvements not now included but recommended by in USCOP and Pew Commission reports in HR 5018 (revision of the Magnuson-Stevenson Act). Applies to all three ecosystems

Pros

1. Ties to ocean awareness/ocean literacy campaign and application of various Essential Principles. Provides multiple ways for presentation of ocean related events to our on and offsite guests on a timely basis for some venues, less for others.
2. Inexpensive production (exclusive of labor of AV and Graphics plus materials)
3. Remodel of space not a requirement to implement.
4. Ties in ecosystem management of USCOP, Pew, and California Strategic Action Plan reports
5. Does not require a large committee or many meetings.
6. Can be made applicable to messages for the mobile booth exhibit
7. Goes beyond a graphic onsite exhibit to a much broader scale encompassing Marketing venues, mobile booth, membership media, etc with delivery of a coordinated message for ocean awareness.

Cons

1. Requires careful monitoring of content to insure there is no violation of the 501c3 designation. Need to be careful also to avoid emphasis on issues.
2. Requires vestment of time of already busy people (Graphics and AV). To catch attention the in house display cannot be just straight text and Av needs to produce the poster.
3. Unknown how much education of staff, especially volunteers, is necessary to cover questions from guests? If a long lead time is necessary for a display, cancels out the timely aspect.

4. Editorial review must be done on a timely basis. Who is or are the designated reviewers?

What needs to be done?

1. While participating departments need to be the decision makers on how they would feature the messages in their publications or the format for the website, for the onsite features, the Exhibits Department will need to
 - a. Design a template for the lollypop display.
 - b. Designate as closely as possible display areas.
 - c. Designate an area and display template where support for particular issues would be elicited (example, USCOP postcard table in Great Hall described above).
2. Appoint a small **temporary** working committee to plan the process but not the content. Need representation from Membership (e-mail letter), Marketing (Pacific Currents, Website), Volunteers, Government Affairs, AV, and Exhibits.
3. Appoint a small **permanent** committee of individuals committed to and knowledgeable about both general public ocean awareness and conservation to carry out the plan.

Connection to “Word of the Week/Day/Month”

Breaking Waves should have a connection to Word of the Week as much as is possible. There will be times when this cannot be done because of the time needed for staff education. To be prepared for the times when it is possible, several steps can be taken.

1. Develop a glossary of 50-100 words that commonly appear in ocean news items. When possible, give a reference for staff members who want to learn a little more.
2. Breaking Waves representatives should work with Word of the Week planners to develop a working plan for coordinating the word and the wave as much as possible.

APPENDIX 4:

LINKS TO OCEAN LITERACY REPORTS

The following ocean literacy reports are available on <http://www.aopmcri.org/>

- *Public Ocean Literacy: What Every Southern California Resident Should Know* (October 2005)
- *Public Ocean Literacy: Making Ocean Science Understandable* (March 2006)
- *Summary of Maritime Literacy Planning Meeting—An Activity of the Marine Board* (February 2006)
- *Summary of the California Conference on Ocean Literacy* (June 2006)

Other important documents such as the *Public Policy Institute of California Statewide Survey: Californians and the Environment* (February 2006) can be found on <http://www.ppic.org/main/publication.asp?i=659>