
America's Aquariums: Roles, capacities and partnerships for ocean education

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Educating the public about oceans and the Great Lakes requires both technical mastery and popular appeal. On a daily basis Aquarium staff deal with real, living, breathing ocean animals. Most have followed their personal fascination and commitment to living animals into the aquarium profession. More than most they understand that living animals fascinate people. Today the aquariums of North America present the wonder of the earth's most amazing, exotic and mysterious environment. For all their wonder terrestrial environments can be explored on foot. The oceans and deep lakes require sophisticated equipment, professional training and a high tolerance for risk in order to experience the full meaning of the cold, the pressure, the currents, the darkness and the daily interactions with your food, your territory, your predators and your kind. Nearly every animal flies, moving freely in all three dimensions. Although comparisons are hard to justify, it can be argued that the oceans and Great Lakes contain the biggest, the smartest, the smallest, the softest, the most colorful, the most venomous and undoubtedly the most impressive. Aquarium guests find that wonder within their own communities.

The goal we share here today is a citizenry that understands both the wonder and the relevance of oceans to human futures. In the following remarks I will expand the term aquariums to include all credible living collections that use ocean messages to produce the informed citizenry essential to ocean conservation.

The need for such education is undeniable. Abundant research portrays alarming changes to ocean ecosystems that predict immediate challenges to the quality of human life. Public understanding of oceans and ocean issues can best be described as dismal.

Ocean education within schools is essential. Ocean messages, however, can become lost within a school district's broader science education objectives. The National Science Teaching Standards barely mention the oceans and contributing experts for those standards do not include ocean scientists. Schools often seek special assistance to track and communicate rapidly evolving issues that are technically complex. Long-standing and effective educational partnerships between aquariums and school systems stand ready to serve. Teachers seek out aquarium partners for their unique collections and

educational materials as well as for their preferences for experiential, hands-on or experimental methods. Finally, school-based programs are also limited to student-aged populations. The oceans crisis cannot wait for today's students to become adults. What about the general public right now?

America's aquariums form the core of a network of educational institutions that daily deploy an array of effective educational experiences about oceans and the Great Lakes. Collectively, these institutions have demonstrated the ability to reach any audience, any message, any need. The existing educational capacity is impressive, combining significant infrastructure, broad appeal to a huge audience, demonstrated competence with the informal learner (who is essentially a volunteer), and impressive examples of cooperative action. More importantly, this existing aquarium network comprises a learning community dedicated to improving the impact of ocean messages upon the understanding, attitudes and behaviors of all citizens.

My unequivocal message to this Commission is that North America's aquariums have both the capacity and the commitment to deliver effective ocean messages. First lets focus on commitment. North American aquariums exist for the sole purpose of engaging and enlightening the public about our planet's water environments and resources. The John G. Shedd Aquarium here in Chicago is a stellar example. Its mission reflects its singular focus: **"The Shedd Aquarium promotes the enjoyment, appreciation and conservation of aquatic life and environments through education, exhibits and research."** The Shedd Aquarium's balanced program includes exhibition of an extensive marine collection, professional interpretation of that collection to all conceivable audiences, special programs on-site and throughout the community and fundamental research activity offshore. The Shedd exemplifies the capabilities of America's accredited aquariums in 48 communities throughout North America. These institutions act through public exhibitry, outreach with live programs to every local community group (including schools, churches, community centers, nature centers, senior care facilities, hospitals, national organizations like scouts), outreach through distance learning and national education through shared curricula and extensive partnering. Finally, the Shedd exemplifies a predominant trend in informal education. Expert sources like aquariums must go beyond presenting scientifically accurate information and enter into advocacy for conservation within the context of long-term welfare of human populations and societies.

In the popular vernacular, aquariums have pop! People vote with their feet and Americans makes it clear that institutions with living collections are more appealing to the public than any other kind of museum experience. The 48 accredited aquariums of the American Zoo and Aquarium Association (AZA) welcomed over 50,000,000 visitors last year. These institutions are treasured and respected within their communities and recognized as a resource for all citizens, families and groups.

While seeking an entertaining family outing, the American family also recognizes aquariums' loftier objectives. A 1996 poll by the Mellman Group named aquariums and zoos as the third most trusted messenger concerning conservation and the environment. Examining average numbers of participants show that AZA aquariums work hard to develop and sustain that trust. An AZA aquarium on average serves 100,000 students and 20,000 teachers annually with both on-site and off-site programming. Public programs enroll an additional 114,000 on site and 22,000 off-site. The general visitor is

the largest educational audience, and each guest may select from a variety of interpretive experiences including exhibit-side interpretation (over 500,000 annually), shows (over 500,000), demonstrations (375,000) and chats (362,000).

Schools are respected and essential partners, but aquarium education is different in every way—in responsibility, authority, audience, messages and methods. One example of an educational program will illustrate both the challenge and the reward of commitment to ocean education. The Splash Zone Program at Monterey Bay Aquarium was originally developed from multiple objectives in education and audience engagement identified by the MBA. Aquarium educators increasingly believe that commitment to conservation grows from early positive experiences with living organisms and nature. First we care, then we learn to conserve. In addition, despite the importance of pre-school learning to child development, pre-school programs are generally under-represented in programs offered at aquariums and zoos. Finally, audience segmentation studies showed that Hispanic attendance, membership and participation at the Aquarium was far below their proportion of population in the Monterey area.

It is important here to note the growing trend to employ evaluation and audience research throughout development of educational programs and exhibits. Typically institutions use front-end evaluation to explore the audience's existing knowledge, what peaks their curiosity and their perceptions of importance. Front-end evaluation is invaluable to establishing realistic and ambitious educational objectives, targeting audience and focusing messages. Formative evaluation actually tests and refines program components periodically throughout development and construction and continues throughout exhibit fabrication and opening. Summative evaluation follows implementation, measuring the program's effectiveness compared to the objectives and also informing the development of future programs and exhibits.

Monterey Bay Aquarium developed age-appropriate activities and materials for pre-school through second grade children centered on their popular Splash Zone Exhibit. Splash Zone is an open area that presents rocky shores and coral reefs. The exhibit allows close observation, searching and discovery, supervised touching of living animals and expert, age-appropriate interpretation by trained exhibit attendants. Teaming with local Head Start offices focuses participation on largely Hispanic families. A weeklong Teachers Institute introduces and demonstrates activities and curriculum for the entire program to Head Start and Kindergarten through second grade teachers. The program includes aquarium visits, outreach to Head Start facilities and public schools, family evenings in the community and teacher in-service at the participant's school sites.

Children in the Head Start/Splash Zone Program receive three free trips to the aquarium (including bus transportation) with programming about the Rocky Shores and Coral Reef habitats and the animals that live there. The focus at this age is on a positive experience and answering the child's question in a program that models care and respect for the habitat. Fully bilingual aquarium educators conduct pre-visit and post-visit outreach to the school to prepare the children for the experience and to consolidate learning. Finally, aquarium staff offer family science nights in the neighborhood community center with ocean based activities, schoolyard science and biofacts from the ocean.

To complement and build upon the contact from the Splash Zone program, Monterey Bay offers Shelf to Shore in cooperation with local libraries in communities

with largely underserved Hispanic audiences. Shelf to Shore allows a patron to check out a pass to the aquarium from their local library that allows free admission for an aquarium visit for the entire family. Monterey Bay also offers a program called Free to Learn, which allows qualified groups whose mission is to help “underserved” segments of the population to apply for free or reduced admission.

Initial summative evaluation of Splash Zone is gratifying and reveals the challenges of educating the volunteer learner. Extensive interviewing, visitor tracking and program evaluation demonstrate that families as well as adults liked and were motivated by Splash Zone. The variety of exhibit techniques including hands-on activities and animal tanks was popular with both children and adults. Open-ended activities like water play and pretend play are highly used and highly valued by children and parents. Visitors especially enjoy things that two or more people can do together. Interactions of children and adults while at the exhibit were seen as especially valuable, the result of focused educational design using family learning principles. Also, there were slight differences between what children and adult reported doing and what was actually observed in the exhibition. Overall, Splash Zone met or exceeded all educational objectives and was recently recognized by professional peers with the 2002 AZA Education Award (top honors) at the Association's Annual Conference in September 2002.

This example raises a general question--how much do we really know about how much the aquarium visitor really takes away from aquarium exhibits or programs? At present research has clearly demonstrated that guests leaving our institutions can articulate new ideas and new attitudes gained during their visit. People walk out being able to repeat messages they heard during their stay. They also exhibit positive attitudes towards conserving oceans. How long this knowledge lasts or how it affects subsequent attitudes and, more importantly, behavior, is poorly known.

Lasting educational effects are difficult to measure in the infrequent, volunteer learner. As elusive as this information is, the broader aquarium community has banded together to seek it out. The American Zoo and Aquarium Association just received funding from the National Science Foundation for phase I of a multi-institution research project that will measure our educational impact. Phase one will measure pre-existing knowledge of our audiences and content acquisition. Subsequent phases will examine visitor's attitudes, behaviors and overall reactions to the aquarium's educational experiences. This innovative collaboration will inform the entire industry and greatly improve the practice of aquarium education.

Once begun, examples of excellence abound. The National Aquarium in Baltimore is noted for its leadership in conservation and recovery of the Chesapeake Bay. Their programs lead the way in targeting underserved audiences. Recently, NAIB has pioneered in exhibiting and interpreting sea horses. The topic is critically important—a charismatic little fish occupying nine coastal habitats around the world. One habitat is the Chesapeake Bay, connecting Maryland residents to replanting of Chesapeake sea grasses and stream restoration in their area. Live interpretation and interactions at the exhibit were extended through email updates as visitors carried their questions and attitudes home. At the peak over 800 emails per day revealed the visitors' incredible emotional reactions, shock at their previous ignorance of local diminishment of sea horse populations and its causes, and expressions of trust and high expectations of the National

Aquarium and its staff. Reaction to a call for volunteers to work in the field on sea grass restoration produced too many volunteers to manage, and the surplus were offered alternatives in ongoing programs for stream cleanup or beach cleanup.

The final accomplishment of America's aquariums—their dedication to professional networking and community partnering—is truly remarkable. No single aquarium leads in all phases of ocean education. Taken collectively, however, aquarium members of the American Zoo and Aquarium Association comprise a cooperative learning community that investigates and communicates educational best practices in order to increase the impact of our ocean messages.

Membership in the American Zoo and Aquarium Association declares an institution's voluntary adherence to the highest standards of science-based animal management, public exhibitry, education and conservation. AZA members are bound by the AZA Code of Professional Ethics and by a mediation process administered by an elected Ethics Board. Institutional members undergo regular accreditation review by an Accreditation Commission that includes on-site inspection by professional peers and demonstrated activity in conservation and education projects beyond the limits of their own local sites and operations. More relevant here, AZA membership also creates a learning community focused on constant improvement of all aspects of operations, shared with other members through professional training programs, regular conferences, publications and special meetings.

Forty-seven other aquariums join Shedd Aquarium as members in AZA. Their central roles in efforts such as Coastal America, in which 10 of 13 Coastal Learning Centers are AZA aquariums, and as originators and ongoing supporters of The Ocean Project validate their commitment to the missions of their institutions and the association. In addition to named aquariums, 161 other AZA institutions either have an aquarium on-grounds or present significant exhibits of ocean fauna such as fish, penguins, seals, sea lions, walruses, dolphins, whales, sea otters, sea turtles, marine birds or many other species that present ocean messages. For example, 63 institutions ranging from the New Jersey State Aquarium to the Akron Zoo hold and exhibit penguins. Each penguin exhibit carries an ocean story to local patrons. The Indianapolis Zoo devotes over 170,000 square feet and 3,000,000 gallons to aquarium exhibits in order to present and interpret marine mammals to midwestern audiences.

The 209 institutions of the AZA claim over 135,000,000 million visitors each year, more than the combined annual audiences of major league baseball, the NBA the NHL and the NFL. More than nine million students annually visit and enjoy on-site programs—over three-and-a-half million receive them free of charge. The number of people served in outreach programs to schools, day care centers, hospitals, senior care facilities and other community facilities approaches three million a year. Over 50 institutions have distance-learning capability and can interact with classrooms or universities across their state. Nearly 800,000 teachers sign up for teacher training each year at an AZA facility.

These remarks briefly outline the expertise, infrastructure and collaborative power of America's aquariums. They cannot capture the passion that aquarium personnel demonstrate daily for the conservation of this unique and essential habitat. America's aquariums are engaged and able today, and stand ready to accept greater challenges as needed.