

# The AZA Framework for Zoo and Aquarium Social Science Research

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## Why a Framework?

The Association of Zoos and Aquariums' (AZA) Conservation Education Committee (CEC) supports the appropriate use of living animals in zoos and aquariums as an important and powerful educational tool to advance a conservation agenda. In recent years, the social science study of zoos, aquariums, their visitors, and their relationships to the conservation movement has increased exponentially. In less than a decade, social science research has grown from a few individuals mainly pursuing basic questions into a full-fledged community seeking this knowledge. Today, the community has benefitted from studies conducted at individual AZA-accredited zoos and aquariums, AZA CEC sponsored national studies, international parallel studies, and an increasing number of theses and dissertations. These studies address questions such as: What is known? Where are the gaps in knowledge? What information is most useful for the field? And how can the information gained generate new or confirmatory knowledge that is part of a larger whole? Answers to these questions have created a solid baseline of information that can be used to help AZA-accredited zoos and aquariums meet their missions. The rapid growth in social science research, however, also presents new challenges for researchers. What current research will be most useful for the field? How can each study generate new or confirmatory knowledge that is part of a larger whole?

Research on learning in zoos/aquariums, and even zoo/aquarium education itself, is maturing and building. Prior to 2000, there was little comprehensive research on experiences in zoos and aquariums, and very little related to the conservation goals that AZA-accredited institutions hope to achieve today. In the last decade, since the CEC first sponsored one of two Multi-Institutional Research Projects (MIRP) now collectively known as the *Why Zoos and Aquariums Matter* projects,, social science research has grown by orders of magnitude. CEC leaders and scholars see the need for a zoo and aquarium social science research framework to help those in the education and conservation communications field understand how they can contribute to a greater body of knowledge. This report represents the CEC's determination to view zoo and aquarium social science research as a collective endeavor that values and represents a more holistic view of how free-choice learning happens in and around AZA-accredited institutions.

To date, more than 30% of AZA-accredited zoos and aquariums in the U.S. have had at least one representative participate in the continuing education program based on the findings and use of instruments from the two national studies comprising *Why Zoos and Aquariums Matter* (Fraser & Sickler, 2008). Zoo/aquarium social science research is now published in a wide range of peer-reviewed journals and increasingly appears in the popular press. Audiences are now ready to use the findings presented to create new strategies based on this scientifically sound research. As we write this introduction, we can state categorically that zoos and aquariums are well prepared to assertively advance their conservation mission, but to do so will require strategic thinking industry-wide, not just within individual institutions.

The following framework provides an opportunity for all AZA-accredited institutions and independent researchers to become involved in social science research and to work collaboratively in order to enhance the impact of zoos and aquariums and the conservation field as a whole.

This research framework also provides a structure for individual institution and multi-institutional studies to be interpreted in the larger picture of what we know about zoos and aquariums, their visitors, and their community relationships. The overarching questions presented in the following sections facilitate the synthesis of information that is useful for and accessible to researchers, educators,

marketers, administrators, and other like-minded individuals.

Within each question that follows are many opportunities for descriptive, phenomenological, structural, and predictive research. The CEC believes that this framework will help individuals, institutions, and the larger zoo and aquarium community to better serve our visitors and communities as a whole.

## Conceptualizing the Challenge

As conservation organizations, zoos and aquariums are committed to achieving social change. They envision a world where all people live in sustainable balance with the biodiversity on which all life depends. To accomplish this mission, zoos and aquariums recognize that their conservation biology research can describe the problems associated with species loss, habitat loss, and disruption of biological systems. While a small amount of this loss can be attributed to natural cycles that govern all life, for the past century it has become increasingly clear that the majority of this loss is directly attributable to human action.

Zoos and aquariums recognize that they must also directly focus on how to change public knowledge, attitudes, and ideally behavior in order to create this sustainable world. The world-wide ubiquity of zoos and aquariums has also created an unprecedented opportunity to act locally and coordinate these actions globally toward achieving their shared goal.

Zoos and aquariums, however, do not operate in a social vacuum. The majority of these institutions are primarily supported by local governments and regional non-profits that may or may not completely agree with these organizations' specific conservation mission. They work within a regional matrix of community organizations devoted to conservation concerns which all share a common goal, but may not agree on the means to that end. Moreover, they also work within a changing regional, national and global story about human relationships to the natural world, which means that their solutions and strategies may not always be applicable to the larger society, even though the principles for their interventions may be the same.

This research framework establishes the principles and issues that have the most benefit for the largest community. It provides governing questions that can help advance knowledge, and organizes those questions within general disciplinary traditions. It recommends idealized conditions for study in order to help individuals situate their work alongside that of their peers. And more importantly, it outlines where effort may lead to new and universally valuable knowledge. In the case of zoos and aquariums, the following framework can also help administrators and those who support zoos and aquariums to identify and assess their own fields for action as conservationists seeking to help shape a more sustainable society.

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## Overview of the Framework

On the following pages, we have grouped core questions under a variety of disciplinary inquiries, all of which can help advance knowledge about how zoos and aquariums can advance their conservation mission. We begin with a brief overview of questions that have been resolved for the medium term, synthesizing the results of a few decades of committed work by more professionals than can be credited in these pages. We then move into a discrete discussion of the discipline specific questions that have emerged from the work of these scholars and practitioners and suggest idealized cases for such study. In the first section following the overview, we suggest that recent research has begun to establish an important focus on the role the zoo or aquarium plays in the community. Here the research is primarily focused on the perceived psychological and sociological values that are either reinforced or challenged by the presence of the institutions. There has been a great deal of moral debate regarding maintaining living animals in zoos/aquariums, but only recently has this issue been tested in qualitative and quantitative study. Directly addressing this concern helps zoos and aquariums articulate more clearly how their mission is part of the larger goals shared by their communities.

In the second section, we recognize that these institutions are part of a larger community of informal learning institutions with both shared and competing goals. At this writing, there is a dearth of knowledge about the niche value of zoos and aquariums within this larger learning community, and what makes their living animals so valuable for accomplishing their specific mission, in contrast to likeminded institutions such as nature centers, science museums, or other museums of conscience. In this section, there is a call for a concerted effort to understand zoos' and aquariums' unique psychological, sociological, political and educational functions by engaging in comparative research with other institutions.

In the third section we describe key questions surrounding the sociological and anthropological contribution of zoos and aquariums within their community. For these questions, the framework recognizes that zoos and aquariums have the ability to operate as social agents, aggregating concerns under their banner, and advocating on behalf of a constituency in their larger community. For these questions, legitimacy and authority are central to understanding how effective these institutions can be at positioning social policy and advocating for change.

In the fourth section, we offer another a new direction for study that has only been anecdotally described in a few very recent studies. It seems that social service agencies have discovered the potential of these institutions as important partners as they commit to supporting families at risk. They report on these activities, but there remains little research on the effectiveness or importance of that work.

In the fifth section, we focus on the development of the field as a profession. We recognize communicating conservation concerns to the public is a rapidly developing field requiring special knowledge and terminology. This question should be proactively addressed in order to directly impact growth in the field and the community who will work with the results of this research.

Lastly, the framework recognizes leaders in conservation psychology and conservation biology who have demonstrated that synthesizing research from across their disciplinary fields in the interest of advancing a conservation agenda has been important to creating new knowledge that can lead to social change.

We believe that this strategy has great promise across all the social sciences, especially if approached from the perspective of zoos and aquariums as social change-agents.

The framework concludes with some recommendations from the advisory committee on the need for funding to help flesh out this research framework and some thoughts on organizational strategies that can help accomplish that goal at the grassroots level. The authors are confident that this initial framework will become a living document that will spawn new disciplinary contributions and new theories that will expand knowledge for the field.



## What we know

Two national studies comprised the multi-institutional research project *Why Zoos and Aquariums Matter*. One focused on visitors' motivation to visit zoos and aquariums and what those visitors took away from a single study, and the second explored the attitudes people have about—and the values they bring to—zoos and aquariums. Funded by NSF and IMLS respectively, these studies give us a strong baseline for future study by using mixed methods and engaging more than 16,000 people. A national poll, commissioned by AZA, later conducted a national study of 2020 individuals. Coupled with many individual zoo and aquarium studies and evaluations conducted in the United States and internationally (most notably in England and Australia) we can claim to know the following about zoo and aquarium visitors:

- **Do they like us?** Yes. More than 88% view us favorably, and less than 3-9% view zoos and aquariums unfavorably.
- **Do they trust us?** Yes. Zoos and aquariums are far more credible to the U.S. public than are extremists. 73% see zoos and aquariums as highly credible versus 40% for PETA. 85% view our staff as experts in animal care.
- **Do we know what works?** We're learning, especially through evaluation studies in lots of different settings. We know, for example, that visitors have preferences as to what engages them:

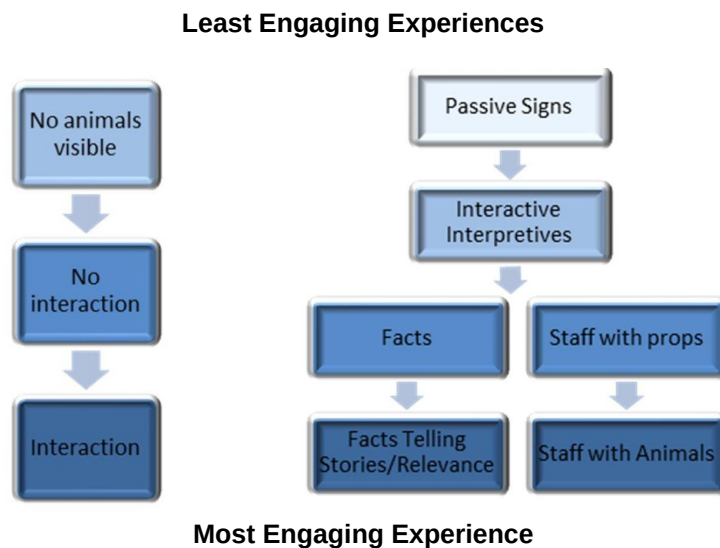


Figure 1: Types of zoo and aquarium experiences that increase audience engagement.

- **Do they learn anything?** Yes. First, they value our role as educational facilities. They come because we're fun, safe places to be with their families, but visitors definitely value what they (and their) children learn about animals and nature. Second, they know more than we think they do. A visit has less cognitive impact than we would have thought. Our visitors know more than the general public and they already know the basic concepts when they enter. Further, months after a visit, more than half of visitors (61%) were able to talk about what they learned during the visit (which related to what they claimed they learned immediately after the visit). Other studies have found significant impact on increased understanding related to conservation versus mere recitation of facts.

- **Do zoos and aquariums promote connection to nature?** Yes. 93% of the public find zoos and aquariums a “good way for children to connect with nature.” Our visitors know the difference between a natural vs. nature experience and they value the zoo/aquarium for providing an experience, often an opportunity to be outside with their families, in nature. Further, for some visitors, this may be the only “nature” experience accessible to some urban residents.
- **Do we know what works?** We have learned there are some components which, along with the social exchange which is both a motivation for some many visitors and a held value of visitors in general, can contribute to the potential for a peak experience:

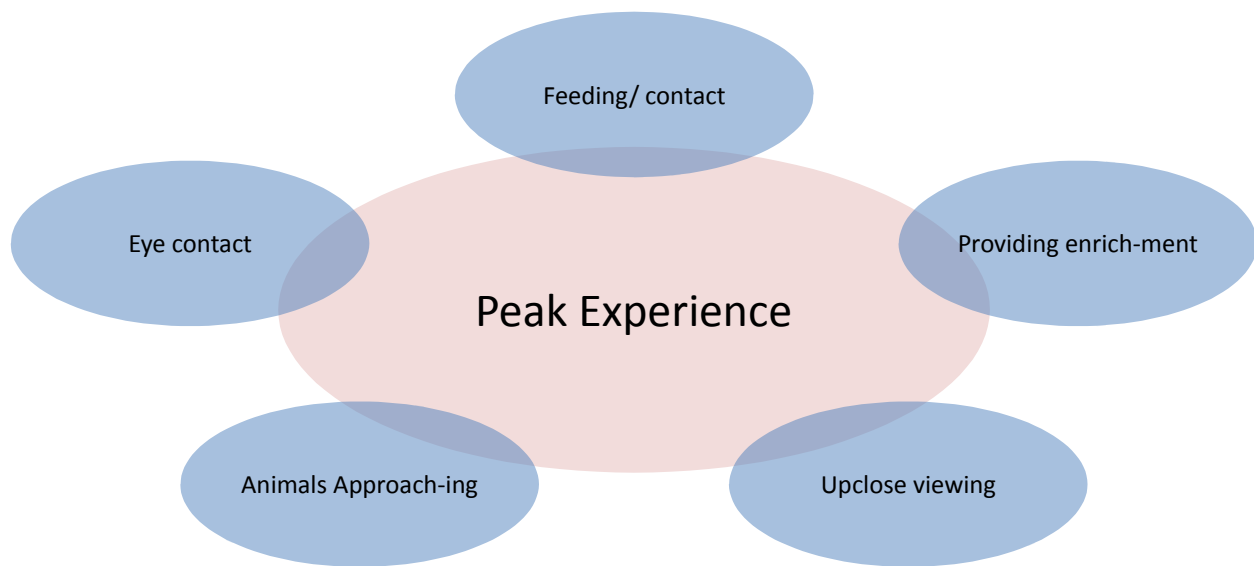


Figure 2: Elements that contribute to peak experiences.

- **Do we affect visitors’ attitudes toward wildlife, conservation, and zoos/aquariums?** Yes—in general. Most visitors (61%) found that their visit experience reinforced/strengthened values/attitudes towards conservation. Visits prompted many (54%) to reconsider their role in conservation action, and especially to see themselves as part of the solution to environmental issues. Nearly half (46%) offered unprompted comments related to personal actions they planned on taking as a consequence of visit and months after their visit, and 35% reported that the visit reinforced/strengthened their beliefs about conservation and stewardship.
- **Do we affect visitors’ behaviors?** Sometimes. Behaviors are very complicated, and there is a tremendous array of behaviors associated with conservation lessons from zoos/aquariums and from talking to the right people.
- **Do we know what works?** A single visit has impact, but cumulative effects are possible and desirable:



Figure 3: Encounters with messaging that lead to change in knowledge, attitude, or behavior.

As a result of this earlier definitive research, we no longer need to ask the same, basic questions. This gives zoos and aquariums a tremendous opportunity to move forward and engage in the next generation of evaluation and research, driven by a need to continue pushing the field forward.

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## A Framework for Social Science Work

### Question 1: What Role do Zoos/Aquariums play in Lifelong Learning Experiences?

The research on values cited in *Why Zoos and Aquariums Matter* has outlined a strategic framework and baseline data on visitors' conservation attitudes and motivations for visiting zoos and aquariums, the perceived role of the zoos and aquariums in American society, and methods for assessing the instantaneous experiences at these institutions. Educators have developed tools for assessing free-choice learning outcomes based on individual experiences with programs or exhibits and conservation psychologists have described basic relationships between zoo/aquarium-going experiences and the development of conservation beliefs and values by visitors, staff, and volunteers. To date, however, this research has been retrospective, correlative, or pre/post experience, and has been primarily focused on the perceived psychological and sociological values that are reinforced or challenged by the presence of the institutions. The theories that have emerged are, at best, tentative because it does not include a longitudinal dimension that reflects how the changing face of zoos and aquariums can be more proactive in the future.

New research in this area will expand on this foundational research by developing refined evaluation metrics that describe the links between individual experiences and lifelong learning. The research will focus on describing how those experiences can be causally linked to actions beyond that institution. Further examination of how visitors integrate the zoo/aquarium in their engagement with other cultural institutions will help expand thinking about the place of zoo and aquarium experiences in the life of the individual. This research focus will push researchers to investigate the perceived and desired role or roles the zoo or aquarium plays in partnerships, events, and the learning life of the community-at-large. In particular, we need to consider social group experiences—how zoos and aquariums operate beyond their property limits—through examination of outreach programs, word of mouth, and community engagement by zoo and aquarium advocates. It is also important that we understand how to optimize parent and visitor goals for casual visits with on-site messaging and experiences.

#### ***Zoos, Aquariums and Other Cultural Institutions:***

Research in this area will focus on how zoo and aquarium visitors also engage with other institutions and how they integrate these experiences in their lives. Projects focusing on advancing theory will address how values are developed across institutions with like messages, or how institutions with dissimilar messages are integrated into values development. Evaluation development will focus on creating shared instruments that are able to determine the contribution of zoos and aquariums to the development of values across institution types by building on the shared goals and affiliations that exist among cultural, scientific, and recreational providers in communities. Two primary foci for these studies will be expanding knowledge of how a variety of out-of-home experiences shape values and beliefs, and the role of social networks intersect with these experiences.

#### ***Institutional Roles in the Lives of Families:***

Significant literature on family development exists, but very little addresses the family's out-of-home learning experiences. Zoos and aquariums offer a unique site to develop new theory and research strategies for learning about how families develop meaning from their experiences. In particular, social conversations, and meaning developed through social interactions, remains without sufficient study to guide the development of more focused park experiences that build on the role of intergenerational learning in the lives of visitors.

### ***Zoos and Aquariums as Learning Communities:***

There has been a great deal of focus on institutions as places that deliver learning to visitors, but little attention to the institutions as learning communities themselves and how their staff integrate into other professional communities. Research in this focus area will address the whole institution as a learning organization, developing theory regarding where the values of education in our institutions lie? What are the values related to adult learning that might expand existing programs to new audiences, even internal or collegial audiences? What various audiences could be reached and how? What are the mechanisms by which values, motivations, engagement, and the conservation mission most make sense for those target audiences and our members/visitors?

### ***Zoos and Aquariums in the Life of a Community:***

On the community level, there is a need to develop and assess more focused research questions on how zoos and aquariums contribute to a community's culture. For example, can we analyze the larger social and relational networks of individuals, organizations, beliefs, values, and engagement? Is it possible to predict who might respond to different experiences and how? Foci for this research may investigate geographic communities or cultural communities represented by ethnic community groups, religious organizations, or social welfare groups such as the Boys and Girls Clubs or Scouting. One aspect of this area of research focuses on the community as opposed to the individual scale, and expands the work on value perceptions to include value-added measures.

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## **Question 2: How Do Zoos and Aquariums Compare with Other Informal Learning Institutions?**

In this section, we address the need for research and evaluation studies and tools that help institutions assess their roles in the larger community of informal learning institutions with both shared and competing goals. It is important to note that little has been done to describe the niche value of zoos and aquariums within this larger learning community. Writers on moral philosophy and child development have focused on implied learning or formative experiences that relate to encounters with living animals, but little has been done to compare this learning to other types of encounters. Furthermore, these studies have tended to focus on children and youth rather than the entire lifecourse where people continue to visit and learn at zoos and aquariums.

In a similar fashion, many organizations share the goals of zoos and aquariums, and some increasingly focus on bringing living beings into their displays without necessarily meeting the accreditation criteria outlined for AZA institutions. Clearly, there are many learning institutions that believe that living animals are important to accomplishing learning with these animals but not all share the specific conservation mission central to AZA institutions. Therefore, it is important for zoos and aquariums to develop new theory about how their approach to the use of living collections fulfills their specific mission in contrast to like-minded institutions such as nature centers, science museums, or other museums of conscience.

### ***Off-Property and Virtual Free-choice Learning:***

Research and evaluation strategies are only starting to emerge on the wide range of free-choice learning conditions, not all of which have physical connections to living animals or exhibitions. Off-site programs, online learning environments, virtual environments, and webcam remote observations are but some of the emerging media creating new informal learning conditions which impact how audiences experience zoos and aquariums. There is a need to advance theory around the role of these experiences in the suite of strategies employed by zoos or aquariums, and how the virtual encounters with living animals in the wild or at zoos and aquariums are changing knowledge, learning, and the visitor experience when they arrive at the physical place.

### ***Environmental Learning Experiences:***

Increasingly, learning experiences in restoration areas, public nature parks, international ecotourism, and other nature-based learning centers are changing visitors' perceptions of what is authentic about the zoo and aquarium experience. Environmental immersion, as a simulation strategy, can no longer compete with real opportunities that are shaping the ecologically focused greening of urban areas and nature opportunities. It is known that zoos and aquariums are recognized as nature experiences but not natural experiences by their visitors. Further inquiry into the "nature of nature" at zoos and aquariums will be essential to helping designers and program developers address the psychological shifts in what experiences are appropriate at zoos and aquariums and the role that living collections at zoos and aquariums will play in people's lives as the perception of nature changes in the 21<sup>st</sup> century.

### ***The Role of Zoos and Aquariums in the Informal Science Education Community (ISE):***

The ISE Community is rapidly working to advance theory through knowledge exchange networks. Zoos and aquariums, however, have not been adequately distinguished from other types of science learning environments. Comparative research is necessary to truly understand how living animals impact ISE outcomes, why these venues are unique in the ISE community, and how conservation education is similar to and different from either science or environmental education.

### ***The Arts & Humanities:***

Recent research on the perceived value of zoos and aquariums, and experiments with arts and humanities programming at some leading institutions, have radically shifted our understanding about how visitors want to use these institutions. Moral decision-making, perceptions of self in society, and the metaphoric function of zoos and aquariums as they support the discourse around urban conservation questions are open for investigation. It is clear from current research that visitors support these topics, but there is a dearth of empirical research on how the many disciplines within the arts and humanities intersect with the conversation and social missions of zoos and aquariums in their communities. Redressing this deficit through directed anthropological, psychological, and sociological study of how arts and humanities programs foster conservation values in zoos and aquariums can help to advance theory and guide the development of innovative programming which can then be evaluated against the mission of zoos and aquariums.

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### **Question 3: How Do Zoos and Aquariums Shape Social Action and Social Activism?**

One goal of conservation education is the creation of environmentally literate citizens who will make decisions and act in a way that benefits themselves and the environment. To achieve this, advancing critical thinking and promoting social action become components of successful conservation education efforts. Engagement in community improvement, social activism, or social action on behalf of animals, wildlife, or conservation are potential outcomes of zoo and aquarium education programs, but only if there is adequate theory to define how these actions can accomplish the intended outcomes. Evaluation tools and strategies for assessing success, and a directed cycle of learning within the community can help refine these tactics across the AZA community. To accomplish these ends, there are three specific needs for new research to help shape these conservation education strategies.

#### ***Studies Assessing the Role of Scale:***

Zoo and aquarium studies have traditionally focused on an individual agent who can make change in their personal behavior following a visit. It is known that people learn over repeated visits and can attribute, at least in part, some change in their behaviors to their experiences with living animals at zoos and aquariums. In terms of personal change and individual action, however, the discourse within the zoo and aquarium education community has continued to focus on the visitor in isolation rather than as a learner within a social world. The lack of knowledge about the difference in what actions individuals can take or choose to take given their social context appears to limit current education strategies. Development of research into how zoo and aquarium education programs work with groups has the potential to shift current education strategies and their evaluation to the level of social change. Further study of how individual behavior-change impacts the person changed on a personal level and within their social group can also help clarify education outcomes and anticipated results. Lastly, developing knowledge and common evaluation strategies for assessing how individual conservation actions help move a community, and in combination with results from other AZA institutions the nation as well, toward larger conservation goals, is essential to an overarching education strategy.

Secondly, there has been little study of the role of groups created through the zoo or aquarium's agency, and how those groups accomplish change in their community. Furthermore, the institutions themselves may serve as social agents in a community of cultural institutions. Many zoos or aquariums foster community initiatives and have staff serving on community boards where conservation issues are contested or launched. These areas of social action are not strategically represented within any social action framework, nor has the sociological theory of social change been adequately organized in a manner that can aid these institutions to evaluate their opportunities for success. As an educational strategy, it is necessary to build this theoretical framework, assess the knowledge of how scale and perceived legitimacy of zoos and aquariums as social agents of change can be used to accomplish these outcomes, and construct an evaluation program to assess this learning throughout the zoo and aquarium community.

#### ***Issues of behaviors:***

While the traditional education goal of zoos and aquariums has been to promote more conservation behavior, there remains little theory developed around the constraints that limit various behaviors they promoted. Research in Australia has demonstrated that developing behavioral recommendations for non-native species was difficult because there were few causal links between the storytelling strategies in zoos and aquariums and what visitors could do to impact the future lives for species represented there. Based on this result, there is substantial need for research into how people understand the degree



of proximity of a behavior in relation to a conservation message—that is, the nearness of the stimuli provided in an exhibit or program to the act itself. There is also a need to articulate the psychological barriers to behaviors promoted by zoos and aquariums, such as the ability and authority to act. Although these behavior-change theories have been researched extensively in media and consumer psychology, there remains little research on how these conditions apply to free-choice environments and specifically in zoos and aquariums where the behaviors are somewhat abstract because the stimuli frequently represent conservation issues remote from the visitor. Therefore, further study of the unique issues of agency and proximity to the issue should be specifically investigated in these settings. To facilitate this, it is reasonable for zoos and aquariums to also develop a more clearly articulated set of behavioral messages and instructions for at-home implementation, and then define those that offer the greatest efficacy for behavior change or reinforcement. Lastly, concerted focus on comparative study of targeted behavioral outcomes that most resonate with a zoo/aquarium visit would help focus education strategies and goals toward the capabilities of these institutions.

#### *Issues of measurement:*

During the writing of this document, we developed some standardized measures for entry motivations, beliefs, and conservation values. However, these measures were standardized for ease of use across the USA, and do not address contextual changes that may exist within communities, nor how specific issues may be opportunistically used in different regions to higher advantage. There is an emerging group of regional associations of zoos or aquariums, as well as worldwide groups seeking to achieve the same ends. Groups like The Ocean Project have done a great service by demonstrating that national and international data can help frame and shape messages and measurement benchmarks for their members. The Year of the Frog demonstrated that there can be a worldwide collaboration on issue-based conservation messaging. In this topic area, however, coherent sub-groups of zoos and aquariums could advance research substantially by focusing on how cultural communities such as Ohio, the zoos and aquariums of the Pacific Northwest, or other coherent communities address social issues and change regionally in order to assess their efforts as a collective group. This cooperative research strategy would gather resources around the development of evaluation metrics that reflect the community and free-choice learning community in aggregate rather than institutions acting in isolation.

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#### **Question 4: What Role do Zoos or Aquariums play regarding Social Services?**

The recently completed *Perceived Value of Zoos and Aquariums* study identified a new role for zoos and aquariums not traditionally part of the AZA discourse, but which represents a distinct opportunity and research need for zoos and aquariums. Interviews with political leaders and intercept surveys at a few zoos and aquariums uncovered that social service agencies expect and use AZA institutions to further their efforts. While some zoos and aquariums have experimented with animal therapy or animal contact programs, few have considered the social value or social service of these institutions as environments that can impact development of skills and relationships as part of community social service programs. Although much of this material has been anecdotally described in a few very recent studies, it would seem that social service agencies have discovered these institutions as an important venue. In addition, some politicians would like to see these institutions commit to supporting at-risk families, and reporting on these activities, but there remains little research on the effectiveness or importance of that work.

##### ***Perceptions of role:***

In the first instance, there is need for qualitative study to assess whether the social service agencies, such as state and federal government health-care, income assistance and human service agencies, themselves believe that zoos and aquariums can offer them support. At a national level, AZA staff could develop a list of social service collaborations currently supported by member zoos and aquariums and a task force could identify a taxonomy of the current levels of engagement and possible partners for exploring how these types of engagement relate to the development of enhanced motivations, skills or knowledge related to animals, wildlife or conservation. Using these data, a new multi-institutional exploratory study could be developed to explore how the roles and the communities themselves enhance or limit the mission objectives of these institutions.

##### ***Potential audiences:***

Few zoos or aquariums are free-access at all times. More than 95% of zoos and aquariums operate at least in part through admission fees, but many of these institutions do offer free or sponsored access as part of their community services. In a few cases, zoos and aquariums partner with other cultural institutions and social service agencies to provide access for low-income visitors or those receiving social assistance. Clearly there are questions related to the efficacy and the longer-term impact of providing access.

The research questions in this area do not focus on building minority or underserved audiences for the sake of audience, but rather on the services offered and the comparative value of these unique venues for providing such services. Professional and political audiences might potentially support zoo and aquarium work with social service agencies, or institutions might use increased engagement with social services professionals to help refine and target programs that aid their local community members and build long-term constituencies for positive experiences at zoos and aquariums.

##### ***Existing psychological use and valence:***

Again, anecdotally, it is reported that social service agencies use zoos and aquariums as public venues to support supervised parental visits, as destinations for school or other groups with learning differences or developmental challenges, and as public services made available to support parents with children in low-income or at-risk communities. Family guides and workshops have been created to help these visitors use the institution for science learning, but there appears to be a deficit in understanding the other psychological and sociological developmental benefits that also accrue from direct and guided

engagement. Future exploration of this topic could help zoos and aquariums develop a more comprehensive strategy for collaboration with the social services in their community.

**Key Readings:**

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### **Question 5: What are the Unique Characteristics of Learning in Zoos and Aquariums?**

Conservation education thus far has focused the mission of zoos and aquariums on changing how people behave. Current knowledge tells us that learning must incorporate knowledge, affect/attitude, and skill in a strategic relationship in order to manifest desired behavior changes. The unique aspects of the zoo or aquarium as a free-choice learning institution based on their distinct collections and experiences offers a fertile ground for continued theoretical and practical exploration. The following are several key areas of inquiry for learning in zoos and aquariums.

#### ***Relationships between various learning domains:***

Now that baseline information about learning is well defined, it is important to focus the next step on trans-disciplinary studies. That is, to examine where and how specific domains of knowledge intersect in a zoo or aquarium. Questions can focus on how characteristics of a learning domain relate to the development of intentionality, or the ways that learning occurs as visitors, repeat visitors, members, volunteers, staff, and organizations come to arrive at new knowledge.

#### ***The characteristics of learners/learning in zoos and aquariums:***

The recent NRC report on *Learning Science in Informal Environments* (Bell et al, 2009) builds on recent research into identity, temporal identity, and motivations. This new strand of research (Strand 6) focuses on identity processes, which in this case refer to the development of the sense of self as a stable construct that can predict behaviors, beliefs, and attitudes toward other people and the environment. Identity theory does not have a robust research tradition in zoos or aquariums. Further research on this topic in situations outside the home or school is important to further understand how identity can be implicated in the desire for self-directed learning or facilitating the learning of others. In particular, there is great need for experimental research to identify strategies, exhibit configurations, and other contexts that help visitors perceive themselves as successful learners. Are there different approaches to learning in zoos and aquariums, preferences for learning in these types of environments, or cognitive processes instigated by conditions in zoos and aquariums that set them apart from other learning institutions?

#### ***The social nature of group learning:***

Secondly, one of the core challenges facing zoos and aquariums is the social nature of their experiences. Recent research has demonstrated that learning in zoos or aquariums is substantially altered by the context, priorities, and values of an individual's social group. Unfortunately, the methodology for understanding learning in groups or intergenerational learning lags behind the methods for other types of assessment. There is need to develop more robust methods for assessing group engagement and learning as well as theory and strategy around comparing social or group learning constructs and processes. Further exploration of whether there are unique aspects, opportunities, or conditions that support social and group learning in these settings is also worthy of pursuit.

#### ***The nature of science in zoos and aquariums:***

Zoos and aquariums focus on conservation action as the logical outcome of science learning. This focus is closely tied to the NRC strand of "reflect on the nature of science" (Strand 4). The characteristics of the scientific enterprise basically assume that science is a) subject to change (i.e., tentative), b) empirically-based on evidence from the natural world, c) subjectively defined, d) involves inference, imagination, and creativity by the interpreter, and e) is embedded in the culture. Zoos and aquariums offer useful environments for investigating how individuals in their groups explore the natural behaviors of animals,

knowledge about species, and cultural assumptions and the implications of that exploration on the overall cultural understanding of the nature of science.

#### **Questions related to specific context and learning:**

Philosophically, zoos and aquariums continue to debate what is learned when viewing captive wild animals, and how the exhibit's setting (for example, immersion versus forced-flow exhibits) impacts learning. However, these context variables have not been adequately articulated for comparative empirical research, relying instead on case study data alone. This leaves open an important question for future researchers that the NRC report also called for: Does the context of the zoo or aquarium alter the ways in which people learn concepts and develop skills? (Two independent strands in the NRC report.) This study area would best serve the community if it focused on whether there are contextual barriers to learning related to how animals are exhibited, what contradictory messages visitors ascertain during their visit and how they draw meaning from those conflicting messages. This research would move beyond study of the animal or interpretive text to explore which specific domains of learning are best facilitated through the overall context, and how the context itself serves to teach.

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## Question 6: A Zoo and Aquarium Education Profession?

As zoo and aquarium education matures, questions regarding the development of the field as a profession are bound to emerge. At present, zoo and aquarium educators share a great deal with their counterparts in other environmental and science education institutions, but they have also recognized that some conditions are unique to the zoo or aquarium setting, in the same way that animal behavioral research and animal husbandry professionals in zoos and aquariums have unique knowledge sets that distinguish them from their peers. This unique condition suggests the need for a new comparative study of zoo and aquarium education practice against the characteristics that define a profession. These questions challenge whether there is a difference between zoo/aquarium education and other free-choice learning settings, what professional development is necessary to truly engage in the business, and what standards of practice are unique to this field.

### *Components of a profession:*

To engage with these questions, it is necessary to begin an exploratory study to articulate the unique components of this profession and to distinguish these components from those held by allied professions. Undertaking this professionalization study would provide the opportunity to define what changes are necessary for the field to be viewed as a profession by those outside the community, and how to engage in that discussion internally. Lastly, a profession is defined by a code of ethics in practice, and clarification of these ethics is essential to the advancement of a professional definition of practice.

### *Conditions of a profession:*

A second tier of research into the profession would establish whether there are unique characteristics of zoo/aquarium educators that distinguish them from other educators. In this case, an exploration of the unique skill sets needed to be successful in zoo/aquarium education would focus on the educators themselves as the research population; examine the pedagogical stance that leads to success; and determine whether the field is trans-disciplinary, interdisciplinary, or a unique field unto itself. Detailed examination of the career paths of zoo/aquarium educators; the ability to move outside the profession after establishing expertise within the field; and their professional aspirations, would enhance the study.

### *Progress of the profession:*

Lastly, historical research into the zoo and aquarium field would offer valuable instruction on how the field has changed and why standards that support the evolution of a profession in zoo and aquarium education have developed. This comparative study would examine the emergence of environmental education and museum education as separate disciplines, where and why these pedagogies were distinct, and how the traditional training of educators in zoos and aquariums has adapted within these two fields. This research should seek to answer the question of how the practice of education in zoos and aquariums has changed over time and to what end, what emergent trends characterize the field today, and how excellence in practice is defined and measured.

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### **Question 7: How do we Assess, Disseminate and Apply Existing Knowledge?**

In any field, there is an ongoing need to continually review new research both within and beyond the field itself. The practice of synthesizing and applying knowledge in service of the field is essential to expanding knowledge. Exploring what is known across disciplines helps to identify concepts or opportunities that reside in that work that may be less evident to those working within the field, helps to challenge assumptions, and offers new perspectives that can enhance practice. This exercise of “data diving” is best characterized under four categories of work.

#### ***Breadth of parent disciplines:***

As an applied education field, there is basic research conducted in several disciplines that can inform the work. For this activity, it is necessary to think broadly about disciplines and reach out to leading scholars in those fields to determine how that material applies. In zoos and aquariums, for example, educators have embraced conservation and environmental psychology, whereas consumer psychology and transpersonal psychology offer different perspectives on learning. More importantly, anthropology, sociology and political science remain under-sourced by those seeking to advance new knowledge in communities. Continual attention to the sub-disciplines within the social sciences and humanities can offer many new opportunities to expand thinking about the zoo and aquarium experience.

#### ***Deep literature synthesis:***

In addition to the broad assessment across disciplines, there is value in delving deeply into what is known, how it is known, and how it has come to have meaning within a discipline. Synthesizing deeply is a valuable tool for understanding how meaning has been applied to currently accepted wisdom.

#### ***Meta-analysis of studies:***

There is no longer a deficit of research or evaluation in the zoo and aquarium field. As shown in the opening pages of this report, there are a great number of both research and evaluation studies that have helped prove that zoos and aquariums achieve their goals. Unfortunately, many of these studies have been conducted in isolation. The literature review and post-hoc analysis of existing datasets are two areas warranted for further study given this exploding treasure trove of data. For instance, a researcher may choose to look for answers across existing studies and bring new research traditions to bear on existing results. For the majority of this work, secondary analysis of reported findings has the potential to unlock applicable theory that is concealed by case studies or location specific analysis.

#### ***Archival data diving:***

Often, research and evaluation studies’ datasets can be used to ask new or additional questions. Delving into old datasets to re-analyze or to ask new questions using the existing data can be a powerful tool. This is particularly relevant when new models emerge from cross-disciplinary studies. This strategy has proven particularly useful in qualitative research when transcripts allow secondary coding or examination for underlying meaning. For example, combining five studies that used transcripts to report experiences in zoos/aquariums may reveal new information that was concealed in the context of any one of the studies when considered in isolation.



**Key Readings:**

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## Conclusion

What does the CEC envision as the future for research in zoo and aquarium education? There is no one recommended approach, but rather, the CEC sees a variety of studies—evaluative, applied, and basic—conducted through a mixture of levels.

We see:

- ❖ Independent studies in local zoos and aquariums
- ❖ Collaborative, confirmatory, and replication studies at one or two sites
- ❖ Small action groups that might be defined regionally, by species, by program, or by interest
- ❖ Nationally representative studies
- ❖ University researchers working beyond the boundaries of zoos and aquariums

This framework does not address funding needs, but does recognize the substantive need for the implementation of an aggressive research agenda. Clearly, evaluative work must be conducted as a part of all professional education activity. Such work could begin to contribute to sub questions in the above framework and thus be incorporated into normal routine. On the collaborative and small action group level, funded projects can, and should, use the framework to demonstrate how the project will provide insight into part of any of the framework questions. For the larger studies, external funding, often from Federal agencies or funding organizations who seek to learn about how the nation is developing a concern for nature would be required, and such studies should emerge at least in partnership and with the knowledge of the CEC and AZA.

Ultimately, what we learn helps zoos and aquariums meet their conservation mission. Thus, the CEC strongly encourages that all research be shared, both academically and practically. It will ultimately be important that any research findings fitting into the above framework should be digestible and usable by those doing education in our institutions, and those who are responsible for the direction and management of our institutions and our future.