

GLOBAL CLIMATE CHANGE AS SEEN BY ZOO AND AQUARIUM VISITORS

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GLOBAL CLIMATE CHANGE AS SEEN BY ZOO AND AQUARIUM VISITORS

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EXECUTIVE SUMMARY

There is overwhelming scientific agreement that global climate change is occurring and has been accelerated by human activity [11]. To slow the pace of climate change and its impacts, there is an immediate need for people to make informed decisions about actions in their daily lives related to global carbon emissions. Recent analyses indicate that we do not have the necessary level of participation in behaviors that can be most effective at addressing climate change [10]. In addition, responses differ among segments of the American public; some segments are not inclined to make behavior changes due to their attitudes about the causes and impacts of climate change and their doubts about whether individual actions can really make a difference [16]. Furthermore, as the American Psychological Association (APA) [1] suggests, ignorance, uncertainty, mistrust, denial, habit, social norms, and lack of self-efficacy present barriers to engaging in behaviors that may address climate change.

Zoos and aquariums are poised to be positive forces in climate change education. These institutions allow easy access to nature and provide practical strategies for tackling environmental conservation challenges [9]. Zoo and aquarium experiences also help visitors build emotional connections to animals that foster concern for the environment [5, 6]. In addition, visitors to zoos and aquariums are quite diverse and represent a cross section of the American public in their knowledge, experiences, and interests [8]. Based on this context and with the support of a National Science Foundation grant, we established the Climate Literacy Zoo Education Network (CliZEN) in the fall of 2010. CliZEN brings together a partnership of zoo educators, learning science researchers, conservation psychologists, and climate scientists to explore strategies for effectively leveraging the unique opportunities of informal science education in zoos and aquariums toward increasing climate change literacy.

One of CliZEN's first activities was to conduct a national survey of zoo and aquarium visitors to expand our general knowledge of this audience and identify how they understand the issue of climate change, view their current actions, and perceive barriers in contributing to pro-conservation efforts. This report presents the results of our national survey and begins to outline how zoos and aquariums can effectively incorporate visitors' values and emotional connections with animals into educational resources that inspire actions with a positive collective impact on mitigating climate change. Five research questions were posed to guide the initial development of the survey items:

1. How do zoo and aquarium visitors' beliefs, attitudes, and behaviors concerning climate change compare to the general public?
2. What are the cognitive, emotional, and behavioral barriers to engaging in climate change action among zoo and aquarium visitors?
3. Do zoos and aquariums provide socially supportive and motivating contexts for discussions and responses to climate change?
4. Are zoo and aquarium visitors capable of utilizing virtual social networks, and online and mobile technology platforms in ways that could enhance their understanding of climate change?

5. Are zoo and aquarium visitors' personal and emotional connections to animals and nature related to their disposition toward changes in personal behaviors and consumer patterns that affect climate change?

The survey took place during summer 2011 at fifteen United States zoos and aquariums using two independent survey forms: (a) a survey primarily focused on *attitudes* (N=3,594) and (b) a survey primarily focused on *behaviors* (N=3,588), and resulting in the following key findings:

1. *Zoo and aquarium visitors are receptive audiences for climate change education*
2. *Zoo and aquarium visitors want to do more to address climate change, yet perceive barriers to doing so, particularly ignorance about what behaviors will be effective*
3. *Zoos and aquariums provide visitors with socially supportive contexts for discussions about animal exhibits and connections to nature*
4. *Zoo and aquarium visitors have access to and experience with virtual social networks and other Internet technology platforms*
5. *Zoo and aquarium visitors' concern about climate change and participation in behaviors to address climate change systematically vary with their sense of connection with animals*

Most significantly, these results indicate that personal connections with animals are strongly related to visitors' climate change conviction and concern, their engagement in behaviors to address climate change, and their desire to do more. With these national data, the zoo and aquarium community has an opportunity and a responsibility to serve as a resource for millions of annual visitors to learn about, discuss, and evaluate the causes, impacts, and mitigation of climate change. This opportunity, however, should not focus on didactic presentations of climate change causes and mechanisms. Instead, a more creative approach could focus on creating dialogue around the solutions that visitors can implement individually and collectively to mitigate climate change. Zoos and aquariums can create the context in which audiences can build understandings about what people are already doing to make a difference, what actions are the most feasible and effective, and how addressing climate change will not only benefit the global environment but also our local ecosystems.

OVERVIEW

Reaching 175 million visitors annually [2], institutions accredited by the Association of Zoos and Aquariums (AZA) are well positioned to play an important role in climate change education. Zoo and aquarium visits have been demonstrated to strengthen visitors' connections to nature, reinforce visitors' conservation outlook, and increase visitors' sense that they can be a part of the solution to environmental problems [9]. Research suggests, furthermore, that zoos can provide positive emotional contexts for visitors [18], that the zoo context supports a social identity related to concern for animals and the environment [5], that it is possible to connect emotional affinity for animals to an interest in conservation issues [6], and that emotional engagement supports learning about environmental issues [3].

As evidenced by increases in global air and ocean temperatures, rising sea levels, and decreased ice and snow cover, climate change is happening. These changes are negatively affecting the Earth's ecosystems, and human activities contributing to heat-trapping gas emissions are the dominant cause [11]. Humans have the potential to intensify or lessen global climate change. Dietz et al. [7] recently proposed that actions such as weatherizing and maintenance taken by individual households could reduce U.S. carbon emissions by 7.4% with almost no sacrifice. According to the APA task force [1] on the interface between psychology and global climate change, however, psychological barriers may diminish humans' participation in climate change mitigation behaviors. APA suggests that such barriers include: 1) lack of awareness about climate change and ignorance of what actions to take to address it, 2) perceptions of or actual scientific uncertainty about climate change, 3) mistrust in information about climate change or the sources of that information, 4) denial that climate change is happening or is problematic, 5) discounting the risks of climate change because it is perceived as geographically or temporally distant, 6) difficulty in changing behavioral habits, 7) concerns about perceived functional, physical, financial, social, psychological, or time-loss risks of behavior change, 8) social norms (i.e., the perceived social pressure to perform or not to perform a certain behavior), 9) conflicting goals and selecting activities that negatively impact climate change, and 10) a belief that humans can not effect climate change. Such psychological barriers cannot be addressed solely by providing more data about climate change. As APA suggests, because many people do not currently perceive direct effects of climate change and, thus, view it as a distant risk, perhaps one over which they do not have control, their time and resources may be directed to other priorities. Furthermore, climate change has been viewed through a political filter such that new scientific information tends to be interpreted to align with previously held beliefs, and the American public has become increasingly politically polarized on the issue of climate change [17], such that those on the right and the left receive very different messages about the issue from different sources.

Zoos and aquariums have an opportunity to develop an innovative approach to climate change education—one that goes beyond didactic information delivery, leverages affective learning pathways, transcends political divisions, and encourages people to make personal connections to climate change by activating a sense of caring and concern for animals whose very existence is in question due to current changes in climate. In order to realize this potential, zoos and aquariums must have a nuanced understanding of visitors' conceptions and awareness about climate change, as well as their climate change mitigation behaviors, and self-perceived barriers to take actions to address climate change.

In developing a guiding framework for this study, we examined research that has explored climate change attitudes in the United States, the psychological factors related to behavior change, the cognitive and emotional impacts of zoos and aquariums on their visitors, and the precursors to learning in informal environments. The following assumptions were foundational in the development of visitor surveys:

- Communicating about climate change using only scientific evidence has had limited influence on the public's prioritization of climate change as a national issue [19, 20].
- Climate change attitudes and engagement vary widely across the American public [16].
- Individual actions to address climate change are heavily influenced by a range of psychological barriers, and are often triggered by emotional reactions and social norms instead of rational decisions [1].
- Zoos and aquariums provide opportunities for visitors to make personal connections with animals, and these connections may facilitate a desire to engage in environmental conservation behaviors [6].
- To capitalize on the opportunities available in zoos and aquariums, educational interventions must resonate with a diversity of visitors and appeal to their values. Knowing what resonates with visitors means understanding their attitudes, preconceptions, frames of reference, biases, and behaviors [4, 8].

The overall purpose of this research was to characterize the readiness of zoo and aquarium visitors to engage with the issue of global climate change. This included describing visitors' cognitive, attitudinal, and behavioral predispositions toward climate change in addition to describing their attitudes and beliefs regarding wildlife, nature, and conservation actions. Using the guiding framework presented above, we developed this study to answer five research questions:

1. How do zoo and aquarium visitors' beliefs, attitudes, and behaviors concerning climate change compare to the general public?
2. What are the cognitive, emotional, and behavioral barriers to engaging in climate change action among zoo and aquarium visitors?
3. Do zoos and aquariums provide socially supportive and motivating contexts for discussions and responses to climate change?
4. Are zoo and aquarium visitors capable of utilizing virtual social networks, and online and mobile technology platforms in ways that could enhance their understanding of climate change?
5. Are zoo and aquarium visitors' personal and emotional connections to animals and nature related to their disposition toward changes in personal behaviors and consumer patterns that affect climate change?

The Climate Literacy Zoo Education Network (CliZEN) led by the Chicago Zoological Society, surveyed a total of 7,182 visitors across fifteen AZA-accredited U.S. zoos and aquariums between June and August 2011 to gain much-needed information about visitors to these informal learning institutions. In order to capture the desired information on a survey of a reasonable length, two survey forms were developed: (a) a survey primarily focused on *attitudes*

(N=3,594) and (b) a survey primarily focused on *behaviors* (N=3,588). The *attitudes* survey also included items from a validated segmentation procedure [14] to allow comparisons between the climate change attitudes of zoo and aquarium visitors and attitudes of the American public that were collected in May 2011 [12].

Taken as a whole, the research results provide a better understanding of visitors' attitudes about climate change, and offer guidance for the development of educational resources that build on visitors' values and emotional connections with animals and inspire actions that have a positive collective impact on climate change. In particular, the results reveal that:

1. *Zoo and aquarium visitors are receptive audiences for climate change education*
2. *Zoo and aquarium visitors want to do more to address climate change, yet perceive barriers to doing so, particularly ignorance about what behaviors will be effective*
3. *Zoos and aquariums provide visitors with socially supportive contexts for discussions about animal exhibits and connections to nature*
4. *Zoo and aquarium visitors have access to and experience with virtual social networks and other Internet technology platforms*
5. *Zoo and aquarium visitors' concern about climate change and participation in behaviors to address climate change systematically vary with their sense of connection with animals*

The next section of the report delves into the survey results related to each of the five key findings and then we present the overall implications of our study. Next, we present the pertinent figures to the key findings in Appendix A and the data tables displaying the results of all the survey items appear in Appendix B. Finally, an overview of our methodology is presented in Appendix C.

KEY FINDINGS

1. Zoo and aquarium visitors are receptive audiences for climate change education.

One of the primary goals of this study was to explore how the proportions of zoo and aquarium visitors across the Global Warming's Six Americas segments compare to the proportions among the general public.

- While 39% of the general public is *concerned* or *alarmed* about global warming, 64% of zoo and aquarium visitors fall into these two segments. Thirty-five percent of the general public are either *disengaged*, *doubtful*, or *dismissive* with regard to global warming versus only 17% of zoo and aquarium visitors (Figure A1).
 - Analyses based on visitors' home Zip Code location revealed that across the major geographic regions of the United States the proportion of *concerned* and *alarmed* visitors was consistently higher than the overall national sample. The range of *concerned* and *alarmed* visitors varied from 59% in the Midwest to 72% in the West (Table B2).
 - Aquarium visitors tend to be more concerned about global warming than zoo visitors (Figure A2).
 - In general, visitors are slightly more inclined to believe 'climate change' is happening than 'global warming' (Figure A3).
- In addition to observed differences in the distribution of the Six Americas segments, zoo and aquarium visitors substantially differ from the national sample in some key attitudinal and behavioral characteristics related to global warming.
 - Nearly two-thirds believe human actions are related to global warming (Figure A4)
 - Global warming is an issue that visitors think and worry about (Figures A5 & A6)
 - Visitors are concerned about the potential impact of global warming (Figures A7 & A8)
- Visitors in the *alarmed* and *concerned* segments tend to engage in various conservation behaviors more so than other visitor segments (Figure A9).
- In general, visitors tend to trust scientists and zoos and aquariums more than other sources of information regarding climate change (Figure A10).

According to the Six Americas team [16], *alarmed* and *concerned* persons are those who are sure global warming is happening and the *alarmed* segment is highly likely to engage in personal behaviors to address it and believes its effects are happening now. Although those in the *cautious* segment have less certainty than those who are *alarmed* or *concerned* that global warming is happening, they believe that it will impact future generations. These findings suggest that zoo and aquarium visitors are a prime audience for climate change education. The majority of visitors tend to think that global warming will harm them personally, as well as harm future generations. Furthermore, they think and are worried about global warming and trust zoos as a source of climate change information.

2. Zoo and aquarium visitors want to do more to address climate change, yet perceive barriers to doing so, particularly ignorance about what behaviors will be effective.

To help inform educational strategies within zoos and aquariums, some visitor survey items focused on identifying any cognitive, emotional, and behavioral barriers to engaging in climate change action.

- Sixty-nine percent of zoo and aquarium visitors would like to do more to address climate change (Figure A11).
 - Of those who want to do more, 92% identified at least one personal barrier that was standing in their way (Figure A12)
- The most prevalent self-perceived barriers to addressing climate change include:
 - Not knowing what actions would be effective
 - Believing necessary actions would cost too much money
 - Uncertainty that personal actions would make a difference
- Almost one-half of zoo and aquarium visitors believe they have little to no impact on personally addressing climate change (Figure A13).
- Zoo and aquarium visitors, compared to the general public, tend to be slightly *less* optimistic whether people in general will do what is needed to address global warming. However, they are slightly *more* optimistic that people have the ability to reduce global warming (Figure A14).
- Compared to some consumer behaviors such as driving a fuel-efficient car, few visitors see the importance of various conservation support behaviors such as talking to others about the importance of addressing climate change (Figure A15).
- Zoo and aquarium visitors, overall, have an awareness of climate change threats. Visitors, however, tend to perceive climate change as a *distant* threat. On average, visitors have a stronger agreement that climate change threatens the survival of arctic wildlife than they do that it threatens local wildlife or human health (Figure A16).

These findings suggest that zoos and aquariums have an opportunity to support visitors in their desire to address climate change by providing information about effective, affordable actions, and validation that the collective impact of individual or group actions will make a difference. Furthermore, zoos and aquariums have an opportunity to draw upon the social context of zoos and aquariums in order to alleviate the level of pessimism about whether or not humans will take collective action to address climate change. In addition, zoos and aquariums may leverage visitors' notions about the threats of climate change on arctic wildlife in order to provide educational resources that address the effects of climate change in their own backyards and on themselves.

3. Zoos and aquariums provide visitors with socially supportive contexts for discussions about animal exhibits and connections to nature.

The surveys included various questions to find out whether zoos and aquariums provide visitors with socially supportive and motivating contexts for discussing and responding to climate change.

- Compared to the general public, zoo and aquarium visitors are more likely to have friends who share their views on global warming (Figure A17).
- While at a zoo or aquarium, almost all visitors tend to enjoy discussing animal exhibit signs and displays with their family or companions (Figure A18).
- Visitors who are *alarmed* or *concerned* about global warming:
 - Use zoo and aquarium visits as a chance to talk to companions about their relationships to nature (Figure A19)
 - Are interested in finding out more about how global warming is affecting wildlife and their natural habitats (Figure A20)
 - View zoos and aquariums as trustworthy places to find out how to help reduce the effects of global warming, more so than visitors who are *cautious*, *disengaged*, *doubtful*, or *dismissive* (Figure A21)

These findings suggest that that zoos and aquariums can capitalize upon *all* visitors' social enjoyment in conversing about exhibits by using interpretive signs as one potential vehicle for climate change education. Potential display topics include the effect of global warming on wildlife and how to help reduce the effects of global warming. Zoos and aquariums can also provide opportunities for visitors to discuss with one another their relationship to nature.

4. Zoo and aquarium visitors have access to and experience with virtual social networks and other Internet technology platforms.

To determine the potential for usage of technology platforms as effective climate change education resources for zoo and aquarium visitors, visitors were asked if they use mobile technology to access the Internet and whether they regularly use any social networks or gaming systems.

- Most visitors have access to a hand-held Internet connection during their visit to a zoo or aquarium (Figure A22).
- Overall, 60% of visitors regularly use Facebook (Figure A23).
 - Usage of Facebook varies considerably based on visitors' ages. For visitors age 18-24 years old, 84% use Facebook, whereas visitors age 60 years old or more, only 28% use Facebook (Figure A24)
- Twenty-five percent of visitors regularly play Nintendo's Wii gaming system (Figure A25).
- In addition, almost half of survey respondents indicated they regularly play at least one type of electronic game (Figure A26).
 - Older visitors, however, may not be as likely to utilize these resources (approximately 20% of the sample).

These findings demonstrate the potential for usage of technology platforms as effective climate change education resources. Visitors' comfort-levels with such platforms are an asset to be considered when developing and implementing technology-based climate change educational strategies. Also important to consider is that the user group will grow, and will soon include those visitors in the 50 and above age range. Furthermore, these survey findings suggest the promise of using social media and other Internet contexts for climate change education both within and beyond the boundaries of zoos and aquarium facilities.

5. Zoo and aquarium visitors' concern about climate change and participation in behaviors to address climate change systematically vary with their sense of connection with animals and nature.

The survey asked various questions about visitors' personal and emotional connections to animals to identify any relationship these connections might have to their disposition toward changes in personal behaviors and consumer patterns that affect climate change.

- Eighty-six percent of visitors report feeling a somewhat to strong sense of connection with the animals they see at a zoo or aquarium (Figure A27).
- Results revealed that zoo and aquarium visitors' sense of connection to animals is highly related to:
 - Belief in climate change (Figure A28)
 - Concern about the effects of climate change (Figure A29)
 - Current consumer and conservation support behaviors (Figures A30 & A31)
 - Wanting to do more to address climate change (Figure A32)
 - The Six Americas segments (Figures A33, A34, & A35)

Zoos and aquariums have a uniquely extraordinary opportunity to connect visitors with animals. These survey findings suggest that climate change education resources within zoos and aquariums can benefit from the strong connections visitors feel with the institutions' living collections. Visitors' connection with animals, sense of commonality with other species, and spiritual connection with nature can be both strengthened via zoo experiences and used as assets when developing and implementing education initiatives within zoos and aquariums that aim to inspire participation in both consumer and environmental support behaviors that address climate change.

IMPLICATIONS

The implications presented here are guided by a question that served as the motivation for conducting this research: Given that Americans appear to have a range of viewpoints about climate change and the ways to address it, can zoos and aquariums be an effective source of communication and education?

The vast majority of U.S. zoo and aquarium visitors agree that climate change is happening and believe it is caused by human actions. Moreover, most visitors are concerned about the effects of climate change and want to do more to address it. But there is still a need for further education. First, although the visitors are cognizant that climate change presents threats, they seem inclined to consider those threats to be somewhat remote, affecting animals in remote places and to a lesser extent future generations. They are less concerned about the implications for humans, people in the U.S., and particularly for themselves. Zoos and aquariums can do more to describe the impacts of climate change on local wildlife, and the ways in which humans will be affected by changing ecosystems.

Second, although visitors acknowledge the human role in contributing to climate change, they are doubtful that humans will be able to mitigate it, and uncertain about what effective behavioral changes they can make personally. Survey findings suggest that despite zoo and aquarium visitors' awareness of climate change and motivation to take action to address it, they experience barriers to engagement in climate change mitigation behaviors. One type of barrier is pessimism about whether others will do what is necessary to address climate change. Thirty percent of zoo and aquarium visitors feel that although human action can reduce the effects of climate change, people in general are not willing to change their behavior. Another fifty percent of visitors are uncertain as to whether or not people in general will do what is needed to address climate change. Another type of barrier is a lack of self-efficacy. Approximately one-half of zoo and aquarium visitors believe they can personally have little to no impact on addressing climate change. When asked what is standing in their way of doing more to address climate change, over 90% of visitors reported at least one barrier. The barrier selected most frequently was a lack of knowledge of which actions would be effective. The next two top barriers reported were a concern that the necessary actions would be too expensive and an uncertainty if actions would make a difference.

With awareness of these barriers comes inspiration for learning opportunities. Zoos and aquariums can address these barriers by providing visitors with educational resources that will aid them in making informed decisions about effective, affordable actions to address climate change. Furthermore, zoos and aquariums can serve as the context in which the collective impact of individual actions can be demonstrated and where social interactions can reinforce a person's inclination to address climate change. When visitors see that other visitors care and are interested in doing more, a type of social comparison can emerge that supports and nurtures collective action. Importantly, zoos and aquariums can allow visitors to develop a social conversation about human involvement in climate change that can continue beyond the spatial and temporal boundaries of the zoo visit.

Findings about visitors' current experiences within zoos and aquariums suggest that these institutions have an opportunity to effectively utilize their animal collections and interpretive displays in order to engage visitors in climate change education. Overall, visitors have a sense of connection with the animals they see at the zoo or aquarium, and this sense of connection is

associated with overall concern about the effects of climate change, a desire to do more to address it, the extent to which they talk to others about the importance of addressing climate change, and exhibiting behaviors to address climate change. Furthermore, most visitors enjoy discussing exhibit displays with their companions. Zoos and aquariums, therefore, can build upon visitors' engagement with the resources of these institutions in order to build communities with the capacity to engage in actions that will have a collective impact on addressing global climate change.

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Figure A1. Segmentation of zoo and aquarium visitors and the national sample according to the Six Americas categories

Nearly two-thirds of zoo and aquarium visitors are *concerned* or *alarmed* about global warming, compared to just over one-third of the general public. Only seven percent of zoo and aquarium visitors are *doubtful* about global warming, versus 15% of the general public.

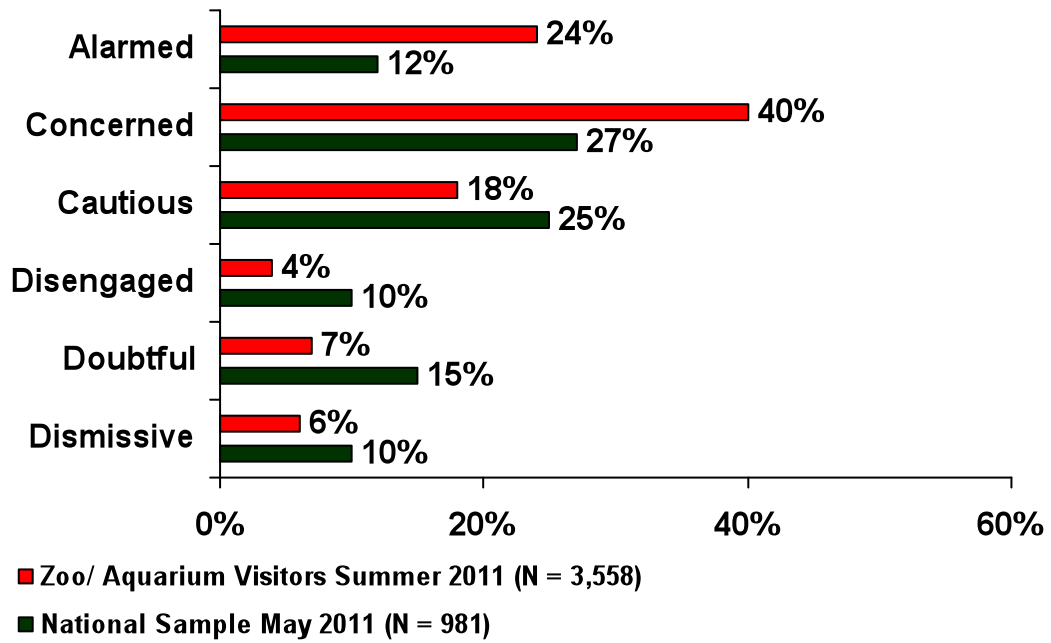


Figure A2. Segmentation of zoo visitors and aquarium visitors according to the Six Americas categories

Aquarium visitors are even more concerned about global warming than zoo visitors. Almost 75% of aquarium visitors are *concerned* or *alarmed* about global warming, compared to just over 60% of zoo visitors.

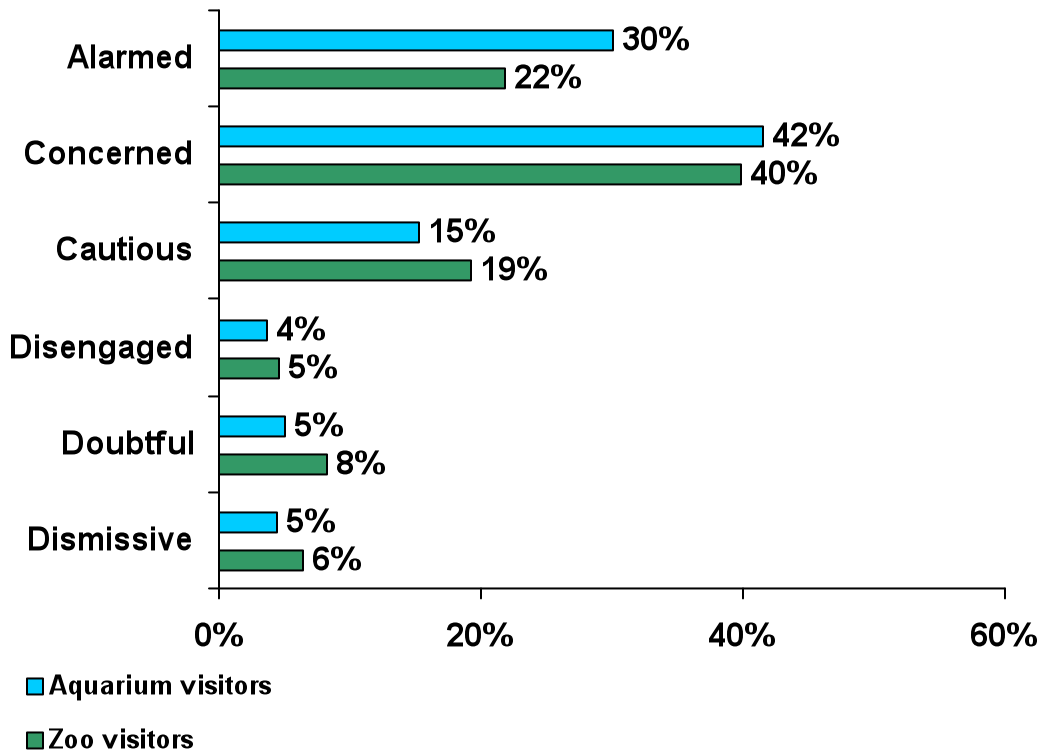


Figure A3. Percentages of zoo and aquarium visitors who think climate change / global warming is happening

The Six Americas team uses the term “global warming” in their national research. The CliZEN *attitudes* survey that used the Six Americas segmentation survey items, likewise, used the term “global warming” throughout the survey. The CliZEN *behaviors* survey, which did not include the Six Americas items, used the term “climate change” throughout the survey. We used the two different visitor surveys to compare responses to alternative wording of the same item: ‘Do you think that [*global warming/climate change*] is happening?’ Eighty-eight percent of zoo and aquarium visitors think *climate change* is happening. When posed with this question using the term *global warming*, 82% of zoo and aquarium visitors are in agreement that it is happening. Although the difference appears small, the percentages are statistically different and suggest that “climate change” may be the preferred term. These results are in line with previous research [13] that has examined people’s perceptions and reactions to the two terms.

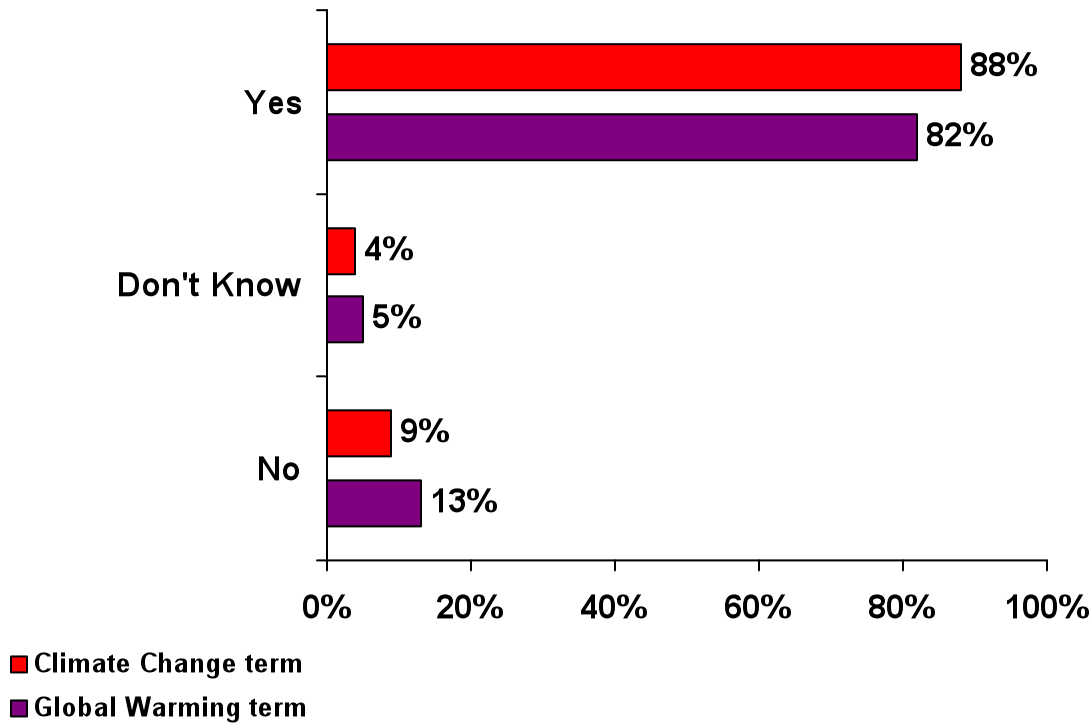


Figure A4. Zoo and aquarium visitors' thoughts on the causes of global warming (assuming global warming is happening) as compared to the national sample

A greater percentage of both the general public and zoo and aquarium visitors think that—assuming it is happening—global warming is caused mostly by human activities than do those who think it is caused mostly by natural changes in the environment. However, more than twice as many zoo and aquarium visitors think that global warming is caused mostly by human activities than think it is caused mostly by natural changes in the environment (65% vs. 26%). For the general public, there is only an 11% difference between the percentages of those who think global warming is caused by humans (47%) versus those who think it is caused by natural environmental changes (36%).

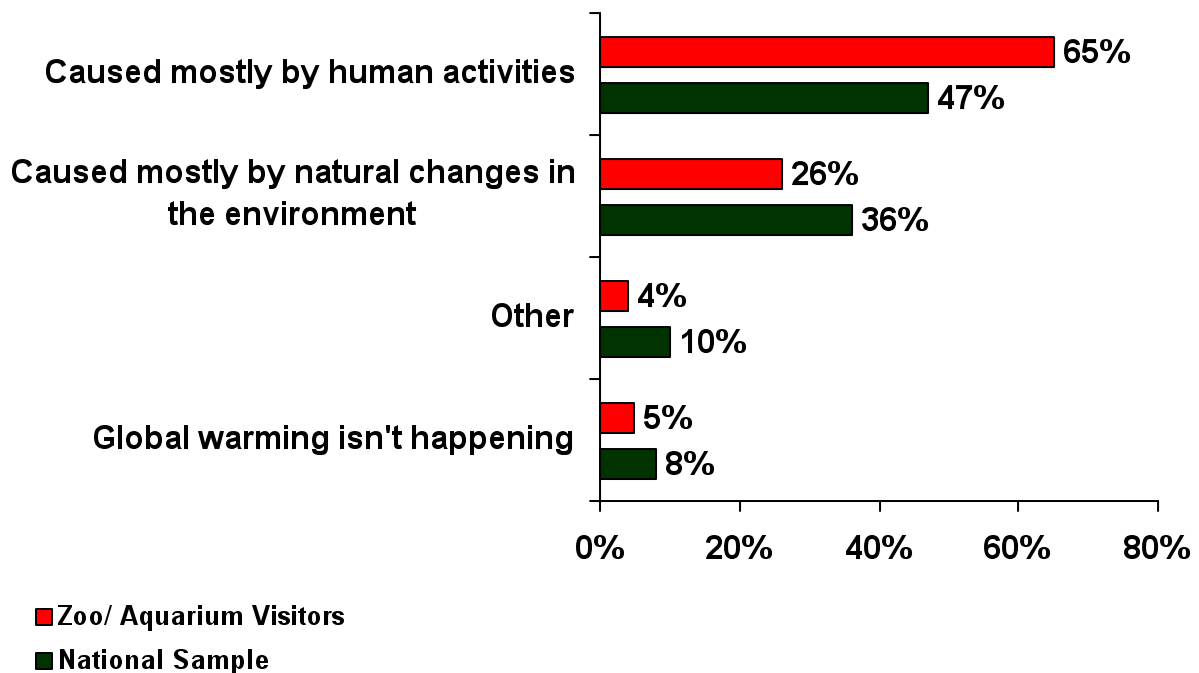


Figure A5. The extent to which zoo and aquarium visitors compared to the national sample thought about global warming before the day they responded to the survey

Nearly three-fourths of zoo and aquarium visitors are thinking about global warming *some* or *a lot* of the time versus less than half of the general public (47%). While only 13% of the general public think about global warming *a lot*, for zoo and aquarium visitors this percentage is more than double (29%).

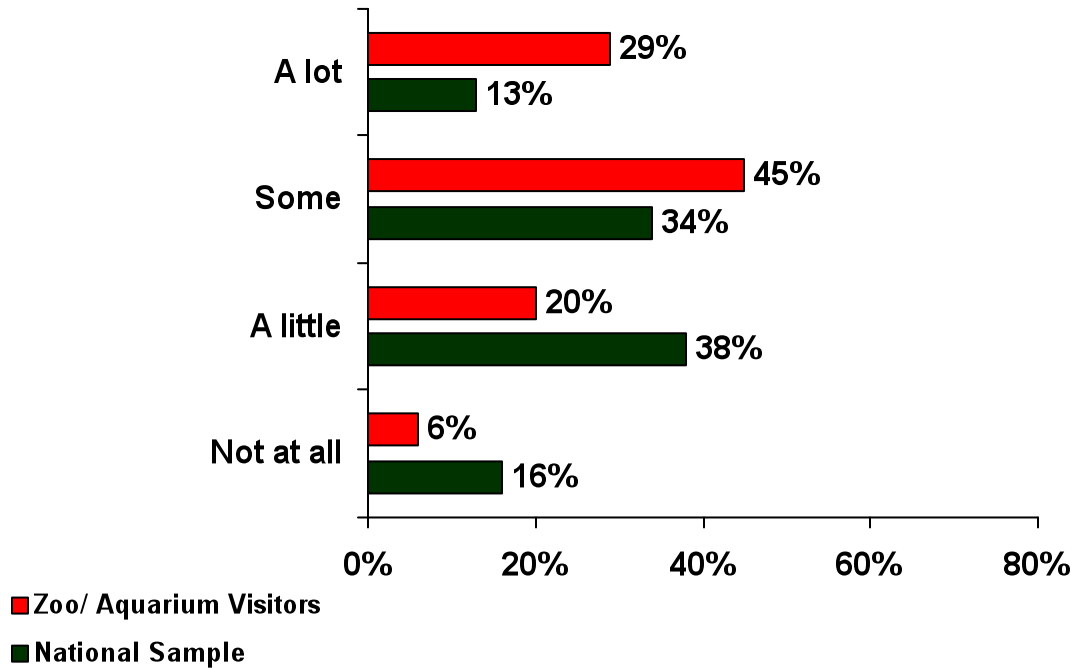


Figure A6. The degree to which zoo and aquarium visitors compared to the national sample are worried about global warming

Less than ten percent of zoo and aquarium visitors are *not at all* worried about global warming, versus 20% of the general public. Conversely, slightly more than 20% of zoo and aquarium visitors are *very* worried about global warming, versus less than ten percent of the general public.

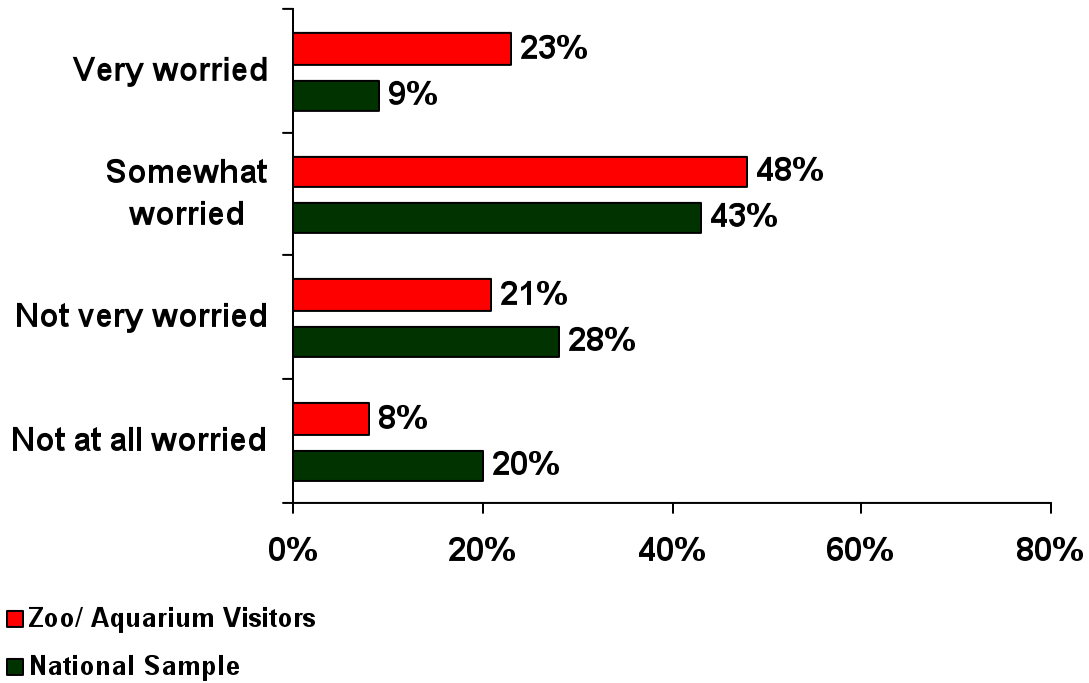


Figure A7. The extent to which zoo and aquarium visitors compared to the national sample think global warming will harm them personally

Approximately 60% of zoo and aquarium visitors think global warming will harm them personally, *moderately* or a *great deal*, versus less than 30% of the general public. Twenty-five percent of visitors think global warming will harm them *a great deal*, versus just over 10% of the general public. Conversely, 25% of the general public think global warming will *not* harm them personally versus only 10% of zoo and aquarium visitors.

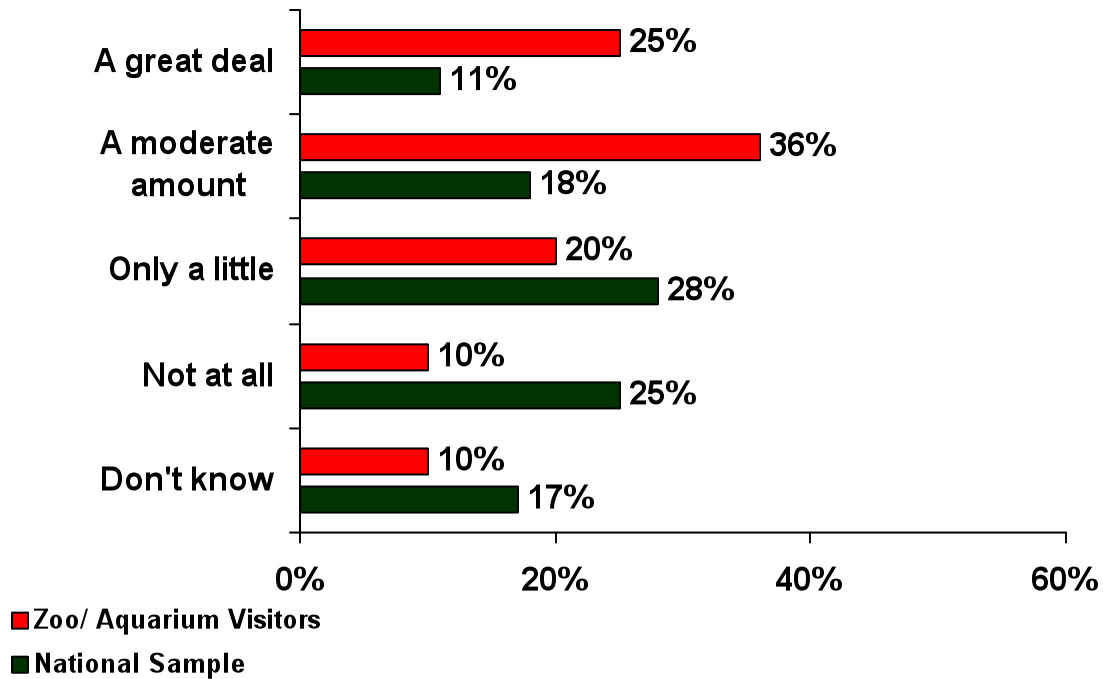


Figure A8. The extent to which zoo and aquarium visitors compared to the national sample think global warming will harm future generations of people

Nearly 80% of zoo and aquarium visitors think global warming will harm future generations *moderately* or a *great deal* versus 60% of the general public. While similar percentages of zoo and aquarium visitors (20%) and the general public (22%) think global warming will harm future generations a *moderate* amount, there is a difference of twenty percentage points between the proportions of the general public (38%) and zoo and aquarium visitors (58%) that think global warming will harm future generations of people *a great deal*.

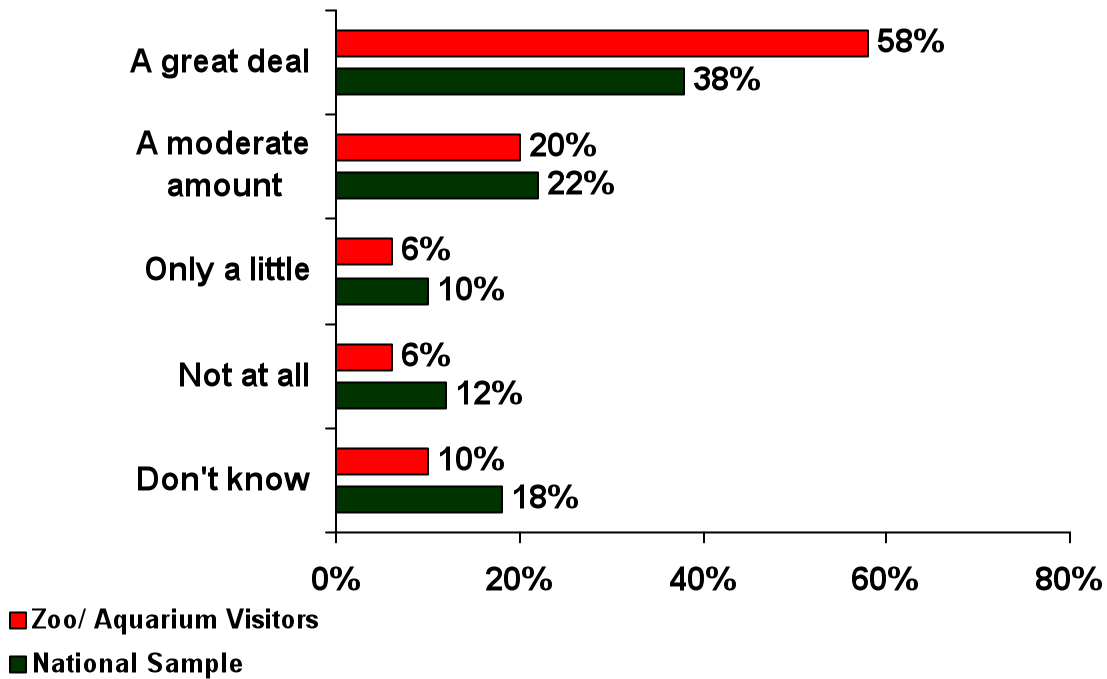


Figure A9. Zoo and aquarium visitors' average ratings of the extent to which they typically engage in conservation efforts during daily activities (recycling, reducing energy usage, buying earth-friendly products, etc.)

When asked to rate the extent to which they typically engage in conservation efforts, zoo and aquarium visitors' overall average rating is 5.31. Those who are *alarmed* or *concerned* about global warming rate this item higher, on average, than the other four segments.

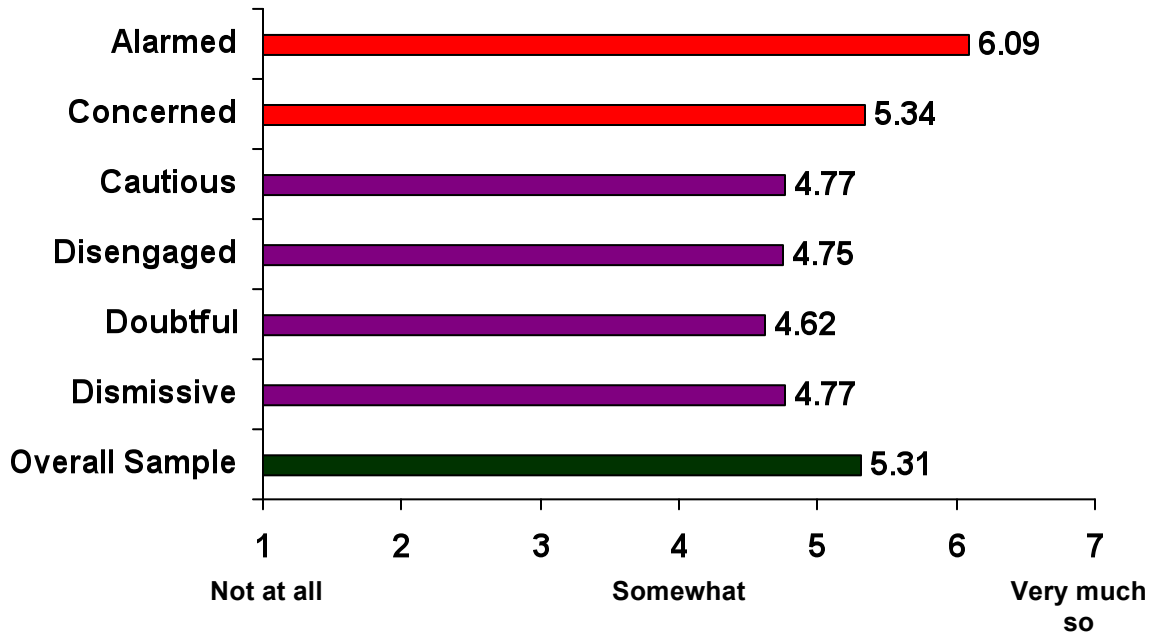


Figure A10. Overall average ratings of how much zoo and aquarium visitors trust various sources of information about climate change.

When asked a series of questions about trusting different sources of climate change information, zoo and aquarium visitors rate, on average, scientists and zoos and aquariums the highest. In contrast, mainstream news media was rated the lowest as a trusted source of information.

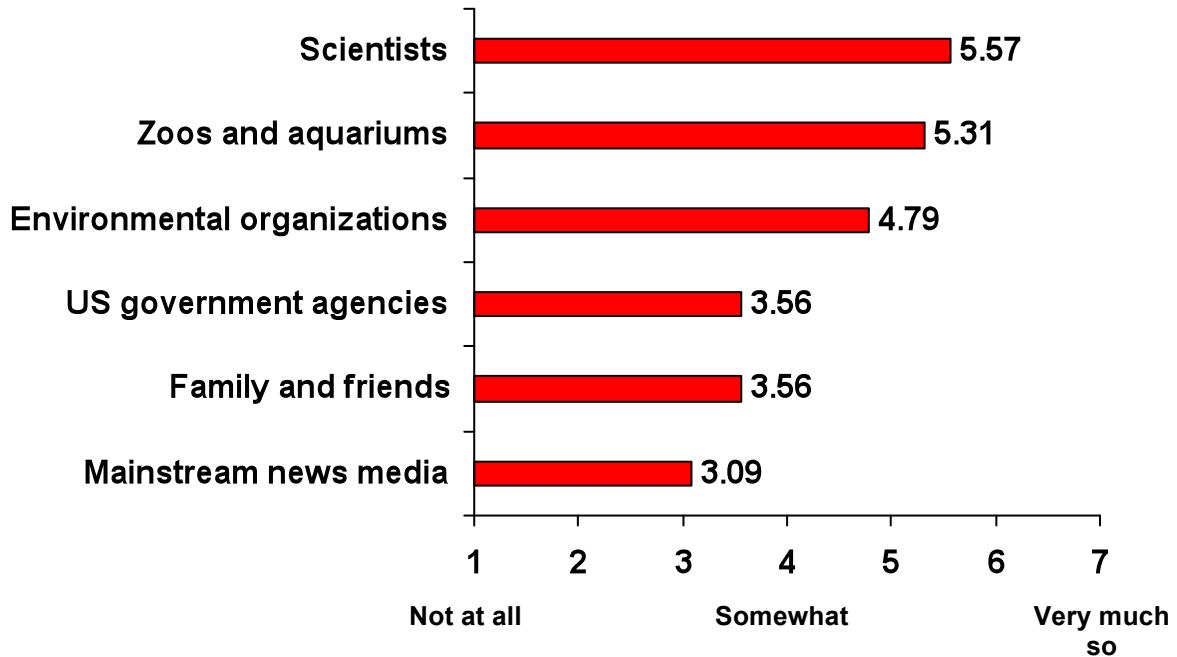


Figure A11. Percentages of zoo and aquarium visitors who would like to do more to address climate change.

Zoo and aquarium visitors are fairly comparable regarding their motivations to address climate change. Approximately 69% of zoo and aquarium visitors would like to do more to address climate change.

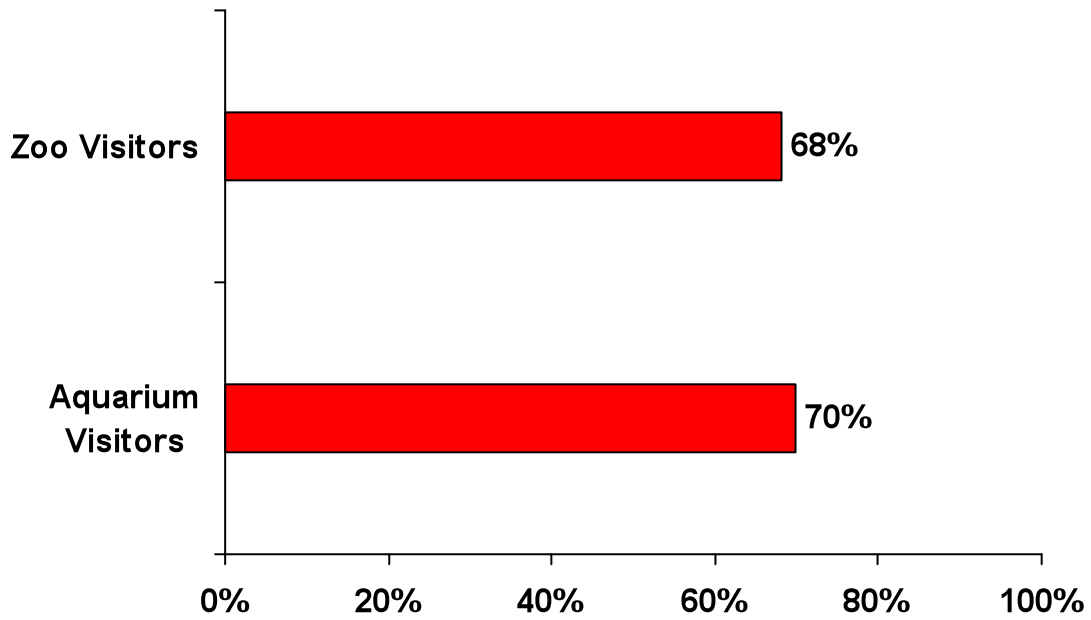


Figure A12. Percentages of zoo and aquarium visitors indicating self-perceived barriers to doing more to address climate change (select all that apply format).

Sixty-nine percent of zoo and aquarium visitors would like to do more to address climate change. Of those, respondents were asked to select which barriers (if any) were standing in their way of doing more to address climate change. Overall, 92% of respondents selected at least one barrier. “I don’t know what actions would be effective” was the response selected by the largest percentage of visitors (39%). Other top selections included a cost barrier (25%) and a lack of certainty that their actions would make a difference (20%).

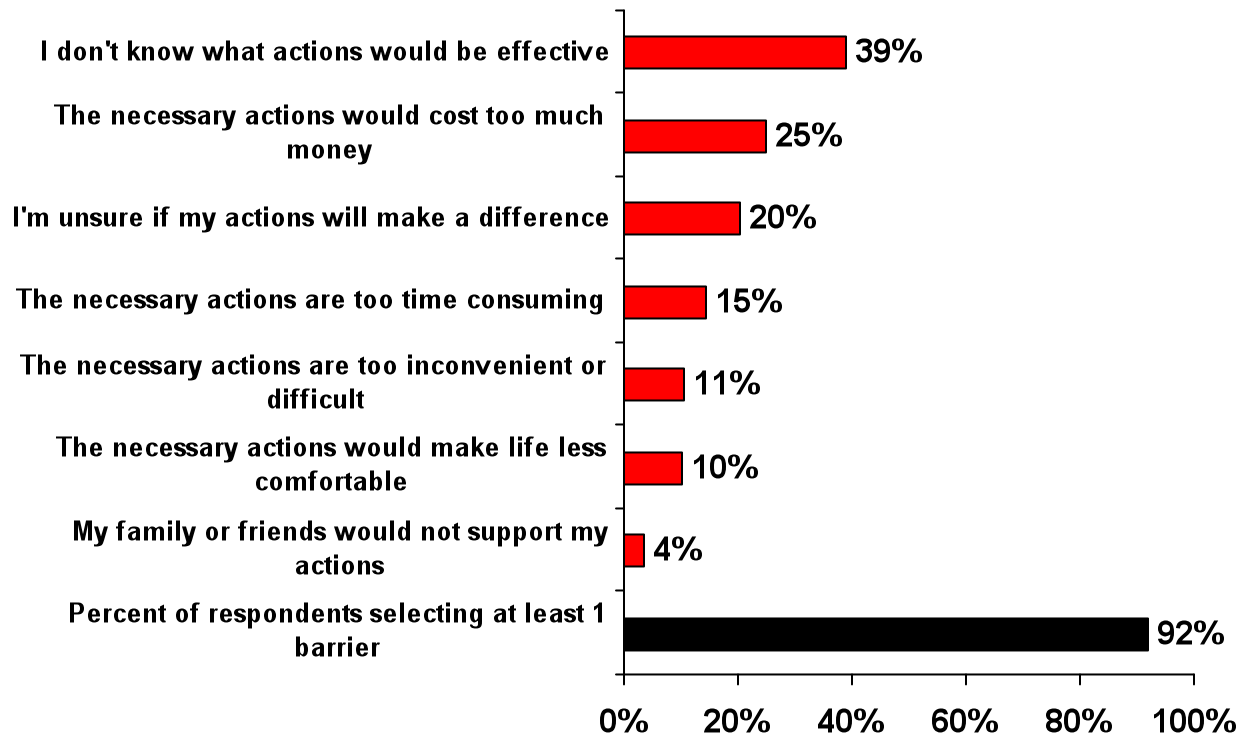


Figure A13. How much of an impact zoo and aquarium visitors believe they can have personally on addressing climate change.

There is almost an even split between visitors who believe and do not believe they can personally have an impact on addressing climate change. Fifty-one percent selected they can have a *fair amount* or a *great deal*, whereas 49% selected *not very much*, *almost none at all*, or *no impact* on addressing climate change. At 43%, a *fair amount* was the most frequently selected response.

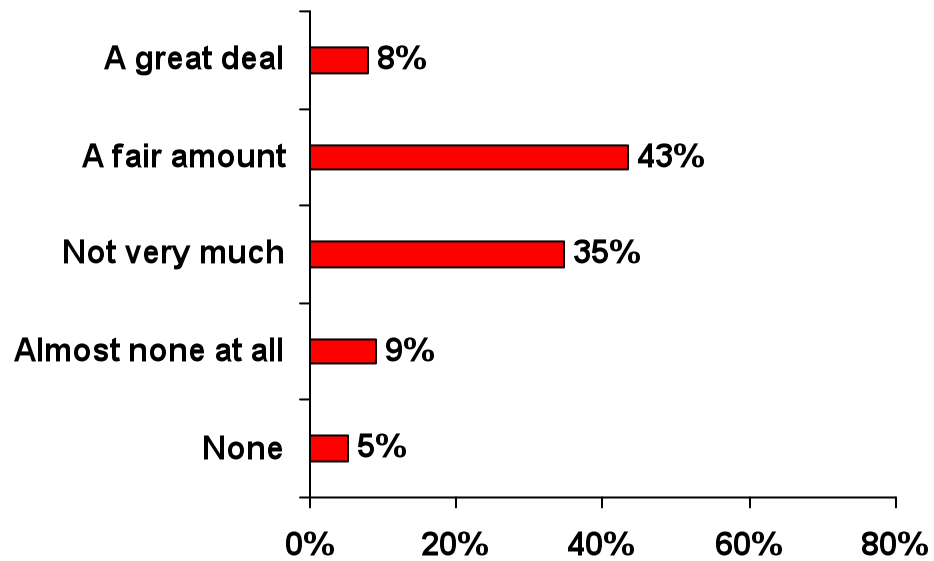


Figure A14. Zoo and aquarium visitors' views on humans' efficacy and willingness to change behaviors to reduce global warming as compared to the national sample

Concern about global warming is a persistent theme among zoo and aquarium visitors. Another theme that emerged from visitors' responses is a belief that humans may not do what it takes to reduce global warming. Just over 50% of visitors identified with the statement, "*Humans could reduce global warming, but it's unclear at this point whether we will do what is needed*" and another 30% of visitors selected "*Humans could reduce global warming, but people aren't willing to change their behavior, so we're not going to*" as the statement closest to their view. Compared to the general public, zoo and aquarium visitors tend to be *less* optimistic that people will take the necessary actions to reduce global warming. However, only 10% of zoo and aquarium visitors compared to 18% of the general public believe that *humans can't reduce global warming*.

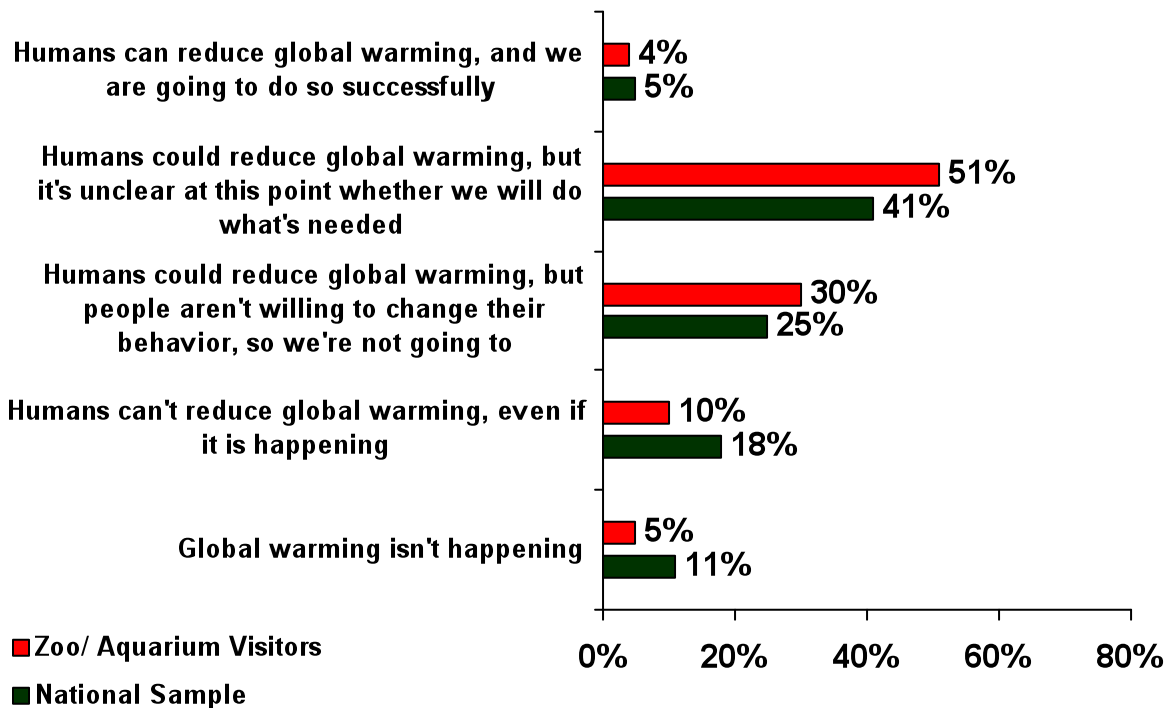


Figure A15. Percentage of zoo and aquarium visitors selecting various behaviors as having the most impact on climate change (select up to three actions)

In addressing climate change, nearly two-thirds of zoo and aquarium visitors understand the importance of driving a fuel-efficient car. However, few visitors see the importance of various conservation support behaviors (donate money, talk to others, and sign a petition) in addressing climate change.

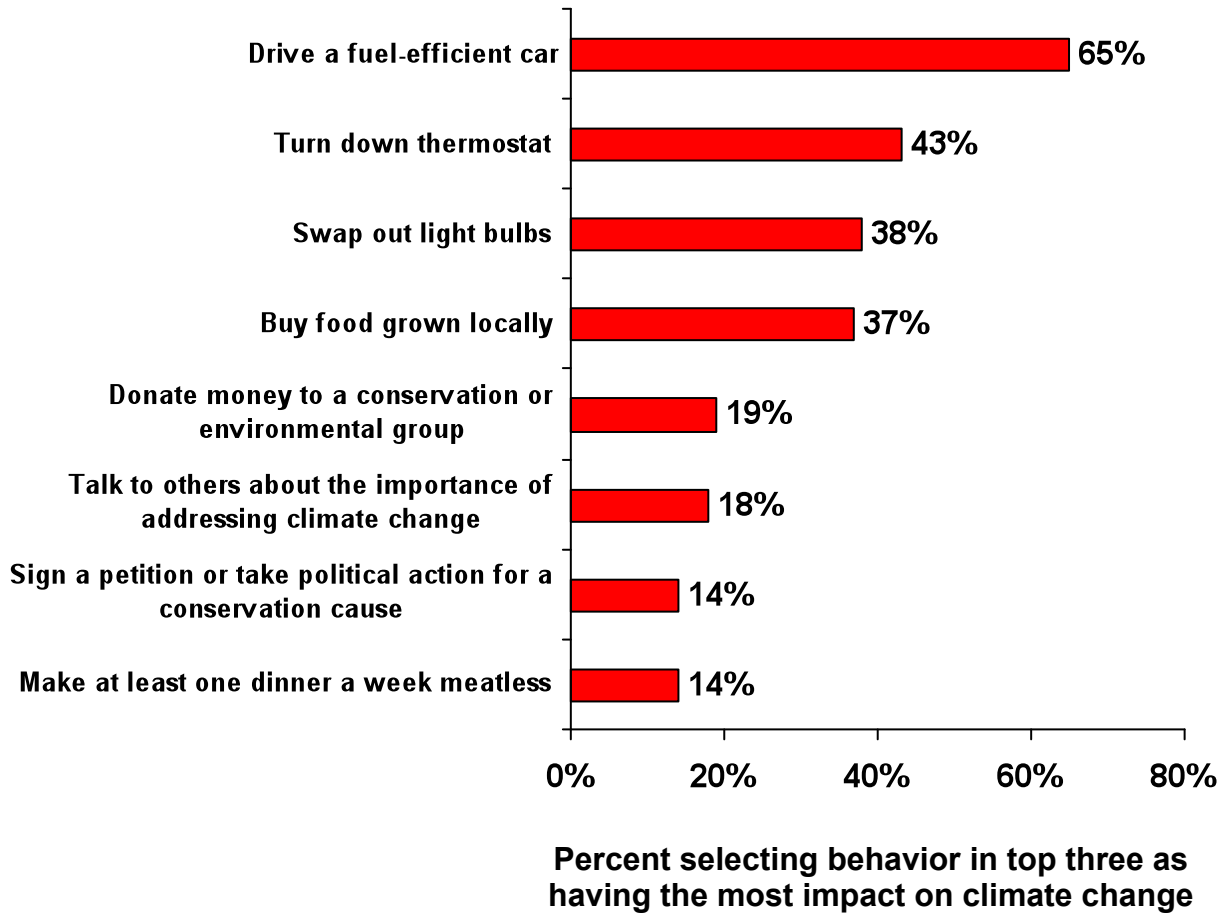


Figure A16. Average ratings for zoo and aquarium visitors' agreement with statements about climate change threats.

Visitors tend to perceive climate change as a geographically distant threat to local wildlife and themselves. On average, zoo and aquarium visitors have a stronger agreement that climate change threatens the survival of arctic wildlife (5.81) than they do that it threatens local wildlife (5.21) or human health (5.18).

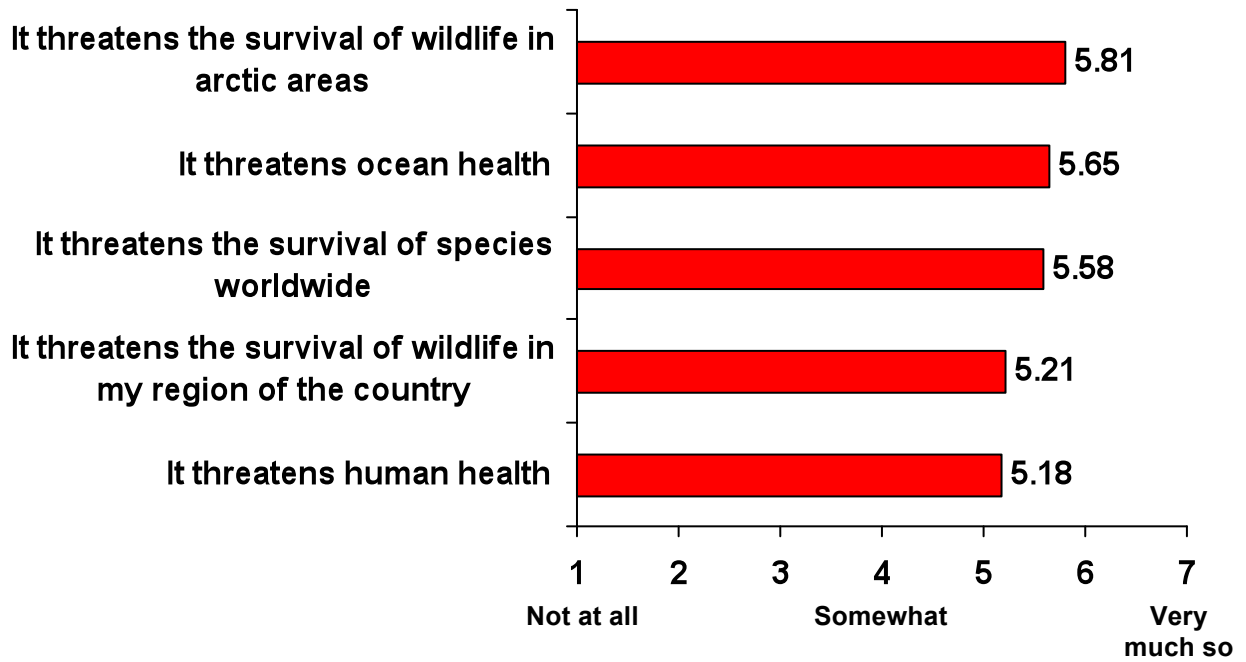


Figure A17. Zoo and aquarium visitors' indication of how many of their friends share their views on global warming as compared to the national sample

Zoo and aquarium visitors have a greater percentage of friends who share their views on global warming than do members of the general public. Thirty-eight percent of zoo and aquarium visitors indicated that most or all of their friends share their views on global warming, versus 29% of the general public. Only four percent of zoo and aquarium visitors indicated that none of their friends share their global warming views, versus 15% of the general public.

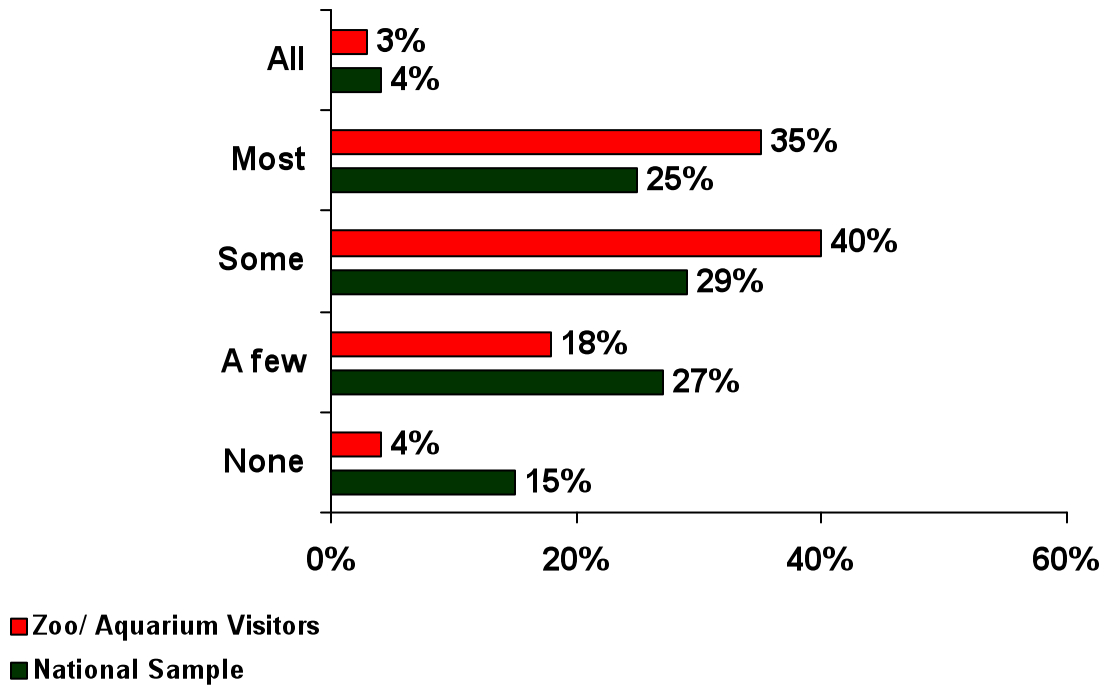


Figure A18. Average ratings of the extent to which zoo and aquarium visitors in each Six Americas segment enjoy discussing exhibit signs and displays with family/ companions

Zoo and aquarium visitors enjoy discussing exhibit signs and displays with their companions, regardless of the Six Americas segment into which they fall. On average, all visitors tend to rate their enjoyment fairly high.

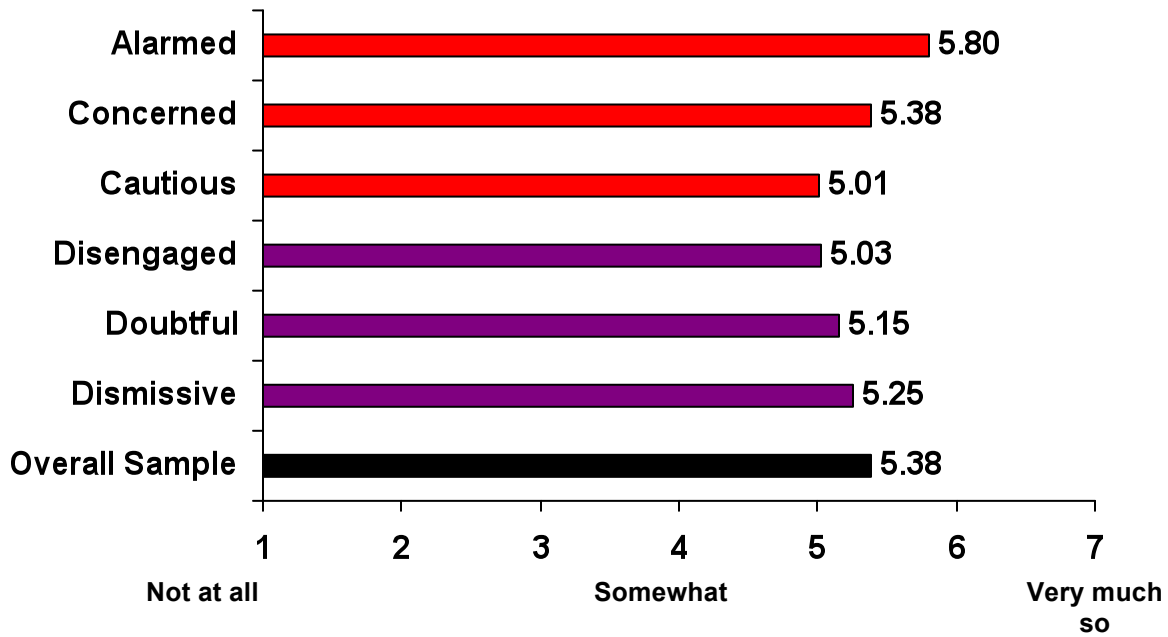


Figure A19. Average ratings of the extent to which zoo and aquarium visitors in each Six Americas segment use their visits as a chance to talk to family/ companions about their relationships to nature

On average, *alarmed* zoo and aquarium visitors rate the degree to which they use their visits as a chance to talk to their companions about their relationships to nature higher than do those who fall into other segments.

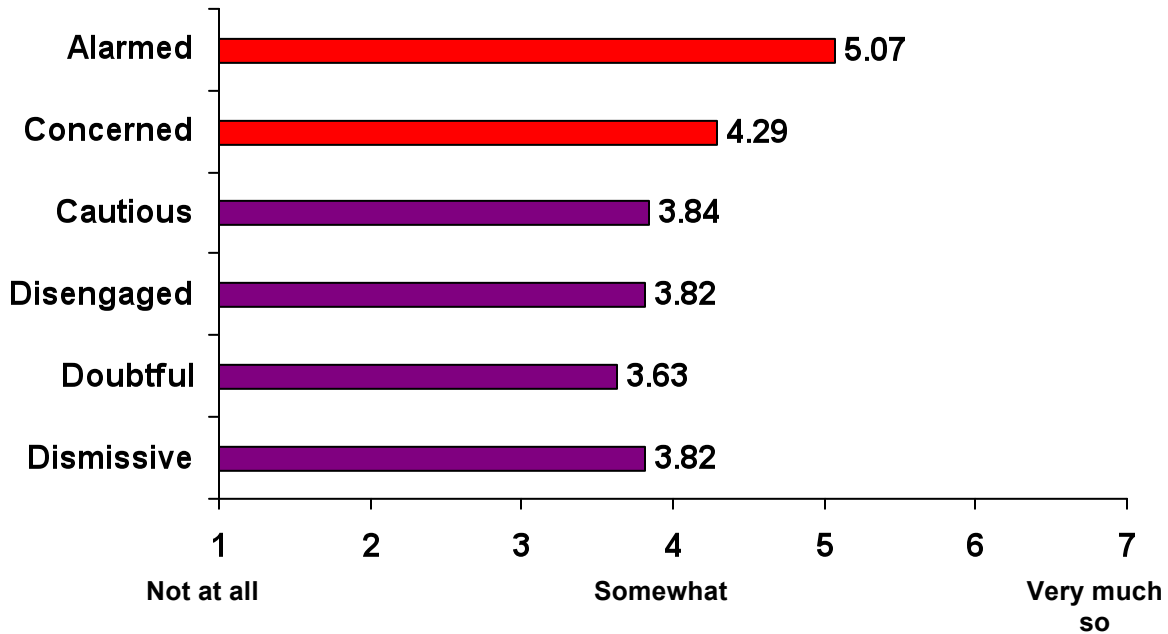


Figure A20. Average ratings of the extent to which zoo and aquarium visitors in each Six Americas segment are interested in finding out more about how global warming is affecting wildlife and natural habitats

On average, zoo and aquarium visitors who are *alarmed* about global warming are much more interested in finding out more about how global warming is affecting wildlife and their habitats than are visitors who are *dismissive*. The average interest rating among *alarmed* visitors was 5.64; the average interest rating for *dismissive* visitors was only 1.79. On the spectrum of typologies ranging from *dismissive* to *alarmed*, with increased level of alarm about global warming comes increased interest in finding out more about global warming and wildlife.

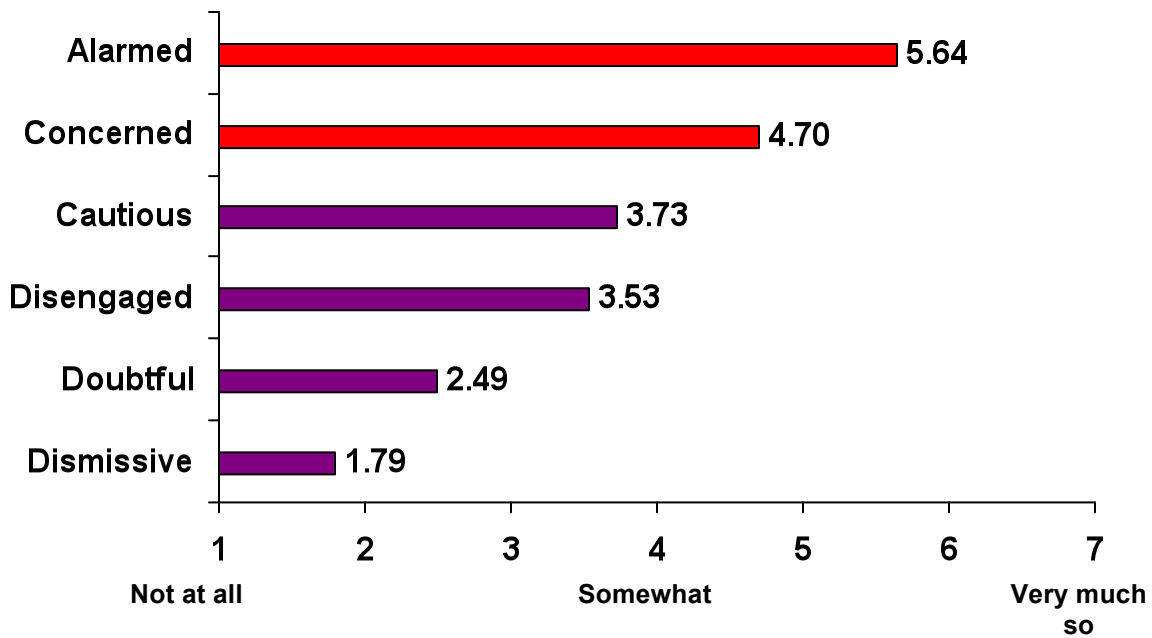


Figure A21. Average ratings of the extent to which zoo and aquarium visitors in each Six Americas segment feel that zoos and aquariums are trustworthy places to find out how to help reduce the effects of global warming

On average, zoo and aquarium visitors who are *alarmed* about global warming more strongly believe that zoos and aquariums are trustworthy places to find out how to help reduce the effects of global warming than are visitors who are *dismissive*. The average trust rating among *alarmed* visitors was 5.71; the average trust rating for *dismissive* visitors was only 2.52. On the spectrum of typologies ranging from *dismissive* to *alarmed*, with increased level of alarm comes increased level of trust in zoos and aquariums on global warming reduction methods.

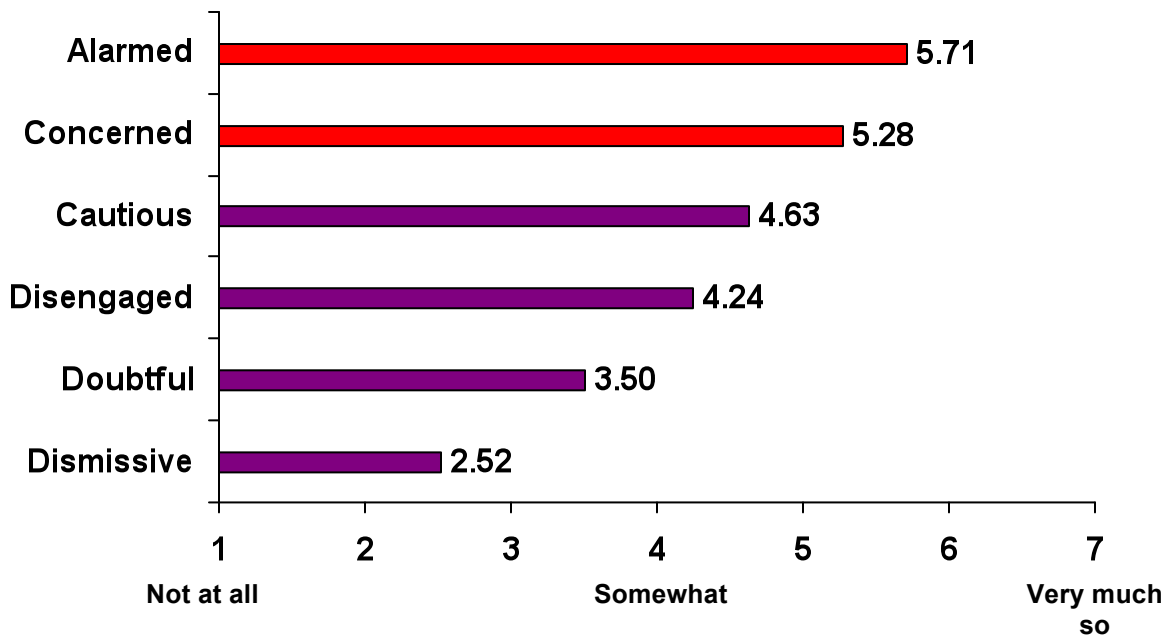


Figure A22. Percentages of zoo and aquarium visitors who reported having a cell phone/mobile device with them that has an Internet connection

Overall, most zoo and aquarium visitors carry an Internet-ready mobile device with them during their visit. The percentage of visitors who have such devices, however, varies by age. More than two-thirds of those aged 18 to 39 have cell phones or other mobile devices that can connect to the Internet.

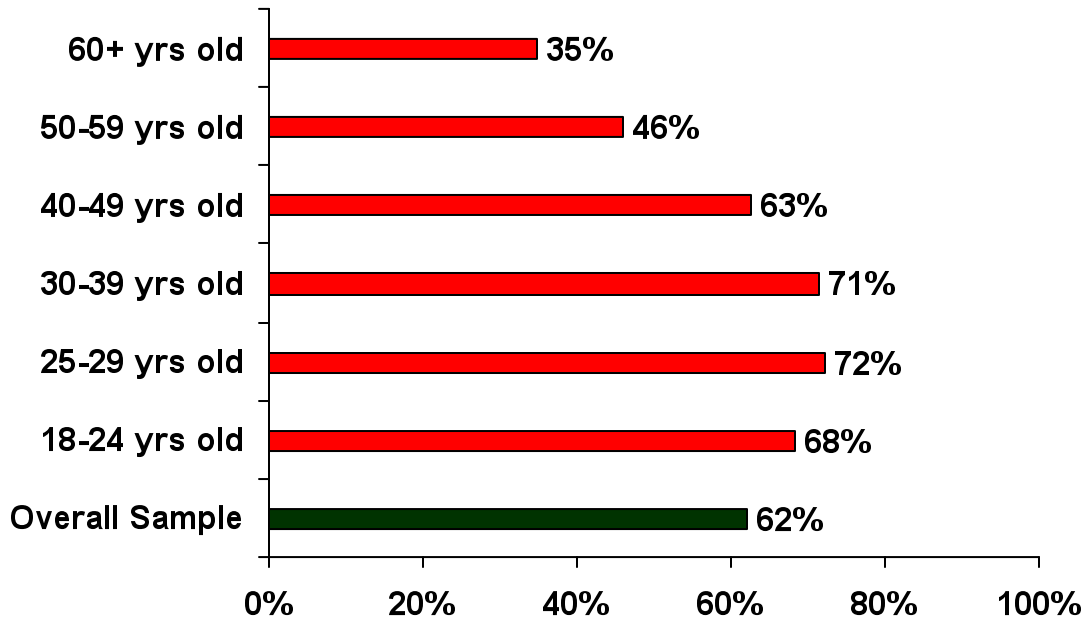


Figure A23. Percentages of zoo and aquarium visitors who report regularly using Facebook, YouTube, Twitter, and other social media (select all that apply format)

Sixty percent of zoo and aquarium visitors regularly use Facebook, whereas only eight percent are regular Twitter users.

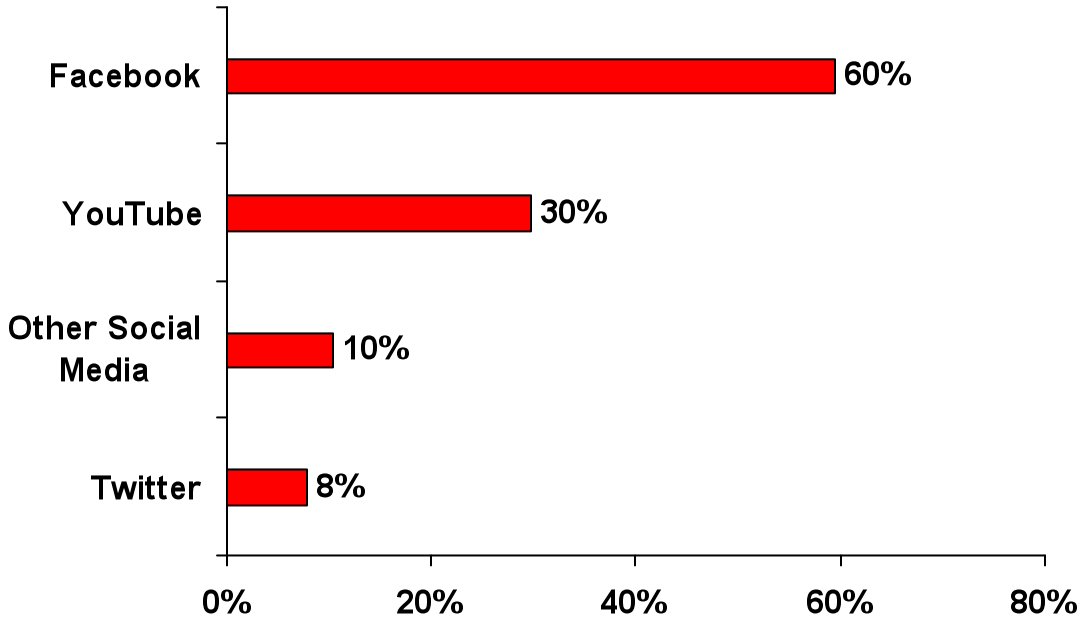


Figure A24. Percentages of zoo and aquarium visitors who report regularly using Facebook

Facebook usage significantly varies by age. Over three-fourths of zoo and aquarium visitors between 18 and 29 years of age use Facebook; however, only about one-fourth of visitors over the age of 59 are regular Facebook users.

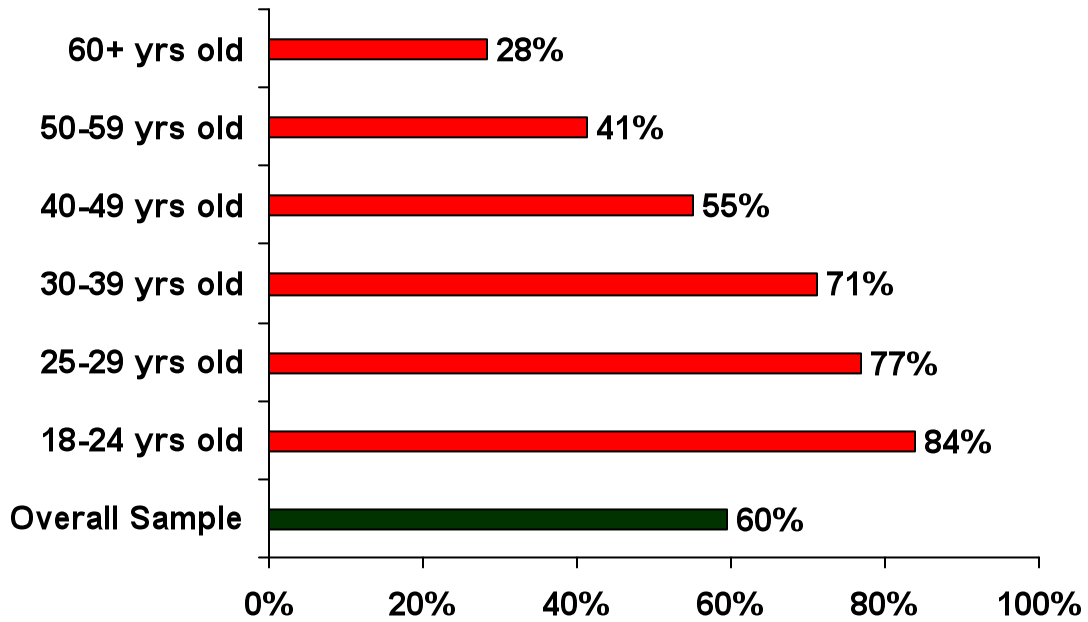


Figure A25. Percentages of zoo and aquarium visitors who report regularly playing Wii, Xbox, other home gaming systems, social network games, or multiplayer online games (select all that apply format)

One quarter of zoo and aquarium visitors report regularly playing Nintendo's Wii gaming system. In contrast, only 6% of visitors report playing multiplayer online games.

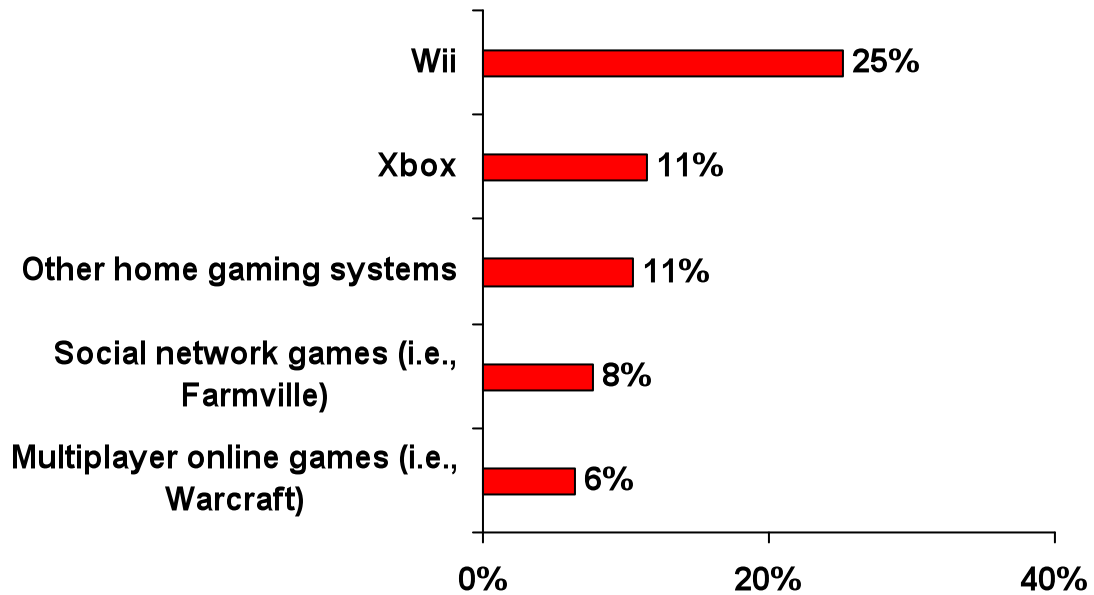


Figure A26. Percentages of zoo and aquarium visitors who report regularly playing at least one type of game (Wii, Xbox, other home gaming systems, social network games, or multiplayer online games)

Nearly one-half of visitors aged 18 to 49 report regularly playing at least one type of technology game. After age 49, the percent of visitors regularly playing at least one type of game dramatically drops off.

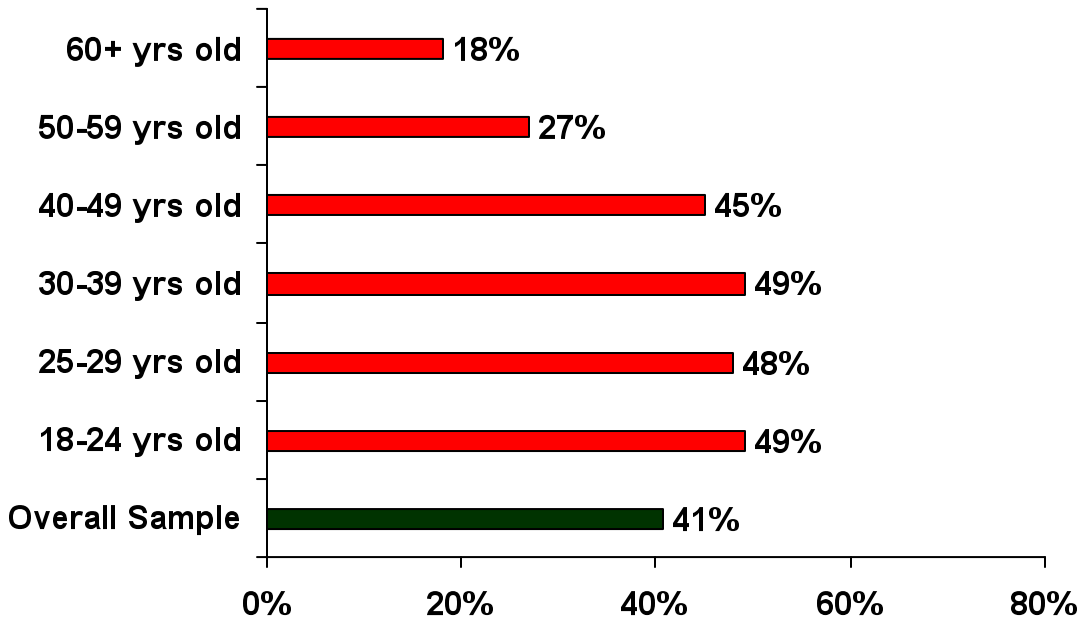
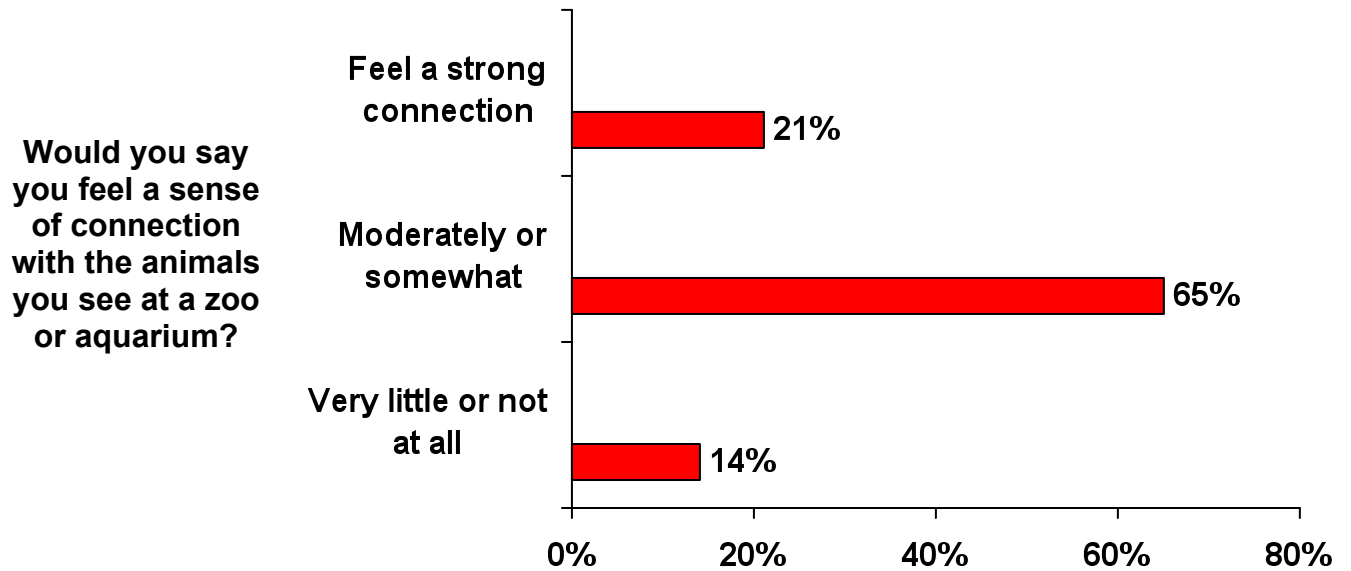


Figure A27. Distribution of zoo and aquarium visitors based on sense of connection with zoo or aquarium animals

On average, visitors rate the strength of their sense of connection with animals they see at the zoo or aquarium 3.56 on a 5-point scale.¹ Twenty-one percent of visitors feel a strong connection (rating of 5), 65% feel a moderately or somewhat strong connection (ratings of 3 or 4), and 14% feel little or no connection with animals (ratings of 1 or 2).



¹ Scale: 1 (*not at all*), 2 (*very little*), 3 (*somewhat*), 4 (*moderately*), 5 (*I feel a strong connection*)

Figure A28. Strength of zoo and aquarium visitors' belief that climate change is happening

As a visitor's sense of connection with zoo or aquarium animals increases, so does his or her belief that climate change is happening. Visitors who feel a strong sense of connection with zoo or aquarium animals have a stronger belief compared to those who feel very little or no connection. On average, visitors who feel a strong connection to animals rate their belief at 8.06; whereas visitors who feel little or no connection rate their belief 6.68.

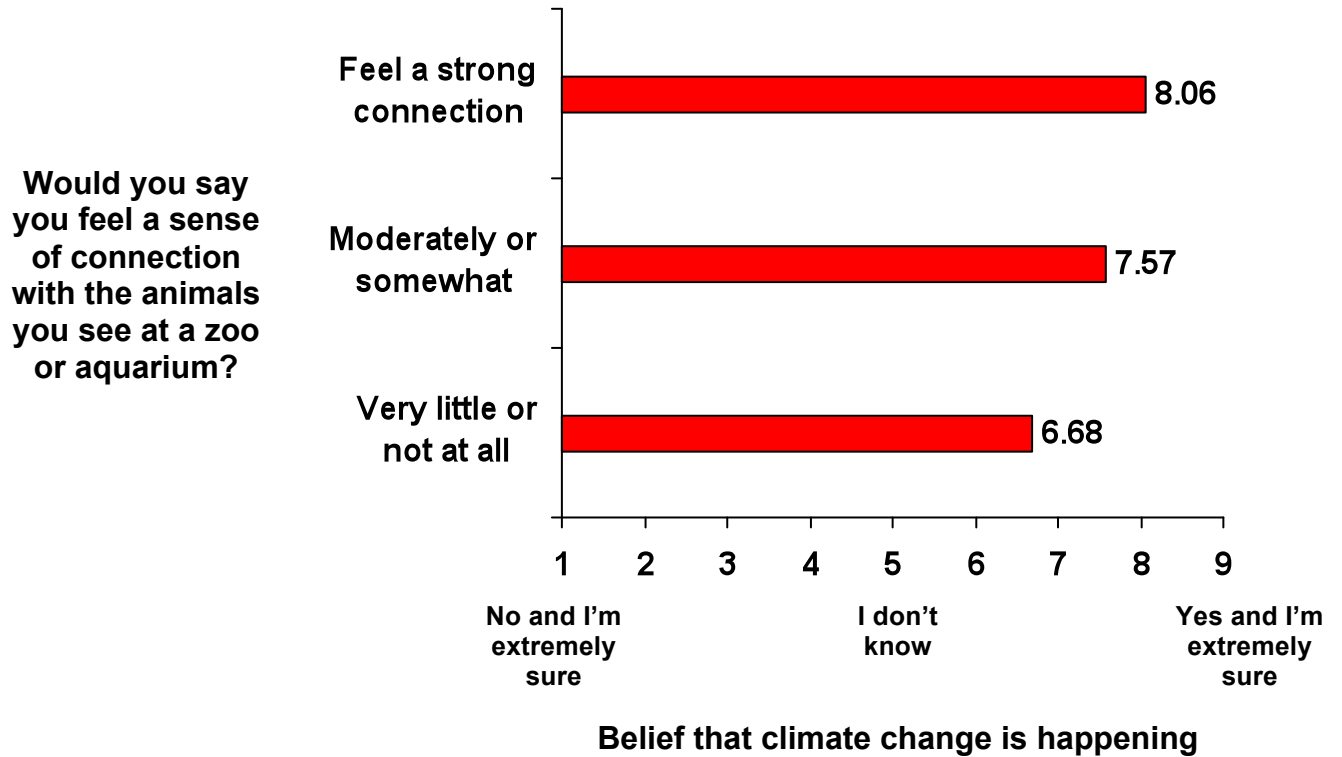


Figure A29. Average ratings of zoo and aquarium visitors' overall concern about the effects of climate change on self, others, and the biosphere, by strength of connection with zoo and aquarium animals

As a visitor's sense of connection with zoo or aquarium animals increases, so does his or her overall concern about the effects of climate change. Visitors who feel a strong sense of connection with zoo or aquarium animals have greater overall concern about the effects of climate change on themselves, other people, and the biosphere compared to those who feel very little or no connection. On average, visitors who feel a strong connection to animals rate their concern 5.58; whereas visitors who feel little or no connection rate their concern 4.17. Overall concern is an aggregate rating of 12 items adapted from Schultz's (2001) environmental concern scale; in the present study, respondents were asked to rate their level of concern about the effects of *climate change* on these items.

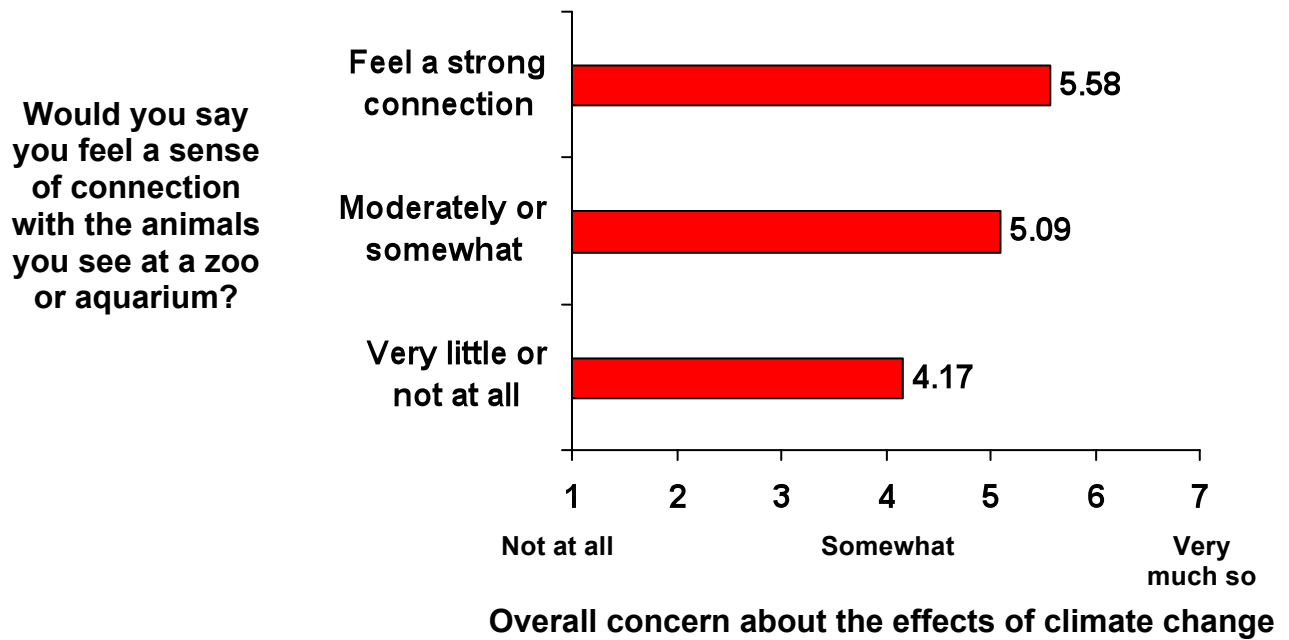
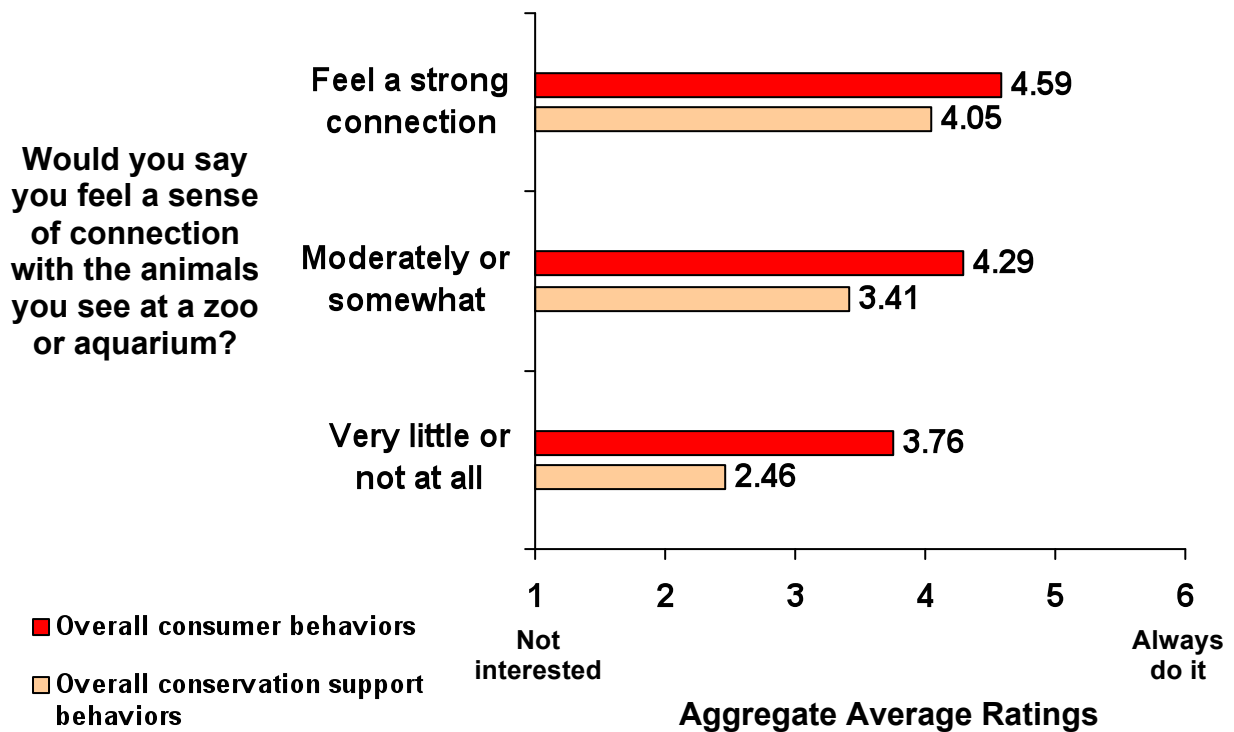


Figure A30. The extent of zoo and aquarium visitors' engagement in consumer and conservation support behaviors

As a visitor's sense of connection with zoo and aquarium animals increases, so does his or her participation in consumer² and conservation support³ behaviors to help address climate change. On average, visitors who feel a strong connection to animals rate their extent of participation in consumer behaviors as 4.59,⁴ and participation in conservation support behaviors as 4.05. In contrast, visitors who feel very little or no connection to animals rate their extent of participation, on average, in consumer behaviors as 3.76, and participation in conservation support behaviors as 2.46. Overall, visitors are more likely to engage in consumer than conservation support behaviors regardless of their sense of connection with zoo and aquarium animals.



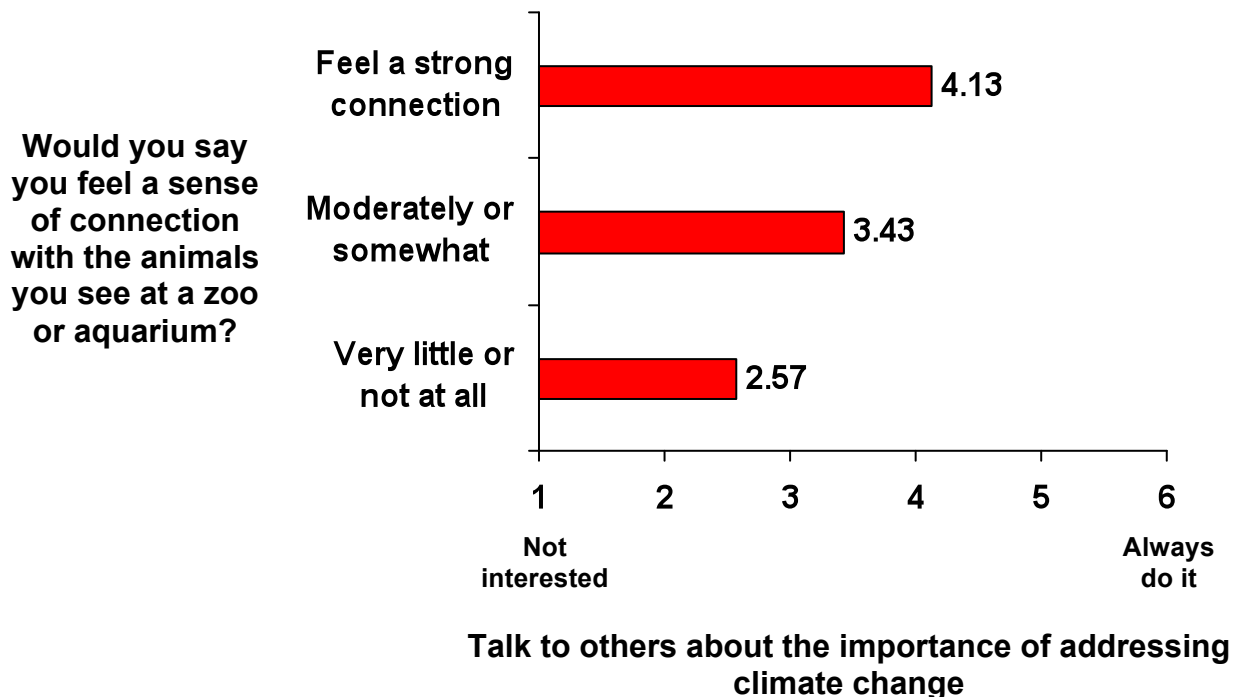
² Behaviors include: Swap out incandescent light bulbs for CFLs, turn down thermostat to 65 degrees or lower in winter and up to 78 degrees in summer, make at least one meatless dinner per week, drive a fuel-efficient car, buy food grown locally.

³ Behaviors include: Sign a petition to take political action for a conservation cause, donate money to a conservation or environmental group, talk to others about the importance of addressing climate change.

⁴ Scale: 1 (*not interested*), 2 (*never thought about it*), 3 (*thinking about it*), 4 (*planning on doing it*), 5 (*do it sometimes*), 6 (*always do it*)

Figure A31. Average ratings of the extent to which zoo and aquarium visitors talk to others about the importance of addressing climate change

As a visitor's sense of connection with zoo or aquarium animals increases, so does the extent to which he or she talks to others about the importance of addressing climate change. Visitors who feel a strong sense of connection with zoo or aquarium animals are more strongly engaged in talking to others about the importance of addressing climate change than those who feel very little or no connection. On average, visitors who feel a strong sense of connection rate this item 4.13,⁵ whereas those who feel little to no connection rate it 2.57.



⁵ Scale: 1 (*not interested*), 2 (*never thought about it*), 3 (*thinking about it*), 4 (*planning on doing it*), 5 (*do it sometimes*), 6 (*always do it*)

Figure A32. Percentages of zoo and aquarium visitors who would like to do more to address climate change

Eighty-three percent of visitors who feel a strong connection to zoo or aquarium animals would like to do more to address climate change. For visitors who feel very little or no connection, less than one-half would like to do more to address climate change.

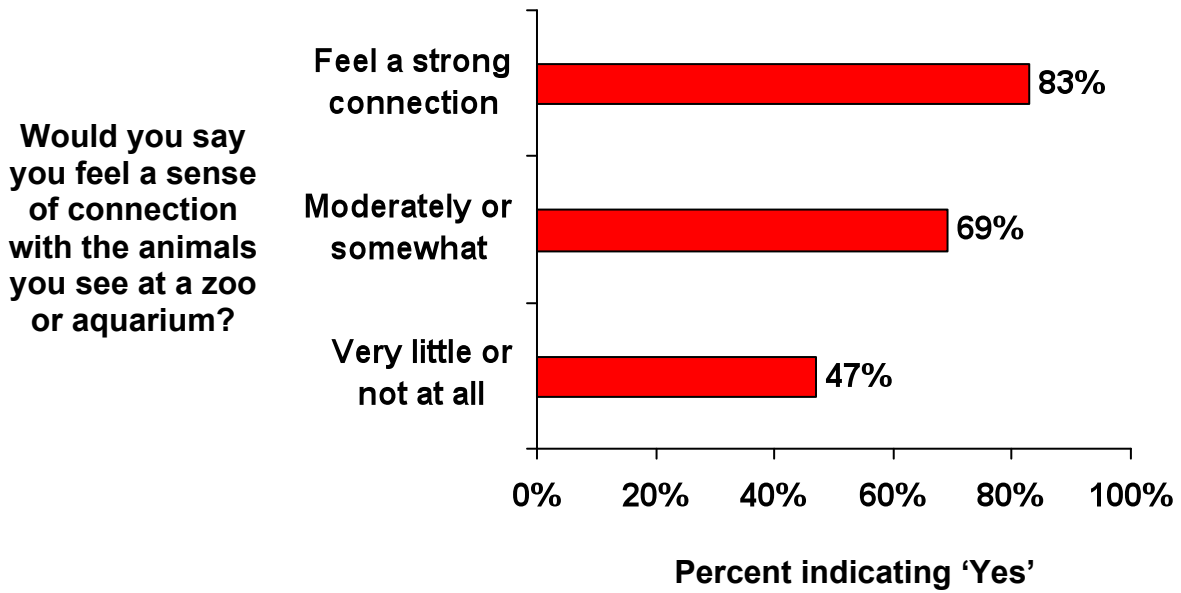


Figure A33. Average ratings of the extent to which zoo and aquarium visitors in each Six Americas segment feel they have a lot in common with other species.

Zoo and aquarium visitors who are *alarmed* about global warming report feeling a stronger commonality with other species than do visitors who are *dismissive*. On average, *alarmed* visitors rate their commonality with other species 5.16; *dismissive* visitors rate this item 3.14. On the spectrum of typologies ranging from *dismissive* to *alarmed*, only the *concerned* and *alarmed* visitors' average ratings fall above the midpoint (somewhat) of the rating scale.

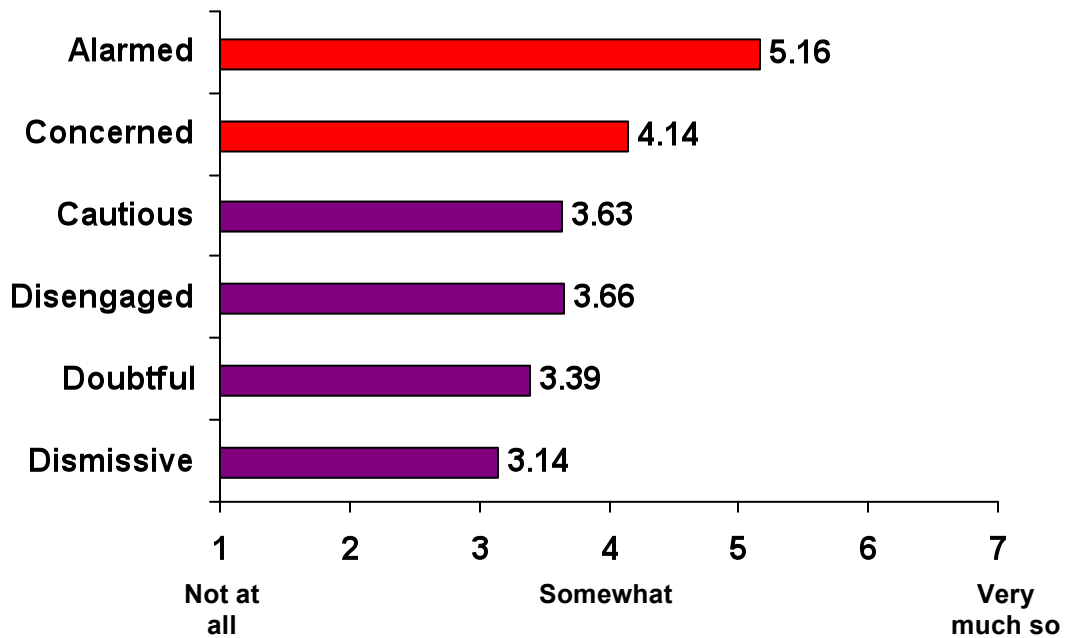


Figure A34. Average ratings of the extent to which zoo and aquarium visitors in each Six Americas segment feel a spiritual connection with nature when they are at a zoo or aquarium

Zoo and aquarium visitors who are *alarmed* about global warming report feeling a stronger spiritual connection with nature than do visitors who are *dismissive*. On average, *alarmed* visitors rate the strength of their spiritual connection as 4.72; *dismissive* visitors rate this item 3.65. On the spectrum of typologies ranging from *dismissive* to *alarmed*, only the *concerned* and *alarmed* visitors' average ratings fall above the midpoint (somewhat) of the scale.

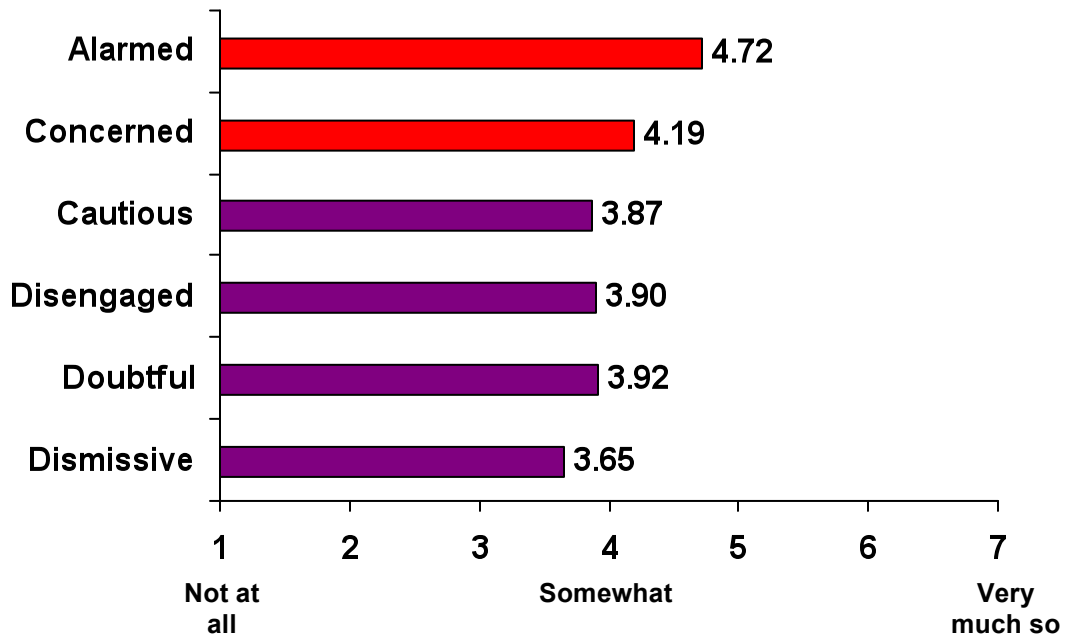
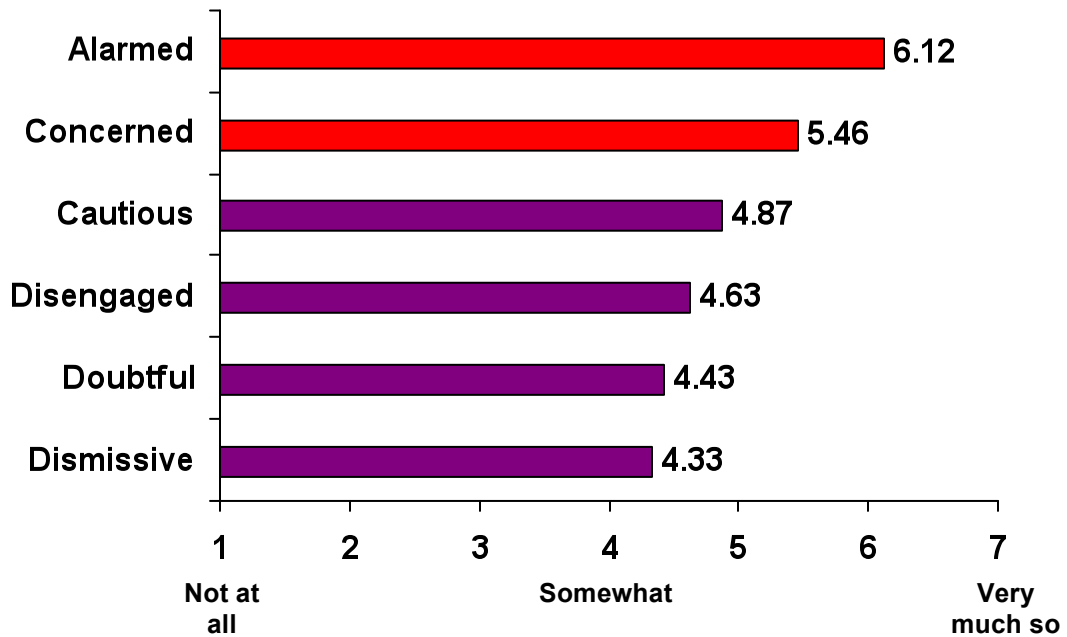


Figure A35. Average ratings of the extent to which zoo and aquarium visitors in each Six Americas segment indicate that seeing animals at a zoo or aquarium makes them think about their concern for animals in the wild

On average, zoo and aquarium visitors in each Six Americas segment score above the midpoint (somewhat) on the extent to which seeing animals at a zoo or aquarium makes them think about their concern for animals in the wild. *Alarmed* visitors, however, rate their concern for animals higher than do dismissive visitors. On average, *alarmed* visitors rate their concern for animals 6.12, while *dismissive* visitors rate this item 4.33.



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Table B1. Global Warming's Six America Segments

	Overall Sample	Zoo Locations	Aquarium Locations	Six Americas National Sample May 2011
Alarmed	24%	22%	30%	12%
Concerned	40%	40%	42%	27%
Cautious	18%	19%	15%	25%
Disengaged	4%	5%	4%	10%
Doubtful	7%	8%	5%	15%
Dismissive	6%	6%	5%	10%

Table B2. Global Warming's Six America Segments based on geographic region of visitors' home Zip Code location

	West (N=667)	Midwest (N=1,441)	South (N=436)	Northeast (N=677)	Outside US (N=80)	National sample
Alarmed	34%	18%	29%	26%	39%	12%
Concerned	38%	41%	38%	41%	45%	27%
Cautious	14%	21%	13%	18%	11%	25%
Disengaged	4%	5%	5%	4%	1%	10%
Doubtful	6%	9%	7%	7%	3%	15%
Dismissive	5%	6%	9%	4%	1%	10%

NOTE: Zoo and aquarium visitors were grouped into regions without regard to the particular location they were visiting.

Table B3. Certainty of Global Warming (*Attitudes Survey Form*): What do you think? Do you think that global warming is happening?

	Overall Sample	Zoo Locations	Aquarium Locations	Six Americas National Sample May 2011
Yes	82%	80%	87%	64%
No	13%	15%	9%	18%
Don't know	5%	6%	4%	18%

Table B4. Certainty of Climate Change (*Behaviors Survey Form*): What do you think? Do you think that climate change is happening?

	Overall Sample	Zoo Locations	Aquarium Locations
Yes	88%	87%	90%
No	9%	10%	7%
Don't know	4%	4%	3%

Table B5. Self-perceived knowledge and beliefs about the cause of global warming: Assuming global warming is happening, do you think it is ...

	Overall Sample	Zoo Locations	Aquarium Locations	Six Americas National Sample May 2011
Caused mostly by human activities	65%	61%	74%	47%
Caused mostly by natural changes in the environment	26%	29%	20%	36%
Other	4%	5%	3%	10%
Global warming isn't happening	5%	6%	4%	8%

Table B6. How worried are you about global warming?

	Overall Sample	Zoo Locations	Aquarium Locations	Six Americas National Sample May 2011
Very worried	23%	20%	29%	9%
Somewhat worried	48%	48%	47%	43%
Not very worried	21%	23%	17%	28%
Not at all worried	8%	9%	6%	20%

Table B7. Risk perceptions: How much do you think global warming will harm you personally?

	Overall Sample	Zoo Locations	Aquarium Locations	Six Americas National Sample May 2011
A great deal	25%	24%	27%	11%
A moderate amount	36%	36%	37%	18%
Only a little	20%	20%	18%	28%
Not at all	10%	11%	8%	25%
Don't know	10%	9%	10%	17%

Table B8. Risk perceptions: How much do you think global warming will harm future generations of people?

	Overall Sample	Zoo Locations	Aquarium Locations	Six Americas National Sample May 2011
A great deal	58%	56%	65%	38%
A moderate amount	20%	21%	18%	22%
Only a little	6%	7%	5%	10%
Not at all	6%	7%	4%	12%
Don't know	10%	10%	8%	18%

Table B9. Risk perceptions: When do you think global warming will start to harm people in the United States?

	Overall Sample	Zoo Locations	Aquarium Locations	Six Americas National Sample May 2011
They are being harmed now	42%	39%	48%	32%
In 10 years	12%	13%	11%	12%
In 25 years	14%	15%	14%	13%
In 50 years	12%	12%	12%	12%
In 100 years	10%	11%	8%	11%
Never	10%	11%	7%	20%

Table B10. Issue involvement: How much had you thought about global warming before today?

	Overall Sample	Zoo Locations	Aquarium Locations	Six Americas National Sample May 2011
A lot	29%	26%	35%	13%
Some	45%	46%	44%	34%
A little	20%	22%	18%	38%
Not at all	6%	7%	4%	16%

Table B11. Issue involvement: How important is the issue of global warming to you personally?

	Overall Sample	Zoo Locations	Aquarium Locations	Six Americas National Sample May 2011
Extremely important	8%	7%	11%	8%
Very important	28%	26%	32%	15%
Somewhat important	40%	41%	39%	38%
Not too important	17%	19%	14%	25%
Not at all important	6%	7%	5%	14%

Table B12. Attitudinal certainty: How much do you agree or disagree with the following statement: “I could easily change my mind about global warming.”

	Overall Sample	Zoo Locations	Aquarium Locations	Six Americas National Sample May 2011
Strongly agree	4%	4%	4%	6%
Somewhat agree	31%	33%	27%	32%
Somewhat disagree	33%	33%	32%	33%
Strongly disagree	32%	29%	37%	29%

Table B13. Interpersonal communication and social influence: How many of your friends share your views on global warming?

	Overall Sample	Zoo Locations	Aquarium Locations	Six Americas National Sample May 2011
All	3%	3%	3%	4%
Most	35%	34%	38%	25%
Some	40%	39%	41%	29%
A few	18%	20%	15%	27%
None	4%	5%	3%	15%

**Table B14. Mitigation efficacy: Perceptions about the effectiveness of collective action
(Which of the following statements comes closest to your view?)**

	Overall Sample	Zoo Locations	Aquarium Locations	Six Americas National Sample May 2011
Humans can reduce global warming, and we are going to do so successfully	4%	4%	4%	5%
Humans could reduce global warming, but it's unclear at this point whether we will do what's needed	51%	49%	55%	41%
Humans could reduce global warming, but people aren't willing to change their behavior, so we're not going to	30%	30%	29%	25%
Humans can't reduce global warming, even if it is happening	10%	11%	9%	18%
Global warming isn't happening	5%	6%	3%	11%

Table B15. Preferred societal response: Do you think citizens themselves should be doing more or less to address global warming?

	Overall Sample	Zoo Locations	Aquarium Locations	Six Americas National Sample May 2011
Much more	29%	27%	34%	28%
More	52%	53%	51%	35%
Currently doing the right amount	11%	12%	9%	21%
Less	5%	6%	4%	9%
Much less	3%	3%	3%	7%

Table B16. Consumer activism: Over the past 12 months, how many times have you punished companies that are opposing steps to reduce global warming by NOT buying their products?

	Overall Sample	Zoo Locations	Aquarium Locations	Six Americas National Sample May 2011
Many times (6+)	5%	4%	5%	8%
Several times (4-5)	8%	8%	8%	5%
A few times (2-3)	19%	19%	20%	11%
Once	4%	4%	4%	3%
Never	49%	50%	48%	53%
Don't know	15%	15%	15%	21%

Table B17. National issue priorities: Do you think global warming should be a low, medium, high, or very high priority for the President and Congress?

	Overall Sample	Zoo Locations	Aquarium Locations	Six Americas National Sample May 2011
Very high	21%	18%	26%	13%
High	35%	34%	36%	26%
Medium	27%	29%	25%	31%
Low	17%	19%	14%	30%

Table B18. Support for a national response: Conditions for action desired

People disagree whether the United States should reduce greenhouse gas emissions on its own, or make reductions only if other countries do too.

Which of the following statements comes closest to your own point of view? The United States should reduce its greenhouse gas emissions ...

	Overall Sample	Zoo Locations	Aquarium Locations	Six Americas National Sample May 2011
Regardless of what other countries do	76%	75%	77%	61%
Only if other industrialized countries (such as England, Germany and Japan) reduce their emissions	5%	5%	6%	2%
Only if other industrialized countries and developing countries (such as China, India and Brazil) reduce their emissions	7%	7%	7%	8%
The US should not reduce its emissions	4%	4%	3%	6%
Don't know	8%	10%	6%	23%

Table B19. I only think of a zoo or aquarium as a place to come with kids, not a place I would visit on my own. (Reverse scale)

	Overall Sample	Zoo Locations	Aquarium Locations	Alarmed	Concerned	Cautious	Disengaged	Doubtful	Dismissive
Very much so (top 2 ratings)	8%	9%	8%	7%	8%	10%	12%	7%	13%
Somewhat (middle 3 ratings)	22%	22%	22%	19%	21%	23%	26%	27%	22%
Not at all (bottom 2 ratings)	70%	70%	71%	74%	71%	67%	61%	65%	65%
Average rating (7-point scale)	2.21	2.23	2.15	2.06	2.15	2.32	2.55	2.30	2.41

Table B20. In general, I feel a spiritual connection with nature when I am at a zoo or aquarium.

	Overall Sample	Zoo Locations	Aquarium Locations	Alarmed	Concerned	Cautious	Disengaged	Doubtful	Dismissive
Very much so (top 2 ratings)	29%	30%	29%	40%	27%	23%	30%	26%	23%
Somewhat (middle 3 ratings)	48%	47%	50%	46%	51%	51%	37%	43%	42%
Not at all (bottom 2 ratings)	23%	23%	22%	14%	21%	27%	33%	31%	35%
Average rating (7-point scale)	4.20	4.20	4.21	4.72	4.19	3.87	3.90	3.92	3.65

Table B21. I feel I have a lot in common with other species.

	Overall Sample	Zoo Locations	Aquarium Locations	Alarmed	Concerned	Cautious	Disengaged	Doubtful	Dismissive
Very much so (top 2 ratings)	27%	25%	30%	49%	23%	15%	21%	16%	16%
Somewhat (middle 3 ratings)	52%	53%	50%	45%	58%	57%	48%	46%	37%
Not at all (bottom 2 ratings)	21%	22%	20%	6%	19%	29%	31%	38%	47%
Average rating (7-point scale)	4.16	4.11	4.27	5.16	4.14	3.63	3.66	3.39	3.14

Table B22. I enjoy discussing the exhibit signs and displays with my family or companions while I am at a zoo or aquarium

	Overall Sample	Zoo Locations	Aquarium Locations	Alarmed	Concerned	Cautious	Disengaged	Doubtful	Dismissive
Very much so (top 2 ratings)	55%	54%	58%	67%	55%	45%	46%	49%	54%
Somewhat (middle 3 ratings)	39%	40%	37%	30%	40%	47%	45%	43%	37%
Not at all (bottom 2 ratings)	6%	6%	5%	3%	5%	8%	9%	9%	9%
Average rating (7-point scale)	5.38	5.35	5.44	5.80	5.38	5.01	5.03	5.15	5.25

Table B23. I use my visits to zoos or aquariums as a chance to talk to my family or companions about our relationships to nature

	Overall Sample	Zoo Locations	Aquarium Locations	Alarmed	Concerned	Cautious	Disengaged	Doubtful	Dismissive
Very much so (top 2 ratings)	32%	32%	32%	48%	30%	23%	24%	19%	25%
Somewhat (middle 3 ratings)	46%	47%	45%	41%	49%	49%	46%	47%	42%
Not at all (bottom 2 ratings)	22%	21%	23%	11%	21%	28%	30%	34%	33%
Average rating (7-point scale)	4.31	4.32	4.28	5.07	4.29	3.84	3.82	3.63	3.82

Table B24. Seeing animals at a zoo or aquarium makes me think about my concern for animals in the wild

	Overall Sample	Zoo Locations	Aquarium Locations	Alarmed	Concerned	Cautious	Disengaged	Doubtful	Dismissive
Very much so (top 2 ratings)	55%	54%	57%	79%	57%	40%	37%	30%	32%
Somewhat (middle 3 ratings)	38%	39%	35%	19%	38%	50%	49%	51%	48%
Not at all (bottom 2 ratings)	7%	7%	8%	3%	5%	9%	15%	18%	21%
Average rating (7-point scale)	5.34	5.33	5.36	6.12	5.46	4.87	4.63	4.43	4.33

Table B25. When I am at a zoo or aquarium I am interested in finding out more about how global warming is affecting wildlife and their natural habitats

	Overall Sample	Zoo Locations	Aquarium Locations	Alarmed	Concerned	Cautious	Disengaged	Doubtful	Dismissive
Very much so (top 2 ratings)	33%	32%	36%	63%	33%	16%	16%	8%	4%
Somewhat (middle 3 ratings)	47%	47%	48%	34%	58%	58%	53%	29%	16%
Not at all (bottom 2 ratings)	20%	21%	16%	4%	9%	26%	31%	64%	80%
Average rating (7-point scale)	4.37	4.28	4.56	5.64	4.70	3.73	3.53	2.49	1.79

Table B26. Zoos and aquariums are trustworthy places to find out how to help reduce the effects of global warming

	Overall Sample	Zoo Locations	Aquarium Locations	Alarmed	Concerned	Cautious	Disengaged	Doubtful	Dismissive
Very much so (top 2 ratings)	45%	43%	50%	64%	51%	33%	28%	15%	8%
Somewhat (middle 3 ratings)	44%	46%	40%	32%	45%	56%	56%	50%	32%
Not at all (bottom 2 ratings)	11%	12%	10%	4%	4%	11%	16%	35%	60%
Average rating (7-point scale)	4.94	4.88	5.05	5.71	5.28	4.63	4.24	3.50	2.52

Table B27. You spend as much time as you can in natural settings such as woods, prairies, mountains or lakes

	Overall Sample	Zoo Locations	Aquarium Locations	Alarmed	Concerned	Cautious	Disengaged	Doubtful	Dismissive
Very much so (top 2 ratings)	35%	36%	34%	49%	31%	25%	31%	35%	43%
Somewhat (middle 3 ratings)	53%	52%	53%	45%	58%	56%	47%	49%	42%
Not at all (bottom 2 ratings)	12%	12%	13%	6%	11%	19%	22%	16%	15%
Average rating (7-point scale)	4.70	4.76	4.58	5.28	4.58	4.26	4.31	4.58	4.84

Table B28. You usually try to help protect and preserve local wildlife habitats

	Overall Sample	Zoo Locations	Aquarium Locations	Alarmed	Concerned	Cautious	Disengaged	Doubtful	Dismissive
Very much so (top 2 ratings)	49%	50%	46%	67%	45%	36%	40%	40%	57%
Somewhat (middle 3 ratings)	44%	42%	47%	31%	49%	53%	45%	49%	33%
Not at all (bottom 2 ratings)	7%	8%	7%	3%	6%	12%	15%	12%	10%
Average rating (7-point scale)	5.16	5.20	5.07	5.79	5.11	4.63	4.71	4.80	5.31

Table B29. You tend to support conservation organizations (volunteer your time, make a donation, sign a petition, etc.)

	Overall Sample	Zoo Locations	Aquarium Locations	Alarmed	Concerned	Cautious	Disengaged	Doubtful	Dismissive
Very much so (top 2 ratings)	30%	32%	26%	52%	26%	17%	20%	18%	26%
Somewhat (middle 3 ratings)	49%	48%	51%	41%	54%	54%	46%	49%	37%
Not at all (bottom 2 ratings)	21%	20%	22%	7%	19%	29%	34%	33%	37%
Average rating (7-point scale)	4.30	4.37	4.14	5.26	4.24	3.69	3.69	3.59	3.77

Table B30. You typically engage in conservation efforts during your daily activities (recycling, reducing energy usage, buying earth-friendly products, etc.)

	Overall Sample	Zoo Locations	Aquarium Locations	Alarmed	Concerned	Cautious	Disengaged	Doubtful	Dismissive
Very much so (top 2 ratings)	54%	54%	56%	76%	54%	39%	39%	38%	46%
Somewhat (middle 3 ratings)	38%	39%	38%	22%	40%	50%	48%	47%	37%
Not at all (bottom 2 ratings)	7%	8%	7%	2%	6%	11%	14%	15%	17%
Average rating (7-point scale)	5.31	5.30	5.33	6.09	5.34	4.77	4.75	4.62	4.77

Table B31. Trust the following sources of information about climate change: Scientists

	Overall Sample	Zoo Locations	Aquarium Locations
Very much so (top 2 ratings)	62%	60%	65%
Somewhat (middle 3 ratings)	34%	35%	32%
Not at all (bottom 2 ratings)	4%	5%	3%
Average rating (7-point scale)	5.55	5.50	5.68

Table B32. Trust the following sources of information about climate change: Zoos and aquariums

	Overall Sample	Zoo Locations	Aquarium Locations
Very much so (top 2 ratings)	52%	52%	50%
Somewhat (middle 3 ratings)	44%	44%	46%
Not at all (bottom 2 ratings)	4%	4%	4%
Average rating (7-point scale)	5.30	5.32	5.26

Table B33. Trust the following sources of information about climate change: Environmental organizations

	Overall Sample	Zoo Locations	Aquarium Locations
Very much so (top 2 ratings)	39%	40%	38%
Somewhat (middle 3 ratings)	49%	48%	52%
Not at all (bottom 2 ratings)	12%	12%	11%
Average rating (7-point scale)	4.78	4.78	4.78

Table B34. Trust the following sources of information about climate change: Family and friends

	Overall Sample	Zoo Locations	Aquarium Locations
Very much so (top 2 ratings)	10%	11%	10%
Somewhat (middle 3 ratings)	63%	64%	61%
Not at all (bottom 2 ratings)	26%	25%	30%
Average rating (7-point scale)	3.56	3.60	3.46

Table B35. Trust the following sources of information about climate change: US government agencies

	Overall Sample	Zoo Locations	Aquarium Locations
Very much so (top 2 ratings)	13%	13%	13%
Somewhat (middle 3 ratings)	58%	57%	61%
Not at all (bottom 2 ratings)	29%	30%	27%
Average rating (7-point scale)	3.55	3.52	3.61

Table B36. Trust the following sources of information about climate change: Mainstream news media

	Overall Sample	Zoo Locations	Aquarium Locations
Very much so (top 2 ratings)	6%	6%	5%
Somewhat (middle 3 ratings)	55%	54%	57%
Not at all (bottom 2 ratings)	39%	39%	38%
Average rating (7-point scale)	3.09	3.08	3.10

Table B37. How much do you agree about climate change: It threatens the survival of wildlife in arctic areas

	Overall Sample	Zoo Locations	Aquarium Locations
Very much so (top 2 ratings)	71%	70%	75%
Somewhat (middle 3 ratings)	24%	25%	21%
Not at all (bottom 2 ratings)	5%	5%	5%
Average rating (7-point scale)	5.81	5.76	5.94

Table B38. How much do you agree about climate change: It threatens ocean health

	Overall Sample	Zoo Locations	Aquarium Locations
Very much so (top 2 ratings)	65%	63%	69%
Somewhat (middle 3 ratings)	30%	31%	26%
Not at all (bottom 2 ratings)	5%	6%	4%
Average rating (7-point scale)	5.65	5.58	5.80

Table B39. How much do you agree about climate change: It threatens the survival of species worldwide

	Overall Sample	Zoo Locations	Aquarium Locations
Very much so (top 2 ratings)	64%	63%	65%
Somewhat (middle 3 ratings)	30%	31%	30%
Not at all (bottom 2 ratings)	6%	7%	6%
Average rating (7-point scale)	5.58	5.55	5.65

Table B40. How much do you agree about climate change: It will lead to an increase in extreme weather events

	Overall Sample	Zoo Locations	Aquarium Locations
Very much so (top 2 ratings)	57%	56%	58%
Somewhat (middle 3 ratings)	37%	37%	36%
Not at all (bottom 2 ratings)	7%	7%	6%
Average rating (7-point scale)	5.40	5.37	5.46

Table B41. How much do you agree about climate change: It threatens the survival of wildlife in my region of the country

	Overall Sample	Zoo Locations	Aquarium Locations
Very much so (top 2 ratings)	51%	51%	52%
Somewhat (middle 3 ratings)	40%	40%	40%
Not at all (bottom 2 ratings)	9%	9%	8%
Average rating (7-point scale)	5.21	5.20	5.23

Table B42. How much do you agree about climate change: It threatens human health

	Overall Sample	Zoo Locations	Aquarium Locations
Very much so (top 2 ratings)	51%	49%	53%
Somewhat (middle 3 ratings)	41%	42%	39%
Not at all (bottom 2 ratings)	8%	8%	8%
Average rating (7-point scale)	5.18	5.16	5.22

Table B43. How concerned are you about the effects of climate change on: You

	Overall Sample	Zoo Locations	Aquarium Locations
Very much so (top 2 ratings)	38%	38%	38%
Somewhat (middle 3 ratings)	45%	45%	46%
Not at all (bottom 2 ratings)	17%	17%	16%
Average rating (7-point scale)	4.63	4.63	4.65

Table B44. How concerned are you about the effects of climate change on: Your health

	Overall Sample	Zoo Locations	Aquarium Locations
Very much so (top 2 ratings)	34%	35%	34%
Somewhat (middle 3 ratings)	47%	47%	47%
Not at all (bottom 2 ratings)	18%	18%	19%
Average rating (7-point scale)	4.49	4.49	4.48

Table B45. How concerned are you about the effects of climate change on: Your lifestyle

	Overall Sample	Zoo Locations	Aquarium Locations
Very much so (top 2 ratings)	34%	34%	34%
Somewhat (middle 3 ratings)	48%	48%	48%
Not at all (bottom 2 ratings)	18%	18%	19%
Average rating (7-point scale)	4.47	4.48	4.45

Table B46. How concerned are you about the effects of climate change on: Your future

	Overall Sample	Zoo Locations	Aquarium Locations
Very much so (top 2 ratings)	45%	45%	45%
Somewhat (middle 3 ratings)	40%	40%	40%
Not at all (bottom 2 ratings)	15%	15%	15%
Average rating (7-point scale)	4.87	4.88	4.85

Table B47. How concerned are you about the effects of climate change on: Children

	Overall Sample	Zoo Locations	Aquarium Locations
Very much so (top 2 ratings)	58%	58%	58%
Somewhat (middle 3 ratings)	33%	33%	33%
Not at all (bottom 2 ratings)	9%	10%	9%
Average rating (7-point scale)	5.36	5.35	5.39

Table B48. How concerned are you about the effects of climate change on: People in the U.S.

	Overall Sample	Zoo Locations	Aquarium Locations
Very much so (top 2 ratings)	37%	37%	36%
Somewhat (middle 3 ratings)	49%	49%	50%
Not at all (bottom 2 ratings)	14%	14%	15%
Average rating (7-point scale)	4.67	4.69	4.63

Table B49. How concerned are you about the effects of climate change on: Humanity

	Overall Sample	Zoo Locations	Aquarium Locations
Very much so (top 2 ratings)	52%	52%	53%
Somewhat (middle 3 ratings)	37%	36%	37%
Not at all (bottom 2 ratings)	11%	12%	10%
Average rating (7-point scale)	5.17	5.14	5.23

Table B50. How concerned are you about the effects of climate change on: Future generations

	Overall Sample	Zoo Locations	Aquarium Locations
Very much so (top 2 ratings)	67%	66%	68%
Somewhat (middle 3 ratings)	26%	26%	25%
Not at all (bottom 2 ratings)	7%	8%	7%
Average rating (7-point scale)	5.65	5.62	5.73

Table B51. How concerned are you about the effects of climate change on: Marine life

	Overall Sample	Zoo Locations	Aquarium Locations
Very much so (top 2 ratings)	65%	64%	68%
Somewhat (middle 3 ratings)	28%	29%	26%
Not at all (bottom 2 ratings)	7%	8%	7%
Average rating (7-point scale)	5.60	5.57	5.69

Table B52. How concerned are you about the effects of climate change on: Animals

	Overall Sample	Zoo Locations	Aquarium Locations
Very much so (top 2 ratings)	61%	60%	63%
Somewhat (middle 3 ratings)	32%	33%	30%
Not at all (bottom 2 ratings)	7%	8%	7%
Average rating (7-point scale)	5.50	5.47	5.55

Table B53. How concerned are you about the effects of climate change on: Birds

	Overall Sample	Zoo Locations	Aquarium Locations
Very much so (top 2 ratings)	49%	49%	51%
Somewhat (middle 3 ratings)	42%	42%	40%
Not at all (bottom 2 ratings)	9%	9%	9%
Average rating (7-point scale)	5.13	5.11	5.18

Table B54. How concerned are you about the effects of climate change on: Plants

	Overall Sample	Zoo Locations	Aquarium Locations
Very much so (top 2 ratings)	46%	45%	49%
Somewhat (middle 3 ratings)	45%	45%	43%
Not at all (bottom 2 ratings)	9%	9%	9%
Average rating (7-point scale)	5.07	5.05	5.12

Table B55. Current behaviors: Buy food grown locally

	Overall Sample	Zoo Locations	Aquarium Locations
Always do it	10%	9%	10%
Do it sometimes	66%	66%	67%
Thinking about it/ Planning on doing it	16%	16%	15%
Never thought about it/ Not interested	8%	8%	8%

Table B56. Current behaviors: Make at least one dinner a week meatless

	Overall Sample	Zoo Locations	Aquarium Locations
Always do it	25%	24%	29%
Do it sometimes	37%	39%	35%
Thinking about it/ Planning on doing it	12%	12%	11%
Never thought about it/ Not interested	25%	26%	25%

Table B57. Current behaviors: Swap out all incandescent (regular) light bulbs for compact fluorescents at home

	Overall Sample	Zoo Locations	Aquarium Locations
Always do it	37%	36%	38%
Do it sometimes	35%	36%	34%
Thinking about it/ Planning on doing it	18%	17%	19%
Never thought about it/ Not interested	11%	11%	9%

Table B58. Current behaviors: Drive a fuel-efficient car (i.e., hybrid or a car that gets at least 30 miles a gallon)

	Overall Sample	Zoo Locations	Aquarium Locations
Always do it	17%	17%	18%
Do it sometimes	13%	13%	13%
Thinking about it/ Planning on doing it	52%	52%	51%
Never thought about it/ Not interested	18%	18%	17%

Table B59. Current behaviors: Turn your thermostat to 65 degrees or lower in winter and up to 78 degrees in summer

	Overall Sample	Zoo Locations	Aquarium Locations
Always do it	29%	28%	32%
Do it sometimes	30%	30%	30%
Thinking about it/ Planning on doing it	20%	21%	19%
Never thought about it/ Not interested	21%	21%	20%

Table B60. Current behaviors: Talk to others about the importance of addressing climate change

	Overall Sample	Zoo Locations	Aquarium Locations
Always do it	8%	8%	9%
Do it sometimes	31%	31%	30%
Thinking about it/ Planning on doing it	25%	25%	25%
Never thought about it/ Not interested	36%	36%	35%

Table B61. Current behaviors: Donate money to a conservation or environmental group

	Overall Sample	Zoo Locations	Aquarium Locations
Always do it	8%	8%	8%
Do it sometimes	31%	32%	30%
Thinking about it/ Planning on doing it	29%	28%	30%
Never thought about it/ Not interested	32%	32%	32%

Table B62. Current behaviors: Sign a petition or take political action for a conservation cause

	Overall Sample	Zoo Locations	Aquarium Locations
Always do it	9%	8%	9%
Do it sometimes	25%	26%	23%
Thinking about it/ Planning on doing it	26%	26%	26%
Never thought about it/ Not interested	40%	39%	42%

Table B63. From the previous list, select up to three actions that you feel have the most impact on climate change (Percent selecting item).

	Overall Sample	Zoo Locations	Aquarium Locations
Drive a fuel-efficient car (i.e., hybrid or a car that gets at least 30 miles a gallon)	65%	64%	68%
Turn your thermostat to 65 degrees or lower in winter and up to 78 degrees in summer	43%	44%	42%
Swap out all incandescent (regular) light bulbs for compact fluorescents at home	38%	38%	37%
Buy food grown locally	37%	37%	38%
Donate money to a conservation or environmental group	19%	19%	17%
Talk to others about the importance of addressing climate change	18%	18%	18%
Sign a petition or take political action for a conservation cause	14%	14%	14%
Make at least one dinner a week “meatless”	14%	13%	16%
None of the above	6%	6%	6%

Table B64. How much of an impact do you believe you can have personally on addressing climate change?

	Overall Sample	Zoo Locations	Aquarium Locations
A great deal	8%	8%	8%
A fair amount	43%	43%	43%
Not very much	35%	35%	34%
Almost none at all	9%	9%	10%
None	5%	5%	5%
Average rating (5-point scale)	3.40	3.41	3.39

Table B65. Would you like to do more to address climate change?

	Overall Sample	Zoo Locations	Aquarium Locations
Yes	69%	68%	70%
No	31%	32%	30%

Table B66. If yes, what is standing in your way? (Select all that apply – Percent selecting item)

	Overall Sample	Zoo Locations	Aquarium Locations
I don't know what actions would be effective	39%	39%	38%
The necessary actions would cost too much money	25%	26%	24%
I'm unsure if my actions will make a difference	20%	20%	23%
The necessary actions are too time consuming	15%	14%	15%
The necessary actions are too inconvenient or difficult	11%	10%	11%
The necessary actions would make life less comfortable	10%	10%	11%
My friends or family would not support my actions	4%	4%	3%
Percent of respondents identifying at least one barrier standing in their way	92%	92%	91%

Table B67. Would you say you feel a sense of connection with the animals you see at a zoo or aquarium?

	Overall Sample	Zoo Locations	Aquarium Locations
I feel a strong connection	21%	21%	21%
Moderately/ Somewhat	65%	65%	65%
Very little/ Not at all	14%	14%	14%
Average rating (5-point scale)	3.56	3.55	3.59

Table B68. To what extent do you think of yourself as: Political viewpoint

	Overall Sample	Zoo Locations	Aquarium Locations
Very liberal	12%	11%	13%
Somewhat liberal	19%	18%	23%
Moderate, middle of the road	40%	40%	39%
Somewhat conservative	21%	22%	19%
Very conservative	9%	10%	7%

Table B69. To what extent do you think of yourself as: Spiritual

	Overall Sample	Zoo Locations	Aquarium Locations
Very much so (top 2 ratings)	45%	49%	37%
Somewhat (middle 3 ratings)	40%	38%	45%
Not at all (bottom 2 ratings)	15%	14%	18%
Average rating (7-point scale)	4.85	4.98	4.57

Table B70. To what extent do you think of yourself as: Religious

	Overall Sample	Zoo Locations	Aquarium Locations
Very much so (top 2 ratings)	36%	39%	28%
Somewhat (middle 3 ratings)	36%	35%	39%
Not at all (bottom 2 ratings)	28%	26%	34%
Average rating (7-point scale)	4.21	4.37	3.85

Table B71. Do you have a cell phone/mobile device with you today that has an Internet connection? (Percent indicating ‘Yes’)

	Overall Sample	Zoo Locations	Aquarium Locations
60+ years old	35%	30%	44%
50-59 years old	46%	48%	41%
40-49 years old	63%	61%	66%
30-39 years old	71%	70%	75%
25-29 years old	72%	71%	75%
18-24 years old	68%	68%	69%
Overall	62%	61%	64%

Table B72. Which of the following do you regularly use? (Select all that apply – Percent indicating ‘Yes’)

	Overall Sample	Zoo Locations	Aquarium Locations
Facebook	60%	61%	57%
YouTube	30%	28%	34%
Other social media sites	10%	10%	12%
Twitter	8%	7%	11%

Table B73. Which of the following do you regularly play? (Select all that apply – Percent indicating ‘Yes’)

	Overall Sample	Zoo Locations	Aquarium Locations
Wii	25%	26%	22%
Other home gaming systems	11%	11%	11%
Xbox	11%	12%	11%
Social network games (i.e., Farmville)	8%	9%	5%
Multiplayer online games (i.e., Warcraft)	6%	7%	6%

Table B74. How frequently do you usually visit zoos or aquariums? (Attitudes Survey Form)

	Overall Sample	Zoo Locations	Aquarium Locations	Alarmed	Concerned	Cautious	Disengaged	Doubtful	Dismissive
Often	28%	34%	15%	33%	27%	25%	18%	26%	29%
Occasionally	56%	52%	65%	55%	58%	56%	63%	55%	50%
Rarely	16%	14%	20%	12%	15%	19%	19%	19%	21%

Table B75. How frequently do you usually visit zoos or aquariums? (Behaviors Survey Form)

	Overall Sample	Zoo Locations	Aquarium Locations
Often	25%	29%	15%
Occasionally	57%	54%	62%
Rarely	19%	17%	23%

Table B76. Are you currently a member of this zoo or aquarium? (Attitudes Survey Form)

	Overall Sample	Zoo Locations	Aquarium Locations	Alarmed	Concerned	Cautious	Disengaged	Doubtful	Dismissive
Yes	30%	39%	12%	30%	31%	29%	26%	32%	25%
No	70%	61%	89%	70%	69%	71%	74%	68%	75%

Table B77. Are you currently a member of this zoo or aquarium? (Behaviors Survey Form)

	Overall Sample	Zoo Locations	Aquarium Locations
Yes	29%	36%	13%
No	71%	64%	87%

Table B78. Your gender (Attitudes Survey Form)

	Overall Sample	Zoo Locations	Aquarium Locations	Alarmed	Concerned	Cautious	Disengaged	Doubtful	Dismissive
Female	62%	65%	54%	67%	64%	60%	57%	52%	45%
Male	38%	35%	46%	33%	36%	40%	44%	48%	55%

Table B79. Your gender (Behaviors Survey Form)

	Overall Sample	Zoo Locations	Aquarium Locations
Female	61%	64%	55%
Male	39%	36%	45%

Table B80. Your home Zip Code (Attitudes Survey Form)

	Overall Sample	Zoo Locations	Aquarium Locations	Alarmed	Concerned	Cautious	Disengaged	Doubtful	Dismissive
Within 50 miles from zoo/aquarium	54%	69%	21%	52%	55%	57%	57%	55%	46%
More than 50 miles from zoo/aquarium	44%	30%	72%	45%	43%	41%	43%	44%	54%
Outside US	2%	1%	7%	4%	3%	2%	1%	1%	1%

Table B81. Your home Zip Code (Behaviors Survey Form)

	Overall Sample	Zoo Locations	Aquarium Locations
Within 50 miles from zoo/aquarium	53%	67%	20%
More than 50 miles from zoo/aquarium	45%	33%	73%
Outside US	3%	1%	7%

Table B82. Your age (Attitudes Survey Form)

	Overall Sample	Zoo Locations	Aquarium Locations	Alarmed	Concerned	Cautious	Disengaged	Doubtful	Dismissive
60 years old or older	10%	11%	8%	14%	9%	6%	9%	14%	9%
50-59 years old	11%	11%	12%	14%	9%	10%	19%	12%	13%
40-49 years old	22%	20%	27%	25%	22%	19%	22%	21%	26%
30-39 years old	31%	35%	23%	27%	32%	36%	21%	31%	30%
25-29 years old	13%	13%	12%	9%	14%	15%	12%	9%	12%
18-24 years old	14%	12%	18%	11%	14%	15%	18%	13%	12%
Average age	39.0	39.2	38.6	41.8	37.9	36.6	39.8	40.1	39.5

Table B83. Your age (Behaviors Survey Form)

	Overall Sample	Zoo Locations	Aquarium Locations
60 years old or older	11%	11%	11%
50-59 years old	12%	12%	13%
40-49 years old	22%	21%	23%
30-39 years old	30%	32%	24%
25-29 years old	12%	12%	12%
18-24 years old	13%	12%	16%
Average age	39.6	39.6	39.7

Table B84. Including yourself, what is the total number of people in your group today? (Attitudes Survey Form)

	Overall Sample	Zoo Locations	Aquarium Locations	Alarmed	Concerned	Cautious	Disengaged	Doubtful	Dismissive
7 or more people	13%	14%	11%	12%	12%	15%	16%	19%	13%
5-6 people	19%	21%	16%	19%	18%	21%	17%	17%	26%
3-4 people	42%	44%	39%	40%	43%	41%	47%	42%	44%
1-2 people	26%	22%	34%	29%	27%	23%	21%	22%	18%
Average number of people in group	4.69	4.85	4.38	4.36	4.73	4.67	6.88	4.58	4.52

Table B85. Including yourself, what is the total number of people in your group today? (Behaviors Survey Form)

	Overall Sample	Zoo Locations	Aquarium Locations
7 or more people	12%	14%	9%
5-6 people	20%	21%	18%
3-4 people	42%	42%	42%
1-2 people	26%	23%	31%
Average number of people in group	4.60	4.75	4.28

Table B86. How many in group are younger than 13 years old? (Attitudes Survey Form)

	Overall Sample	Zoo Locations	Aquarium Locations	Alarmed	Concerned	Cautious	Disengaged	Doubtful	Dismissive
7 or more children	2%	2%	1%	2%	2%	1%	5%	2%	1%
5-6 children	3%	4%	2%	3%	3%	4%	2%	5%	4%
3-4 children	15%	18%	8%	13%	13%	18%	13%	19%	18%
1-2 children	49%	53%	39%	48%	49%	48%	51%	46%	53%
No children in group	32%	23%	51%	35%	33%	29%	29%	27%	24%
Average number of children in group	1.75	2.04	1.15	1.46	1.76	1.83	2.87	1.85	1.75

Table B87. How many in group are younger than 13 years old? (Behaviors Survey Form)

	Overall Sample	Zoo Locations	Aquarium Locations
7 or more children	2%	3%	1%
5-6 children	3%	4%	1%
3-4 children	14%	17%	7%
1-2 children	51%	54%	46%
No children in group	30%	23%	46%
Average number of children in group	1.73	1.98	1.17

APPENDIX C: METHODS

The goal of this study was to gain information that would allow zoos and aquariums to effectively develop educational resources that build on visitors' values and emotional connections with animals and inspire actions that have a positive collective impact on mitigating climate change. Five research questions were posed to guide the initial survey item development:

1. How do zoo and aquarium visitors' beliefs, attitudes, and behaviors concerning climate change compare to the general public?
2. What are the cognitive, emotional, and behavioral barriers to engaging in climate change action among zoo and aquarium visitors?
3. Do zoos and aquariums provide socially supportive and motivating contexts for discussions and responses to climate change?
4. Are zoo and aquarium visitors capable of utilizing virtual social networks, and online and mobile technology platforms in ways that could enhance their understanding of climate change?
5. Are zoo and aquarium visitors' personal and emotional connections to animals and nature related to their disposition toward changes in personal behaviors and consumer patterns that affect climate change?

Survey instrument development

At the beginning of the survey development process our biggest challenge was to develop a comprehensive survey that was relatively short and practical for visitors to complete during their visits to our institutions. Given the large amount of information we wanted to collect from visitors, the decision was made to create two independent short paper surveys: (a) a survey primarily focused on *attitudes* and (b) a survey primarily focused on *behaviors*. Thus, by using two surveys, we could minimize the time needed to complete an individual survey while still being able to collect a broad range of information. The intent was that each institution would distribute both surveys simultaneously (randomly alternating surveys) to visitors. Each visitor would then complete only one of the two surveys.

Survey instrument content

The visitor *attitudes* survey served as an opportunity to compare zoo and aquarium visitors' attitudes and beliefs about global warming to a national study of the general public that was conducted by the Yale Project on Climate Change Communications and the George Mason University Center for Climate Change Communication. The "Six Americas" national study [16] conducted by Yale and George Mason aimed to provide a baseline for understanding the American public's attitudes about global warming in order to provide a foundation for effective communication about this topic. Their study revealed that based upon beliefs about global warming, six unique audience segments appear to exist among the American public. These six segments (which form a continuum) were labeled: Alarmed, Concerned, Cautious, Disengaged, Doubtful, and Dismissive. According to Maibach et al. [15], the six audience segments were determined via a nationally representative 2008 survey of 2,164 U.S. adults who participated in an online panel. Panelists responded to items about global warming beliefs, issue involvement, behaviors, and preferred societal responses. The audience segments were determined via Latent

Class Analysis and validated by a discriminant analysis. The researchers also developed a short segmentation tool which contained 15 survey items from their original study. These 15 items were combined with attitudinal items regarding visitors' general experiences at zoos or aquariums, their sense of connection to animals and nature, and their previous behaviors concerning environmental and conservation activities to constitute the visitor *attitudes* survey form.

The visitor *behaviors* survey contained eight behavioral items to assess visitors' current actions in addressing climate change. These items concerned various consumer behaviors and other conservation support behaviors. Most of these items came from a visitor survey that was used in 2009 at three Northwest Zoo & Aquarium Alliance institutions (Oregon Coast Aquarium, Oregon Zoo, and Woodland Park Zoo). Other items on the *behaviors* survey included: (1) visitors' perceived personal control over addressing climate change and various perceived barriers to their actions; (2) level of trust of various information sources about climate change; (3) awareness of climate change threats; (4) sense of connection with zoo animals; (5) concern about the effects of climate change on self, other people, and the biosphere (these items were based on a validated survey instrument focused on environmental concern (Schultz, 2001); (6) religious, spiritual, and political perspectives; and (7) items related to visitors' technology access and usage. In addition, the visitor *behaviors* survey consistently used the term "climate change" (vs. "global warming") to determine any differences in visitors' responses to the two different phrases.

Finally, both the visitor *attitudes* and *behaviors* survey forms contained identical demographic items on group composition, home Zip Code, age, gender, frequency of zoo or aquarium visits, and membership status at the particular zoo or aquarium the respondent was visiting that day.

Survey sites

Surveys were collected at ten zoos and five aquariums, including Columbus Zoo and Aquarium, Como Park Zoo and Conservatory, Indianapolis Zoo, Louisville Zoological Garden, Oregon Zoo, Pittsburgh Zoo & PPG Aquarium, Roger Williams Park Zoo, Toledo Zoological Gardens, Brookfield Zoo, New England Aquarium, National Aquarium (Baltimore), Aquarium by the Bay, Monterey Bay Aquarium, and the John G. Shedd Aquarium. The majority of participating zoos are partners in the CliZEN project. Supplemental funding from NSF allowed us to include the aquarium sites and funding from a Boeing grant allowed us to include Woodland Park Zoo.

Data collection and entry

Surveys were first pilot tested in May 2011 at Brookfield Zoo and the John G. Shedd Aquarium. A total of 95 *attitudes* and 106 *behaviors* surveys were collected between the two locations. Preliminary analyses of the surveys resulted in minor changes to the survey layout and item wordings.

General data collection took place between June 1 and August 15, 2011 and followed Institutional Review Board approved protocols and procedures. Data collection was conducted by institutional staff at each of the participating zoo and aquarium sites. Each site had a designated staff member to coordinate and supervise the data collection. These staff members participated in a standard data collection training session (via an online webinar) and received

procedure documents from Chicago Zoological Society. Each institution distributed both survey forms simultaneously, randomly alternating between the visitor *attitudes* and *behaviors* survey forms. Each respondent completed only one of the two survey forms (*attitudes* or *behaviors*). Data collectors kept a running count of the number of visitors who declined to complete a survey. The overall response rate was 49%. Response rates at each site varied, and ranged from 27% to 79%.

Once collected, paper surveys were mailed or scanned and emailed to Chicago Zoological Society for data entry. Surveys were deemed “usable” and entered only if at least 50% of the survey was completed and if the respondents were aged 18 years or older. The overall final count of usable surveys was 7,182 (Table C1). For the entire visitor sample, the margin of sampling error for each survey form is plus or minus 1.60%, with 95% confidence. The margin of error for zoos is plus or minus 1.98% and the margin of error for aquariums is 2.95%.

Table C1. Total number of usable surveys

	<i>Attitudes</i> survey form	<i>Behaviors</i> survey form	Overall
Zoos (10 locations)	2,442	2,492	4,934
Aquariums (5 locations)	1,152	1,096	2,248
Total (15 locations)	3,594	3,588	7,182

Data analysis

The visitor *attitudes* survey contained the “Global Warming’s Six Americas” 15-item screening tool. In order to segment respondents into one of the Six America’s audience segments, visitor responses to the 15 items were subjected to variable coding and statistical procedures as outlined in the Global Warming’s Six Americas Screening Tool Manual [14]. SPSS Version 15 was used to run the manual’s SPSS syntax containing the linear discriminant functions that classified respondents into one of the six segments. After the segmentation procedure was completed, a discriminant analysis using the responses to the 15 items was conducted to compare our results with the Six Americas segmentation of zoo and aquarium visitors. Overall, results indicated that 84.5% of the visitors were correctly classified into the Six Americas segments. Examining the results by segment revealed that classifying “Alarmed” and “Disengaged” segments had the highest correct hit rates (93.0% and 93.5% respectively), whereas classifying the “Doubtful” and “Dismissive” segments had the lowest correct hit rates (62.5% and 78.5% respectively).

For the visitor *behaviors* survey, two preliminary analyses were conducted on the behavior items and items pertaining to concern about the effects of climate change. For the behavior ratings, a principal components factor analytic technique was used to examine if there was any underlying correlational pattern in respondents’ behavior ratings across the 8 survey items. Two

underlying factors were found and accounted for 54.8% of the variance in the ratings (Table C2). Factor one accounted for the majority of the explained variance and contained three items concerning active conservation support behaviors. The second factor, which contained five items, was centered on various consumer behaviors. Both factors are consistent with two general types of environmentally significant behavior that Stern [22] has classified as public-sphere environmentalism (conservation support behaviors) and private-sphere environmentalism (consumer behaviors).

Table C2. Rotated Factor Loadings: Current behaviors to help address climate change

	Factor 1	Factor 2
Sign a petition or take political action for a conservation cause	.858	.187
Donate money to a conservation or environmental group	.833	.195
Talk to others about the importance of addressing climate change	.747	.314
Buy food grown locally	.080	.717
Make at least one dinner a week meatless	.170	.690
Swap out all incandescent (regular) light bulbs for compact fluorescents at home	.194	.646
Turn you thermostat to 65 degrees or lower in winter and up to 78 degrees in summer	.286	.562
Drive a fuel-efficient car (i.e., hybrid or a car that gets at least 30 miles a gallon)	.250	.536

Survey items related to visitors’ concern about the effects of climate change were adapted from Schultz [21]. Previous analyses of respondents’ ratings to the 12 items have uncovered three distinct factors of environmental concern related to concern for self, concern for others, and concern for the biosphere (each factor or sub-score reflecting the ratings of four survey items each). However, our own factor analysis of visitors’ ratings revealed that as a group, the 12 items were factor free and only grouped into one overall factor. Furthermore, inter-correlations among the three sub-scores (i.e., concern for self, others, and the biosphere) revealed higher coefficients (.79 or higher) than had previously been reported in studies with these items. One possible reason for our findings may be related to the rating directions for these items. Previous studies have used the expression ‘concerned about environmental problems’ in the directions. Whereas, for our study we used the expression ‘concerned about the effects of climate change’. This change in directions may have had an impact on how zoo and aquarium visitors responded to these survey items. As such, we simply computed one overall concern score for respondents based on their ratings across the 12 items.