

Aquarium of the Pacific
Southern California Wetlands Recovery Project

Forum on
Wetlands and Watershed Public Education and Outreach

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INTRODUCTION

The Aquarium of the Pacific and the Southern California Wetlands Recovery Project hosted a half-day forum for zoos, aquaria, museums, and other educational organizations in the Southern California region to discuss wetland and watershed education and outreach. Literally millions of people use these Southern California institutions each year, and there is a need to explore how all these organizations might work collaboratively to maximize the effectiveness of important messages about these issues. The forum resulted in stimulating and productive discussions where the participating institutions shared their experiences and ideas on wetland and watershed education outreach.

SUMMARY OF DISCUSSIONS

The forum participants were comprised of staff from zoos, aquaria, museums, and other education institutions. (See Appendix A: List of Participants and Appendix B: Agenda).

Outcomes and Outputs

Mary Loquvam from the Southern California Wetlands Recovery Project (SCCWRP) opened the forum by reminding all participants of the large number of people who visit information educational institutions such as those represented in the room. To cite an example, the San Diego Zoo has 5 million visitors per year while the Aquarium of the Pacific has 1.4 million people. More people go to zoos and aquaria than go to all major sporting events (except NASCAR). The attending institutions can have a tremendous impact on educating the public about the environment and if we work together we can spread more consistent, powerful, and effective messages about wetlands and watersheds to the public.

The purpose of this forum was to share experiences about wetland and watershed education and outreach projects and discuss best practices so that we may learn from one another, develop networks, and start a continual communication.

What the Public Needs to Know about Wetlands and Watersheds

What is a Process We Could Use to determine what goes Into an Exhibition to Promote Stewardship?

Jerry Schubel from the Aquarium stressed the necessity of getting the science right in the beginning. Too often in zoos and aquaria there is a tendency to settle on simplicity which does not produce the desired impact. Stewardship action should always have a scientific basis. Similarly stewardship for watersheds and wetlands must be based on good science and emotional connectivity. The planning and implementation of any program should be designed to bring about a social change using concepts from commercial marketing—social marketing.

Schubel began the discussions by presenting a talk on the process to use to determine what goes into an exhibition to promote stewardship.

Step 1: Decide on audience, desired outputs, outcomes, and impacts

Step 2: Convene scientific experts in the forefront with exhibition designers as observers

Step 3: Reverse the roles and have the exhibition designers as the experts with scientists as the observers

Step 4: Test the ideas out on appropriate focus groups.

Step 5: Reconvene the original group and review the approach

Step 6: Repeat steps 2-5 with core group and some outsiders

Step 7: Create the exhibit and collateral programs

Step 8: Conduct a longitudinal evaluation

Some additional thoughts include: Don't expect all staff members to like the process and include creative people who enjoy creative combat as creative abrasion produces the best results. This is the process the Aquarium works with and intends to use again for the next exhibit on waves, beach, surf, and surfing.

A Scientist's Perspective

Eric Stein, chair of the SCWRP's Science Advisory Panel and staff on the Southern California Coastal Waters Research Project, gave a presentation on the scientific perspective of wetlands and watersheds. Wetlands loss in the US has been the result of previous government subsidization for agricultural purposes, intensified urban development, and lack of respect for the environment. Wetlands loss has been extensive in the nation with California leading with the highest percentage loss. There is a need in exhibit design to go beyond the superficial message and go more into the complexity of the wetlands and watershed education.

Stein informed participants about the various types of wetlands adding that most people have a traditional view of wetlands as extensive marshy grasslands seen on the East Coast. However wetlands come in all shapes and sizes. Southern California in particular is drier and supports wetlands that are drier in nature, but still valuable to surrounding native plants and animals. Exhibits seldom show these dry types of wetland which are highly dynamic in nature and perform the same important functions such as supporting wildlife, flood control, etc. The idea that if we add more water to the systems, the systems would benefit is a fallacy as the plants and animals in this region have come to rely on these seasonally fluctuating systems. Adding more water to create the traditional east coast-looking wetlands would probably result in the influx of more invasive species causing physical and biological changes to our ecosystem. The seasonality is a critical part of these watersheds.

Historically California was a much wetter place. The change in condition of the wet landscape was a result of climate change and human effects such as ground water extraction. The wet periods resulting in rivers and streams flooding basins at some time in history were followed by dry down over time.

Most living things rely on wetlands in some way. In dry climates, 75% of terrestrial land based animals rely on wetlands in some part of their life cycle. Humans also rely on wetlands for flood protection, good water quality, erosion protection (lessons of Hurricane Katrina made that more apparent), recreation, and research. We are all connected through watersheds—and if one part of our ecosystem is taken out it ultimately affects the rest of the ecosystem. The threats to wetlands can be from human actions such as drainage, dredging, filling, logging, grazing, runoff, air and water pollutants, etc. They can also be natural such as through erosion, subsidence, sea level rise, droughts, and hurricanes and other storms.

When developing plans for restoration, stewardship, and management for the future it is important to envision how the wetland should function 50 to 100 years from now and how the environmental processes may function then to ensure that the system will be resilient and sustainable. We all live in a watershed and depend on it. Everything is connected and what we do matters.

Thoughts from Other Participants

- Given that we live in a human-dominated environment, if we want functioning wetlands, we have to design for it and incorporate futuristic elements.
- Visitors need to know about issues most do not know about, such as sedimentation control.
- When managing any type of restoration consider what that region needs rather than just what that particular wetland needs
- Need different types of wetlands to make ecosystems function. It is a concept that is hard to accept.
- Consider future environmental constraints. We need to select what will work together in the context of future conditions.
- Open up a different mind set for visitors. Consider the historical perspective of the watersheds. Illustrate how we have changed the environment in the last 100 years, and how we can change it again, for the better, in the next 100 years.

- Include time frames for change that make plans seem more attainable.
- The public message about environmental awareness has to do with conservation of habitat resources. The new wetland features may not look like the wetlands of the last century but can perform the same functions.
- We live in an artificial environment. When developing educational programs remind the public to get out and see more natural environments.
- Illustrate how smart choices have been proven to work.
- Nature evolves and human's role in nature evolves. The challenge for humans is to preserve ecosystem functions in this evolution of the human-dominated environment. We need to be better stewards to do that. Present conditions in Southern California resulted because there was no plan—so let's create a plan.

Exhibits and Programs of Participating Institutions

Aquarium of the Pacific, Long Beach

Jerry Schubel, Barbara Long, Amy Coppenger, Sandy Trautwein, and Corinne Monroe spoke about the Aquarium's present and future endeavors to inform the public about the Los Angeles and San Gabriel Watersheds. Present projects include:

- *It All Flows to Me*, an educational program funded by the Water Replenishment District that teaches students K-12 about the link between their watershed, groundwater, and the coastal ocean. Post visit materials and an animation that shows the journey of trash to the ocean adds to the effectiveness of the program. The next step for the program involves creating a mobile exhibit to reach out to those who cannot visit the Aquarium.
- *Rios de la Vida* fountain mural, a public exhibit finished in February 2005, depicts the native plants and animals still living in our watershed today while signage placed along the fountain give further details.
- A coastal wetlands exhibit slated to open in spring 2007. The exhibit will realistically tell the story of California's coastal wetlands with a combination of interpretive signage, interactive opportunities, native plants and animals.
- *Our Watershed Story*, a public exhibit to be located on the Pierpoint Landing plaza and open in summer 2007 will use a lenticular display to contrast the watersheds in their natural state, before human settlement, to its current heavily developed state.
- Watershed exhibit and LEED platinum classroom surrounded by native landscaping. The exhibits will identify actions that could be taken to restore some of the natural qualities of our watersheds while the classroom, designed to employ sustainable materials and operations, will be used as a venue to explore watershed in greater depth.

Discovery Science Center, Santa Ana

Janet Yamaguchi and Paul Pooler spoke about the *Dino Quest* exhibit at the Discovery Science Center. The \$5.5 million exhibit uses life-sized dinosaur models and technology to encourage hands-on learning. Visitors become assistants to paleontologists and using transmitters gather information to tackle various challenges. The research mission doesn't stop there—it carries on in the homes of visitors through an online component, developed

with UCI Game Lab, where visitors can continue studying dinosaurs and their life systems. The Discovery Science Center hopes to employ a similar concept and technology for a new water gallery which will focus on the natural aspects of water, watersheds, and other environmental issues. This time visitors will take on the role of engineers and follow a specific story line as they work on environmental issues, transmit the information to other engineers, and eventually continue the game at home through the online component. The goal of these exhibits is to tackle hard science on top of environmental science.

Kidspace Children's Museum, Pasadena

Alexis Nadeau elaborated on the outdoor learning programs at the Kidspace Children's Museum designed to bring children closer to the environment. The program directed at Title I schools is funded by the Metropolitan Water District. With this program museum staffs go to Title I schools and give information about where water comes from. The children then come to the museum to see the interpretive Arroyo watershed, a mini model of Pasadena's Arroyo Seco, with a gentle stream, native landscaped gardens, a wildlife pond, and trails. The program allows the museum to show the difference between the manmade world and the natural world and allows the children to continue the activities in their school. Museum staff again goes to those schools when the children are in fourth grade and teach how water shapes the earth. The children then come back to the museum for their final visit to experience new activities. Another fun program gives children the chance to dress up as different ecosystems and vote for which animal most impacts the environment and why.

County of Orange

Mary Anne Skorpanich outlined how the residents of Orange County comply with the Clean Water Act. The county receives a mandate to educate the public and is doing so by developing programs to do education and outreach on different levels. The programs use Environscape Models to show how a watershed functions and funding other agencies to do teacher-training through ProjectWET. A larger project includes the conversion of a nature center into a watershed education center by Main Street Design. The project is presently geared towards 2nd and 3rd graders. The center discusses the human connection to their habitats; links the behaviors of children and their parents at home to their impacts on the environment; describes the roles of water cycle and water quality; and the functions of the landscape. The County of Orange is in the process of trying to figure out what the key messages of the center should be, looking at what other kinds of similar centers are out there, making sure not to replicate the same information, and trying to find a niche that has not been filled. The long-term goal is to develop a network to cover a geographic spectrum and at different grade levels.

Naval Weapons Station, Seal Beach

Bob Schallmann described the environment of the Naval Weapons Station at Seal Beach. The station is located in a marsh habitat and constitutes one of the few remaining natural, undeveloped coastal areas of Southern California. The wetlands provide an important habitat for many endangered bird species. Several outreach programs are in place that tackle issues such as wetland conservation, water quality, endangered species, migratory birds, and emphasize people's role in this system. The early evolution of the programs included outreach to schools and now is beginning to take reach out to the public.

El Dorado Nature Center, Long Beach

Esther Kim and Meaghan O'Neill and spoke about the snack shack in Colorado Lagoon that has now been converted to a science and education center. The center mainly features summer programs and development is under way to create a high school curriculum for the programs. The curriculum focuses on entire watersheds and integrates field trips to take children to the actual sites. The programs do not deal with hard education but rather focus on looking, learning, and discovery to ignite a spark in the children to cultivate a sense of stewardship. Weekends are the peak visitation days when families gather at the El Dorado Park. Though most of the families are non-locals the programs can be applied to any community. Majority of the families are Hispanic which created the need to develop bi-lingual programs.

Zoological Society of San Diego

Joe Arlotto, Kelly Hendrickson, Andy Schucker gave details about the larger master plan of the Wildlife Park which incorporates an extensive irrigation system, gray water usage, better water quality, and wetlands landscape. The master plan essentially creates a microcosm of the California landscape and as such faces similar problems faced by planning and water management agencies. Problems such as how to use waste water for irrigation when it is not tertiary treated; how to develop wetlands on site but not have the animals destroy them; how to prevent erosion when animals need to graze; and how to increase water quality, conserve water, and educate the public about these matters. The master plan involved a dedicated team comprised of zoo staff, engineers, compliance specialists, scientists, and geologists. Other endeavors already in place include a discovery station which aims to educate visitors about watersheds and tie the animals to habitat conservation. Another critical initiative is the joint education program with the San Diego Water District which offered classes for developers informing them about local regulations, and permits.

Sea World, San Diego

Tiffany Golota, Debbie Nuzzolo, Patricia Schick described the several public education programs offered by Sea World. The programs also contain a focus on wetlands/watershed related issues and give information about storm drains, endangered species, and the connection to the ocean. Sea World works with several nature centers to enhance the populations in the marshes. The goal in attending this forum was to gather information on what other institutions are practicing and developing and to collect important messages about wetlands and watersheds to include into the Sea World education programs.

Los Angeles Zoo, Los Angeles

Michelle Mills said that the Los Angeles Zoo have not yet developed specific programs on wetlands and watershed education but are carefully looking at other institutions and learning from their experiences. Right now the LA Zoo is in the midst of developing a new mission statement and new conservation message. Education about wetlands and watershed will need to be incorporated into the new mission.

Main Street Design

Tevere MacFayden and Penny Perez attended the forum to gather knowledge about how to get messages across to visitors when they are not at the heart of what the visitor is looking for. We have to be proactive with audiences who don't self-select to come to these institutions. To design and develop effective exhibits we need to know how you can take one facility and let it work for multiple audiences and how to do branding and social marketing.

Other Ideas to Explore

Talk the Walk

The participating institutions are taking or have taken great strides in watershed education. Though we 'walk the talk' and try to integrate conservation messages into our programs we also need to 'talk the walk' and reveal to our visitors about the smaller, though no less significant, feats of environment related accomplishments. For example greenroofs are an iconic symbol of green buildings yet the City of Long Beach has no building codes for them. The Aquarium of the Pacific had to work with the City to receive special permission and develop new codes to be allowed to include a greenroof for the watershed classroom. Similarly waterless urinals may save thousands of gallons of water a year but the City has no codes for it which forced the Aquarium to install them as a demonstration project.

Adult Education

A large percentage of visitors coming to zoos, aquaria and educational institutions are adults however most wetlands and watershed education program are geared for school children. The recent California and the World Ocean Conference 2006 was a demonstration of the number of adults interested and ready to change. The Aquarium of the Pacific's education department is primarily focused on school children but several programs are in place targeting adults such as the lecture series, forums, California and Ocean courses, while programs to be developed include the concept of trails where adults and children can follow trails based on their interest to encounter different experiences and knowledge. The County of Orange has hired a PR firm to help deliver messages and then track the responses to see how effective they are. El Dorado Nature Center is working on promoting their programs with homeowners association who are looking for speakers and for guidance on how to renovate their homes using eco-friendly methods and materials.

Networking

There are many institutions spearheading exactly what is being discussed at this forum. We should join forces and form partnerships with other similar non-profits, educational institutions, research agencies, etc. Organizations that are doing a lot of great work in this field and can be potential partners include NEMO (Nonpoint Education for Municipal Officials), Sea Grant, University of California Cooperative Extension, nurseries, and local governments. Forming a network also aids in distributing and separating the important messages between institutions. Remind visitors that our institution is part of an alliance aimed at informing the public about the environment.

Teacher-Training

Teachers are over-worked and have no time for new curriculum. How to not add to their workload yet introduce new information to them is a challenge. The Discovery Science Center offer after-school programs about five months in a year to develop a rapport with teachers. Over time they found that feeding teachers small bits of information at a time over the course of a few years is a good way to add to the student's curriculum without over burdening the teachers. The Discovery Science Center has a system where they start relationships early on with soon to be teachers.

The County of Orange has learned that everything is driven by school standards and that any new program needs to be designed to fit those school standards. The assistance of Inside the Outdoors, an environmental education program administered by the Orange County Department of Education is an essential partnership. They write curriculum, pair with other work programs, provide logistics, market, and also raise funds to subsidize lower incomes kids' transportation and fees.

Video Gaming

Children spend 25 hours a week on video games so it is inevitable that they be used as an educational tool. Having the ability to construct your own world and manipulate the environment is what engages the user. The Kidspace Children's Museum has a video game similar to SimCity where children can create an ideal village or town including how to treat and supply water. The Aquarium is working with University of Southern California (USC) Game Pipe to develop a video game for teenagers that focus on the ocean and require children to go outdoors.

Other Ideas

- Use appropriate terminology that is personal. We cannot start with words such as 'riparian.'
- If you have animals, use them. Animals are always a powerful draw.
- Use incentives and perks to draw people in.
- Learn from successful projects of:
 - San Francisco Bay Estuary Institution, which has created powerful billboards in San Francisco that show what certain regions looked like before development.
 - North Carolina, which serves as an excellent example of how to teach residents about the importance of watersheds. Not only are most of the residents familiar with the term 'watershed' but people can identify which one they belong to, how they effect their watershed, and their role in the protection of it.

Next Steps

- A number of participants' organizations have wetlands and watershed messages they are using or plan to use which will incorporate Stein's points from his presentation on the scientific perspectives of wetlands and watersheds. These messages should be sent to Loquvam by January 10, 2007 and include a brief description of the process and/or sources used to develop the messages and if there is yet any measure of how

effective it has been. The messages from all the participants will be compiled and redistributed.

- The compiled messages will be used as a starting point for the next conversation on wetlands and watershed outreach to discuss in particular:
 1. How these partners have made the message of wetlands and watershed integral to the message(s) of their institutions and
 2. How others around the table can do the same.
- The Wetlands Recovery Project will follow up with Mills to track down and distribute information on North Carolina's watershed branding and education campaign and how effective it has been. In particular we want to learn:
 1. What are North Carolina's successful strategies and messages and
 2. How these messages and strategies might be employed in our institutions, region, and state.
- The Aquarium intends to meet with County of Orange to discuss critical watershed messages and Discovery Science Center to learn more about their new online and gaming features.
- Communicate with www.thankyouocean.org and ask them to include messages about protection of wetlands and watersheds.
- Inquire about Mississippi's network of institutions along the river that work together and have formed a visible alliance.

CONCLUSION

The Aquarium of the Pacific and the Southern Wetlands Recovery Project hosted a forum on wetlands and watershed education outreach on October 12, 2006. The successful forum allowed participants to inform others about their latest wetland/watershed related projects, recount lessons of experience, and discuss what future initiatives should be taken to inform the millions of visitors who pass through these organizations every year about their environment.

Appendix A
List of Participants

Name	Organization	Email
Joseph Arlotto	Zoological Society of San Diego	jarlotto@sandiegozoo.org
Amy Coppenger	Aquarium of the Pacific	acoppenger@lbaop.org
Tiffany Golota	Sea World	tiffany.golota@seaworld.com
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Appendix B
Workshop Agenda

Forum on
Wetlands and Watershed Public Education and Outreach

October 12, 2006
9:30 am – 2:00 pm

- 9:00 am Introductions
 (Mary Loquvam)
- 9:15 am What do we want to achieve today as outcomes and outputs?
 (Jerry Schubel)
- 9:30 am What do we think the public needs to know about wetlands and
 watershed?
 • Determine what goes into an exhibition to promote stewardship
 (Jerry Schubel)
 • A scientist's perspective
 (Eric Stein)
- 10:30 am What exhibits or programs are our institutions using?
 (All)
 • Today?
 • Future?
- 11:45 am What are the best practices?
 (Mary Loquvam & Jerry Schubel)
- 2:00 pm Adjourn