

# Summative Evaluation

Water: H<sub>2</sub>O = Life



at the  
American Museum of Natural History

report prepared by:  
People, Places & Design Research

**Summative Evaluation of the Exhibition**  
***Water: H<sub>2</sub>O = Life***  
**at the American Museum of Natural History**

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## Executive Summary

This visitor research was commissioned by the American Museum of Natural History (AMNH) to explore visitors' perceptions about the exhibition, "Water: H<sub>2</sub>O = Life" – which was installed from November 2007 through May 2008. The primary focus was on general public visitors; a related activity involved assessing the perceptions of elementary students visiting with school groups, which is not part of this report.

### Goals for this evaluation

Although the main emphasis was on evaluating the Water exhibition, AMNH also sought to use this opportunity to explore visitors' perceptions that might be relevant to the upcoming Climate Change exhibition. These four goals guided the development of the research strategy, specific interview questions, the analysis of data, and the structure of this report:

- ◆ assess whether visitors are getting something (whether learning, enjoyment, personal motivation) from this exhibition;
- ◆ find out whether visitors are associating water-related issues that they see in this exhibition with climate change /global warming (including whether they entered the exhibition with a sense of those connections, and whether the exhibition changed their perceptions);
- ◆ explore visitors' interest in seeing a climate change exhibition; and
- ◆ explore visitors' interest in educational programs that could be created in conjunction with a climate change exhibition.

### Methods used for this evaluation

Three research methods were developed to investigate visitors' experiences in the Water exhibition; two methods were developed for general visitors and one for children in school groups:

1. **Entrance interviews** were conducted with a random sample of 'general public' adult visitors as they were entering the exhibition (in family groups or adult-only groups, 1 adult per visitor group, n = 167; of these, 152 had not seen the exhibition before and were the basis for analysis of data from this method)
2. **Exit interviews** were conducted with a separate random sample of 'general public' adult visitors as they were leaving the exhibition (in family groups or adult-only groups, 1 adult per visitor group, n = 316);
3. **End-of-visit questionnaires** were distributed to teachers and students in elementary school groups (n = 25 teachers, 320 students; two levels of classes were studied: 3<sup>rd</sup>-4<sup>th</sup> grade, and 6<sup>th</sup> grade); analysis of the data from these questionnaires is being conducted separately by AMNH staff.

In this collaboration, the research strategy and research instruments were developed by People, Places & Design Research (PPDR); the data collection for all methods was conducted by AMNH staff and intern, with training and monitoring of the quality of work by PPDR.

### Visitor sample characteristics

The random sample of people contacted entering or leaving this exhibition may or may not be representative of AMNH's total audience, but it was sufficiently diverse for in-depth analysis on this project – containing substantial numbers of first-time visitors to the Museum as well as repeat visitors, New York City and tri-state residents as well as US domestic visitors and foreign visitors, about half the sample who belong to any kind of environmental organization (and half the sample who do not), a wide range of ages of adults, family visitors as well as adults visiting without children, and relatively equal proportions of men and women interviewed in the Exit Interviews (somewhat more women in the Entrance Interviews). In addition, the sample contained people who began with relatively low or moderate interest in the subject of water as well as people with high interest, and people with no expectations about what they would see in this exhibition as well as people who had specific interests or curiosities.

Overall, the sample composition is considered to be excellent for an evaluation of this type, including the high degree of similarity between the characteristics of the Entrance Interview sample and the Exit Interview sample: on 5 of 6 characteristics, the samples were statistically similar, and only on gender was there a minor difference (not statistically significant), which showed in the detailed analysis of results to make no difference in visitors' perceptions of the exhibition.

### Highlights of the Findings

This research produced results about visitors' experience of the Water exhibition (the first list of findings) as well as results that may be of interest for the climate change exhibition (the second list).

- ◆ Expectations are an important context for visitor experiences; for example, if people come expecting to see something specific and they don't see it, their experience is affected. Visitors to Water tended to have vague expectations: almost half could articulate no expectations, one-fifth only mentioned the title, and one-fifth expected to see something about conservation issues. Almost half expressed no specific interests regarding the exhibition; the other half indicated a variety of curiosities.
- ◆ Visitors entered the exhibition thinking that they already knew about many water-related topics. At least two-thirds claimed high familiarity with household water use, the water cycle, issues about quality of drinking water, hurricanes, polar bears, and coral reefs. About half claimed high familiarity with water supply for cities, droughts in Africa, and barrier islands.
- ◆ All visitors (99%) could articulate some main idea that they got from seeing this exhibition. The primary message was conservation, expressed in a variety of ways: how to save water, the importance of water, its scarcity, protecting the

supply of water – in one way or another, 85% of the visitors interviewed mentioned something about conservation.

- ◆ Although conservation was the main message perceived, visitor experiences and learning were quite wide ranging, suggesting that this was a “multiple entry, multiple exit” type of experience (people came in at different levels of interest and knowledge and they all got something out of it), rather than one where all visitors had the same experience of, for example, getting three primary messages.
- ◆ This exhibition made people think about their everyday lives and the future. Although half (51%) said they already do things to help with water conservation, more people (72%) said they realized they could do more. Being worried about the future (65%) may be a good stimulus for people to act, although some people (22%) saw things in the exhibition that made them hopeful about the future too.
- ◆ Experiencing this exhibition expanded people’s views of global water issues – increasing interest in global issues among some people (especially those who are not already environmentally ‘active’), giving some people a different understanding of life in developing countries, and helping some people see more connections between water and global warming.

Findings pertaining to the upcoming climate change exhibition:

- 🌍 During the development and testing of questions for the research instruments, it was clear that the term ‘climate change’ does not have as much resonance with people as the term ‘global warming.’ Therefore, we chose to use both terms to refer to the topic; answers are indistinguishable on these terms.
- 🌍 Visitors left this exhibition with almost exactly the same perceptions as when they entered regarding which water-related issues are important in climate change: polar bears, droughts in Africa, and hurricanes.
- 🌍 Interest in a climate change exhibition is good, and was unchanged by seeing the Water exhibition (~ half expressed high interest, one-fourth expressed medium interest, and one-fourth expressed low interest).
- 🌍 Visitors’ interest in climate change focuses on what can be done about it: ‘alternative energy sources & future technology’ was most interesting (62% high interest), along with ‘what we can do to reduce our impact’ (54%). Interest is significantly greater among people who are environmentally active.
- 🌍 All educational programs are likely to attract some audiences; the type of audience varies by program. The most widely appealing educational program formats were: online information from the exhibit’s web site (49% high interest), family-friendly hands-on conservation programs (44%), and debates on solutions and resource management issues (38%).

## **A. Expectations & Interest in the Topic of Water**

A useful context for interpreting audience reactions to the exhibition is the question, “where are visitors starting from?” This section explores the visitors’ initial perceptions about the topic of water, before seeing the exhibition. Key findings are:

- Many visitors entering the exhibition (42%) could not articulate any expectations of what they might see or ideas of what it’s about, other than “water.” However, some people (21%) got the idea (from the title) that it would show the importance of water to life, and some people (19%) expected something about conservation.
- At least two-thirds of visitors (66%-79%) felt that they already knew about most of the water issues presented in a list of nine items: household use, water cycle, quality of drinking water, hurricanes, polar bears, and coral reefs.
- Almost half of the visitors entering this exhibition (43%) could not articulate any specific interests or anything they would like to find out about water. It’s such a broad subject, and perceived as mundane, that people had difficulty beginning a conversation about it.

## A.1. Expectations about a water exhibition

ENTRANCE
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OVERVIEW: Many visitors (42%) had no expectations about the water exhibit, and couldn't guess what it might be about, aside from "water." About one-fifth of the visitors guessed (from the title) that the exhibit would show the importance of water to life. Another one-fifth expected that conservation issues would be a part of the exhibit.

*What have you heard about the Water exhibit – what's going to be the main idea? (or what would you guess is the main idea? / or what would you expect to see?)*

24%	water
21%	importance of water to life, water equals life
19%	conservation issues
5%	basic info: water cycle, distribution
5%	heard it was a good exhibit, heard there was hands-on
5%	animal life in water
3%	problems with water, pollution, water quality
2%	how water impacts us, the planet
1%	global warming
5%	other answers
18%	no idea, don't know, no expectations

### Sample of answers (besides "water" and "don't know")

*Water and it's impact on the planet*  
*Something new and unusual, some history and future*  
*Saw on Steven Colbert about the exhibit*  
*Water, live animals*  
*Underwater animals*  
*Sea life and everything related to water*  
*Water on earth, what's happening, problems*  
*Water/global warming*  
*Heard there is hands on stuff*  
*Heard it was very good, but no real info.*  
*Where does water come from*  
*Circle of water, cycle with weather, etc. And ocean evaporation*  
*Water conservation*  
*Water and the environment*  
*Trying to make water less polluted*  
*Scarcity of water globally*  
*Planet survival/pollution of the earth*  
*Environment*  
*Ecology and science, recycling of water*  
*Conservation and where water comes from, limited supply, etc.*  
*Conservation*  
*A message that we need to conserve water*

*Related to origins of life, preservation, ways to conserve water*  
*Hadn't heard, conservation and getting water where people need it*  
*Connect people with water, where it comes from, how important and need to conserve*  
*Don't know, conservation, everything is 90% water*  
*Preciousness of water*  
*Why water is important*  
*Water, we can't live without it*  
*Water equals life*  
*Importance of water*  
*How water relates to our lives as humans*  
*How it is important to life, water*  
*How fundamental water is to life on earth*  
*Searching for water on other planets or how it gives life on our planet*  
*Heard it was really interesting, we will learn about how water necessary for life*  
*Saw some articles, interesting and pretty, everything you want to know*



## A.2. Knowledge of water issues before seeing the exhibition

### ENTRANCE

OVERVIEW: Most people who are coming to this exhibit for the first time feel that they are already knowledgeable about many of the nine topics presented to them. The four topics that people felt the most knowledgeable about were: household water use, the water cycle, the quality of drinking water, and hurricanes (74-79% of visitors said they could state two facts about these subjects). The three least familiar topics were: water supply, droughts in Africa, and barrier islands (42-55% of visitors said they knew something about these). There was only one statistically significant difference based on people’s orientation toward the environment: those who are environmentally active believed they were more knowledgeable about droughts in Africa compared to those who are sympathetic but not active on environmental issues.

### *Which of these water issues do you already know something about?*

	<u>Overall</u>	Attitude toward environment <sup>1</sup>	
		<u>Active</u>	<u>Sympathetic</u>
household water use	79%	83%	75%
water cycle (evaporation, condensation, etc.)	78%	83%	75%
the quality of drinking water	76%	78%	75%
hurricanes	74%	78%	70%
polar bears	68%	73%	66%
coral reefs	66%	67%	68%
water supply for cities, reservoirs	55%	59%	53%
droughts in Africa	53%	64%	** 45%
barrier islands	42%	44%	44%

\*\* Asterisks indicate statistically significant differences (p<.05) between sets of figures. For example on this page, there is a substantial difference in the proportion of ‘active’ visitors who know about droughts in Africa, compared to those who are ‘sympathetic but not active.’ The figures should be read as percents of the column heading, e.g., 64% of ‘active’ visitors know about droughts in Africa.  
 (++) are used in this report to indicate patterns of differences which are not quite statistically significant (milder differences, which may have occurred by chance), but which suggest a trend and may have some intuitive value in some circumstances.

<sup>1</sup> Visitors were asked to characterize their own relationship to environmental issues, given the choices of 1) very interested and active in environmental concerns; 2) sympathetic to environmental issues but not active; 3) somewhat interested; or 4) not very interested in environmental issues. The results for the sample of entering visitors who were seeing the exhibit for the first time were: 43% ‘active,’ 48% ‘sympathetic,’ and 9% ‘somewhat’ or ‘not interested’ (only 14 people, not enough to include in the analysis above). This proportion of ‘active’ visitors is the highest figure we’ve seen across numerous studies of zoo and aquarium audiences.

### A.3. What interests visitors about this topic?

ENTRANCE
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OVERVIEW: Many visitors (43%) couldn't articulate anything that they wanted to find out about water (indicating that it's perceived by some people as a mundane topic, and people think they already know about it, and there isn't much curiosity). Among those who did express some curiosity, the responses were varied and included: the water cycle, water conservation, the status of water supplies, marine life, and the quality of drinking water.

#### *Is there something you would like to know about water - any special interest?*

10%	everything, learn more about it
7%	basic info: water cycle, molecular structure
7%	how to conserve water
6%	status of water, scarcity, future ramifications
5%	animal life in water, especially oceans
5%	quality of drinking water, distribution, where it comes from
4%	global warming, rising sea levels
4%	technology, hydropower, desalinization
3%	ocean phenomena, e.g., tsunamis, volcanoes
2%	how to stop polluting water
8%	other answers
43%	no, nothing [similar proportion among 'active' and 'sympathetic']

#### **Sample of answers**

*How dirty the water is, how scarce water is*  
*Future implications of dwindling water supplies*  
*Water in the future*  
*Conservation, global warming*  
*Ecological issues*  
*How to conserve water*  
*How to protect/care for water*  
*Environmentally, rising water level*  
*Everything*  
*Everything*  
*General curiosity about all things related to water*  
*Teaching ecology in school/teacher so to expand knowledge*  
*Deep sea stuff where no light gets through how we keep our water supply*  
*Learning about different types of animals*  
*What's in water, microscopic life*  
*General info.*  
*Molecules and water*  
*What else besides drinking, what else is water about*  
*Bottled water issues, transportation, etc.*  
*Population issues, safe water supply for people*  
*How petroleum oil formed at bottom of seas*

*Tsunami*

*Diversity of water*

*Hands on stuff, I am a scientist*

*How it helps us survive in life, how essential water is*

*The ways it moves, to see it in general*

*Desalinization*

*Energy and water*

*Hydrology, wells*

## **B. Perception of Interpretive Messages**

This section of the report looks at visitors' perceptions of the interpretive messages after seeing the exhibition. Also, what exhibits and types of information were most interesting to visitors? Some highlights of the findings are:

- The vast majority of visitors (85%) got some kind of conservation-related message from this exhibition, primarily about the importance of conserving water.
- Virtually all visitors recalled some specific messages from the exhibition. Some of the more frequently mentioned ideas include: how to save water, that only 1% of the earth's water is available as fresh water, and the global problems & comparisons.
- When asked what was most interesting, some people referred to specific exhibits or media (Science on a Sphere, interactives, animals, videos, fog entrance), while others referred to information that may have been surprising – the negative impact of dams, how little fresh water is available for use, global comparisons, and how much water is used for agriculture.

## B.1. Overall perceptions of interpretive themes

EXIT
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OVERVIEW: One interpretive theme stood out clearly to most visitors – 63% thought the main idea was conservation and how to save water. Most of the other answers also reflected the theme of conservation in different words: the importance of water to life, raising awareness about the fragility of water resources, sources of water pollution, and environmental problems in general.

### *Thinking about all of what you saw, what's the main idea?*

- ✓ 63% water conservation, how to save water
- ✓ 16% importance of water, precious resource
- 15% water, general education, how we use water
- ✓ 12% raise awareness about scarcity of water
- ✓ 4% environmental issues, problems
- ✓ 3% water pollution, how to protect supply
- 3% other answers
- 1% don't know, no answer

✓ Overall, 85% gave conservation-related answers.
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### Sample of answers

*Teaches kids about how much of an impact water has on entire planet/conservation*

*Conservation*

*Propaganda, green & good for young kids*

*Water, ecological issues*

*Aware of water*

*Not to waste water*

*Hard to say*

*Increase awareness of how we use the planet resources.*

*Water conservation; impact on planet, dependency*

*Conserving water*

*Water conservation*

*Conservation*

*Source utilization conservation, contamination/pollution*

*Concern about damage with pollution and possibility of world without water*

*Realizing we have to save water*

*To conserve water*

*How we are using up our water resources, urgency and need to make changes*

*Need to conserve water*

*About saving water/importance of water*

*Understanding water's place on earth and how humans impact and what we can do*

*Waste and conservation*

*Educational especially for children*

*Conserving water*

*Water, history, how we use it, more clean water*

*Filtration, rivers*

*Conserve water*  
*Importance of conservation and protection of water*  
*Role of water in nature and human life*  
*Saving water*  
*Safeguarding water supplies*  
*Saving water*  
*Try to save water*  
*Water and its relation to humans*  
*Conservation*  
*Preservation of water*  
*Water*  
*How water - hard to say, so many aspects - glaciers*  
*To save water for future*  
*A lot of things*  
*Understanding nature, history, conservation, future global trends, human interaction with water*  
*Multitude, uses and manifestations of water*  
*Different functions of water and the useful applications where it comes from phases of water*  
*Conservation of water*  
*Water conservation, waste water*  
*I don't know, unfortunately it's the end of the day and we are very tired*  
*Importance of water*  
*Conservation of water*  
*Awareness of water globally*  
*Conserving/valuing water*  
*Conservation*  
*Prevention*  
*Water conservation*  
*The conservation of water and future use*  
*Conservation of water*  
*Conservation of water, how much we waste*  
*Water*  
*Understanding and protecting fresh water resources*  
*Fragility of water as source of life, human consumption, warning and solutions*  
*That water is renewable but limited*  
*Preciousness of water*  
*Conserve water*  
*Conservation*  
*How precious water is as a resource*

## Interpretive themes (continued)

OVERVIEW: The most salient content was “how to conserve water,” followed by the information that less than 1% of the water on the planet is useable fresh water (SOS program) and that there are global inequalities in availability of fresh water.

### *What are the top 2 things that people are likely to find out from seeing this exhibit?*

32%	how to save water, personal impact
20%	how little fresh water is available, <1%
17%	global situations, inequalities, problems in other countries
12%	awareness of issues, scarcity, potential future problems
12%	importance of water, precious resource
5%	pollution, contamination issues
5%	impacts on wetlands, wildlife
4%	desalinization issues
4%	bottled water issues
4%	basic info: water cycle, forms of water
3%	negative impact of dams
2%	local NYC issues
1%	global warming issues, glaciers
6%	general positive – it was educational, entertaining
8%	other
6%	don't know, blank

### Sample of answers

*We're in a lot of trouble; we need to be doing what we can; we should be demanding of our political figures*

*Impact of humans on the world, explained in clear way; desalinization*

*Small % of fresh water; damage because of dams*

*Knowledge of actual amount of fresh water; desalinization is not an option*

*Water is disappearing, go to see the exhibit; how to save money*

*Importance of preserving water we have; understanding how scarce it is to so many other people*

*Conservation; three phases of water*

*How much water they go through a day; ways you can make changes to reduce footprint*

*Come to see how it's set up; good for kids*

*3% of drinkable water; most is in icebergs, Mono Lake*

*How scarce water is; importance of considering all environmental issues, holistic approach*

*They are likely to have a deeper level of concern; much greater appreciation for adaptations to need for wa*

*Scientific material in a way that's understandable, good visualization of topic with lots of numbers*

*Bottled water; conserving water; friends in CA, overuse of water there*

*How much work women in undeveloped areas do to transport water; why I bug my house guests to conserve*

*Water safety; preservation*

*How little water is fresh; 1/3 is accessible*

*The way water is used, ways to conserve it*

*Info on conserving water; info on water usage*

*How much water we have to save; some countries don't have too much water*

*To learn about water conservation, my sister wastes too much water*  
*How precious fresh water is; how every iota of life depends on it*  
*We're in bad shape*  
*Sewage system in NYC is much better than I thought, contamination; 1% fresh usable water*  
*Pollution in water; emphasis on conserving water, we take it for granted*  
*Amount, little fresh water available; desalinization not feasible because of cost*  
*Water comes in many forms, innovative ways to use it; interactive quiz at the end*  
*Conservation; world-wide water issues*  
*Global aspect of issues; scarcity of fresh water*  
*Effects of water on our life; how much we take water for granted*  
*Importance of water; easy to take for granted how easy it is to get clean water*  
*How to conserve water at home; why it is important to conserve water*  
*How precious a commodity our fresh water is not limitless; desalinization is so expensive; would like to have*  
*How much water we can use, 1%*  
*How water works; how to conserve water*  
*Cause and effect of our behavior; education system isn't doing enough in terms of these issues; should be in*  
*Scarcity of water; how we use water; why you can't filter out salt*  
*How to save water; how important it is for earth*  
*Bush administration has been suppressing the issue; so much that people don't know*  
*How to save water; invasive species problem*  
*Little bit of water in world; we waste a lot of water*  
*How vital water is; it will be a major problem - population growth.*  
*Global situation; limited supply*  
*How wasteful Americans are with water; preserving wetlands*  
*How they can save water; how to be more conscious of importance of water*  
*How to save water in your house; how different countries conserve water*  
*About how water conservation helps people, water and how it's used*  
*How much water they are wasting; how conservation can benefit them and globally*  
*How little fresh water we have; people in west - it is important to conserve water*  
*How to recycle water; how the earth's water is, fresh*  
*Pay attention to wasting water; places without water*  
*Try to save water; only 1% of water is usable*



**B.2. What was most interesting to people?**

EXIT

OVERVIEW: Visitors named an extensive variety of specific exhibits and informational content when asked what was most interesting. People enjoyed the mix of types of experiences: the interactives, animals, videos, and special effects (e.g., entrance fog screen). Science on a Sphere was also a highlight in this exhibit, and the message people got from it – how little fresh water there is on the planet – was a memorable piece of information. Other content of interest was about the negative impacts of dams, the global comparisons, and how much water is used in agriculture (e.g., to grow rice, make a t-shirt, etc.).

*Tell me two things that you thought were most interesting in this exhibit:*

Types of exhibitry:

20%	interactives, hands-on
15%	live and stuffed animals (polar bear, mudskippers), info about animals
11%	videos, film
8%	water wall, vapor cloud, fog screen at beginning
4%	photos, diagrams, visuals

Messages:

17%	impact of dams, info about Three Gorges Dam
15%	how little fresh water is available for use (<1%)
12%	global aspects, comparisons, inequalities
10%	how much water is used, especially for agriculture
7%	ways to conserve, solutions
5%	historical, religious, cultural use of water, how people transport water
4%	water cycle, groundwater
3%	local NY city information, epilogue, where our water comes from
3%	threats to water quality, pollution
2%	global warming effects, iceberg melt, coral

Specific exhibits or content:

19%	Science on a Sphere, globe video
5%	Mono Lake
4%	computer game, the quiz at end
4%	turbines in East River
3%	bottled water exhibit
3%	what's in a drop of water, cholera, microscope
2%	invasive species
2%	3 states of water
2%	desalinization
2%	3-D exercise, water level in Tucson
1%	A Single Drop (at beginning)
1%	rock canyon
3%	everything, how it was presented, well done
12%	other answers
4%	blank, nothing

**Sample of answers**

*Mono Lake thing; globe/world*  
*Facts and data; how people live in restricted water areas*  
*Dams, the number they build per day; mountain of plastic water bottles, CDs degrade slowly*  
*Comparison of water use by countries; sphere and comparison of salt/freshwater available*  
*Displays; videos, explanations of things*  
*Conservation; sacrifices of so many*  
*Percent of water that is usable of % all water; critical problem in so many places and its not clear what can*  
*Quiz is really helpful for everyone; basic knowledge about how water is hydrogen and oxygen; how people*  
*Effect it has on different ecosystems; waste of water*  
*Very little fresh water; all good ideas of what you can do around the house*  
*Distance people have to carry water in other countries; mud fish*  
*Single drop; different containers for water*  
*Well, drawing water; fog screen- kids liked*  
*Scarcity of water; things you can do to conserve; exhibits that show these things*  
*Mudskippers, movies*  
*Fishes; biggest river, tidal zones*  
*Videos; computers w/ info about where NY gets water*  
*Ways of using water, fog nets in Peru; Perth is desalinizing water from ocean, different cities and how they*  
*Entrance; globe points out areas where there is no water, the whole thing*  
*Comparison of water usage; stations relating to ecology of water*  
*Ocean, videos; ancient use of water (Mexican)*  
*Invasions of ecosystems; amount of damming in the world*  
*Amount of available fresh water; finding better ways of water transport*  
*Statistics on how little water there is; we went through quickly*  
*Hands on things; honestly it wasn't an interesting exhibit, too much reading for kids*  
*The way dams have created and destroyed environments, blue planet visual w/ amount of fresh water*  
*The globe (SOS); the pipes, different ways water is used, different countries*  
*Information about how animals adapt to water; daring taking social question of equity in presenting water*  
*Dam, sediment accumulation; globe video*  
*Dams info; educating people to live differently and every day life choices*  
*Blue planet; West Coast being introduced*  
*Films; personal connection with snake head*  
*Adaptation of the animals; models where you can touch*  
*Three Gorges dam in China; awareness of availability of water and global situation*  
*No, disappointed in whole thing*  
*House interactive quiz; globe video*  
*Mee Kong River; beginning of exhibit*  
*Globe Science on a Sphere; frozen, liquid, phases of water*  
*Quizzes on computer; animated globe*  
*Dams; water carriers*  
*Speed at which humans are building dams.*  
*Desalinization*  
*T-shirts take so much water*  
*Globe video; polar bear*  
*Projects at the end (local projects); infectious disease*

*How many cultures use water in different ways; for many cultures it is hard to get water  
Movie on planet; hands on things (scales, etc.)*

*Chemistry; diagrams are good showing, >1% visually, good*

*Information; learned a lot about water in other parts of world*

*Tap water vs. bottled water; conservation connection for aquatic life*

*Projection on earth <1% water; 3d image of Tucson under water - evolution*

*How little fresh water we have; realize how abundant we have when lots of world has shortage*

*Hands on, 3d glasses, live animals*

*Three phases of water (ice, gas, liquid); dam interactive*

*Documentary film; percent of water used in industry/agriculture*

## **C. Impact of Seeing the Exhibition**

Some potential impacts were assessed by comparing visitors' interest in and awareness of global water issues before vs. after seeing the exhibition. Others focused on to what extent are people coming away with a sense of urgency? Are they concerned and motivated to do more to save water? The key findings are:

- Visitors indicated that their interest in global water issues increased significantly as a result of seeing this exhibit (35% vs. 52% high interest; based on self-ratings of before vs. after by exiting visitors).
- The top two reactions selected by a majority of visitors were: 'realizing I could do more to help with water conservation' and 'more worried about the future.' People were able to cite some specific things that they could do to save water.
- There was no change in visitors' perceptions of which water issues are related to global warming when comparing the entrance vs. the exit samples. People think that polar bears, droughts and hurricanes are related to climate change, while they are less likely to see connections with barrier islands or the quality of drinking water.

### C.1. Interest in water issues after seeing the exhibit

EXIT

OVERVIEW: After seeing the exhibit, people indicated that their interest in global water issues had increased (from a modest 35% who rated themselves as having high interest ‘before’ to 52% who rated themselves as having high interest ‘after’). ‘Active’ environmental supporters rated their interest higher, both before and after, compared to the ‘sympathetic but not active’ people. Changes in ratings were most dramatic among the ‘sympathetic’. Interest was not related to any other demographic characteristics such as residence, gender or familiarity with the museum.

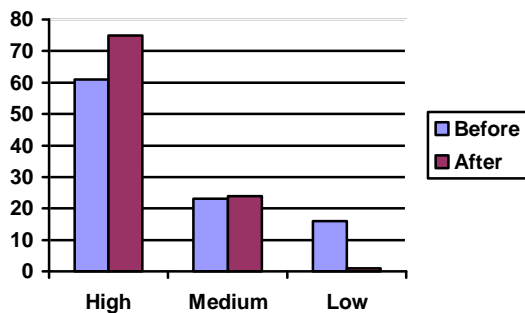
*How would you rate your interest in global water issues on a scale of 1 to 10?*

	<u>Before</u>		<u>After</u>
high (9,10)	35%	**	<b>52%</b>
moderate (7,8)	30%		36%
low (1-6)	35%		12%

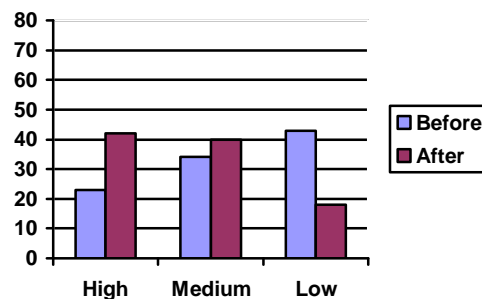
**Percent who changed their rating:**

no change, already high	30%
no change, medium/low	18%
increased by 1-2 points	35%
increased by 3+ points	16%

**Change in interest among ‘active’ environmental supporters**  
(34% of audience)



**Change in interest among ‘sympathetic’ but not active**  
(61% of audience)



## C.2. Possible Outcomes

EXIT
------

**OVERVIEW:** When visitors were given a list of seven potential reactions after seeing this exhibit, the two most selected were: ‘realizing I could do more to help with water conservation’ (72%) and ‘more worried about the future’ (65%). These findings suggest that people got the intended messages. There were no significant differences between people who consider themselves ‘active’ vs. ‘sympathetic’ toward environmental issues. It is interesting to see that even though half of the visitors said they are already doing some things to help with water conservation, they still realize there is more that can be done.

Follow-up questions (presented on the next three pages) show that among those who are already doing things to help, the most frequently mentioned actions are: not using bottled water, not leaving the water on when brushing teeth, taking shorter showers, and watering lawns and gardens less. These four ideas were also mentioned most often by those who realized they could do more to help.

People who said they felt hopeful about the future were asked to explain. They expressed optimism primarily because of the examples in the exhibit of things people can do to help (and the case studies of people already doing something), and because they believe people can be educated by exhibits such as this.

***Which phrases describe what you might be thinking about water a week from now?  
(pick up to 3 answers)***

	<u>Overall</u>	Attitude toward environment	
		<u>Active</u>	<u>Sympathetic</u>
Realizing I could do more to help with water conservation	72%	82%	70%
More worried about the future	65%	61%	68%
Realizing I already do things to help with water conservation	51%	59%	45%
I’ll remember that it’s all connected to global warming	48%	45%	49%
I’ll have a different understanding of life in developing countries	41%	41%	42%
Hopeful about the future	22%	23%	23%
There’s so much information, I might forget the details	18%	14%	21%

***In what sense do you realize you already do things to help with conservation?***

(Percents are based on the 43 people who were asked this follow-up question, not the whole sample)

28%	we do household things mentioned in exhibit (no specifics)
26%	we don't buy bottled water
21%	we don't leave water on when brushing teeth or shaving
19%	we take shorter showers
18%	we use gardening, lawn and landscaping techniques to save water
9%	we only run dishwasher with full loads
9%	we use low water toilets, flush less
7%	the exhibit gave me some more ideas of things I can do
5%	we have rain barrels to collect water
5%	we use low water shower heads
7%	other answers

**Sample of answers**

*We do most of what we saw in last area*

*All the toilet systems use only three liters*

*Shorter showers, conserve water*

*Fix leaks, use low water shower heads, use tap water not bottled*

*At home, dripping faucets, watering lawn*

*Don't buy bottled water; flushing toilet/using water/food*

*Household, don't water lawn, try to reduce dishwasher use, showers*

*I shut off water brushing teeth, take quick showers*

*Little things, run washers when load full; grass watering, no bottled water*

*In house I try to be careful with dishwasher, reusable water bottles*

*In house*

*And will do more now that I know how to trap rain water, bottled water*

*Don't drink bottled water, three minutes in shower*

*Conscious of the way I landscape my home, kitchen and bathroom*

*More aware of things I can do*

*Grew up conserving water*

*Take quick showers*

*Particular about how I landscape, no exotic plants*

*Brushing teeth, shavers*

*Low flow shower heads*

*Bottled water, household things*

*Try not to run water when I don't need it*

*In household, wash only full machines*

***In what sense do you realize you could do more to help with water conservation?***

(Percents are based on the 95 people who were asked this follow-up question, not the entire sample)

22%	I will try harder to be more conscious
17%	household things that were mentioned in exhibit (no specifics)
16%	don't buy bottled water, get reusable containers
13%	don't leave water on when brushing teeth or shaving
12%	take shorter showers
12%	gardening, lawn and landscaping ideas to save water
6%	rain barrels to collect water
5%	only run dishwasher with full loads
4%	use low water shower heads
2%	fix leaky faucets
2%	use low water toilets, flush less
14%	other answers
3%	blank, no answer

**Sample of answers**

*There are things I neglect and I will try to do better*

*To be more conscious*

*Not wasting so much*

*Saving it, keep it clean*

*Not running water at unnecessary times*

*I always realize but I don't do anything*

*Washing with dishwasher is better than sink; no pre-rinsing; no bottled water*

*Careful w/ bottled water, grow plants acclimated to less rainfall, vote*

*Be more conscious during daily chores*

*We try already to do a lot, buy low flow shower head, water bottles*

*Rain water barrels*

*I should be more earth friendly, use less*

*Basic things, low flow toilets, shower heads, lawns*

*Creating awareness*

*Use it wisely*

*Every day things, brushing teeth, rain barrels*

*Run the water when I do dishes - I could stop that, etc.*

*Buying less bottled water etc. Showers*

*Make sure kids turn off faucet*

*Landscaping*

*No drinking bottled water everyday*



***In what sense are you hopeful about the future?***

(Percents are based on the 54 people who were asked this follow-up question, not the entire sample)

43%	there are things we can do, people are conserving
31%	people are becoming more aware, educating people
9%	we have the technology and the science to solve problems
6%	we have plenty of water, we won't run out
6%	we can band together, political change can happen
13%	other answers ("I'm just an optimist")

**Sample of answers**

*I'm an optimist, no problems humans can't solve with conservation technology*

*People start to realize that we can't waste it*

*People will do things better for the environment.*

*Drinking water, moving to desalinization, waste water treatment*

*That there is water left for us*

*It seems there are ways we can make changes*

*Household use*

*There are projects people are doing to make a difference*

*We are starting to do things to reduce our impact*

*I think more people come in contact with explanations*

*A lot of knowledge about things that can be done to change get together*

*That we're trying to educate on conservation*

*Because my job will make clean drinking water*

*Awareness*

*More possible strategies, more of human face to the issue of water*

*That people will become more knowledgeable*

*To get government globally interested*

*There are processes they have and there is understanding and political*

*Future generations and ours*

*We have scientists working on these things*

*That this will educate people and raise awareness*

*I think we're finding out what we can do about it*

*Hopefully people will get the message*

*There is enough water for me*

*There are a few things I didn't know were being done that are being done*

*Don't think we'll run out of water anytime soon*

*Wetlands work going on to help, just this exhibit shows increase in sensitivity*

### C.3. Changes in awareness of water issues related to global warming

<b>ENTRANCE vs. EXIT</b>
--------------------------

OVERVIEW: The three issues that people were most likely to perceive as related to global warming prior to seeing the Water exhibition were polar bears, droughts in Africa, and hurricanes. After seeing the exhibit, visitors' perceptions were about the same, with the exception of an increase for 'household water use.'

*Which of these are clearly related to global warming and climate change? (pick 3-4)*

	<u>Entrance</u>		<u>Exit</u>
polar bears	63%		60%
droughts in Africa	55%		57%
hurricanes	51%		46%
water cycle (evaporation, condensation, etc.)	38%		36%
coral reefs	38%		44%
water supply for cities, reservoirs	32%		32%
household water use	26%	**	36% ↑
barrier islands	22%		21%
the quality of drinking water	19%		24%

#### Analyzed by environmental orientation:

	<u>Active</u>		<u>Sympathetic</u>	
	<u>Ent.</u>	<u>Exit</u>	<u>Ent.</u>	<u>Exit</u>
polar bears	67%	65%	65%	60%
droughts in Africa	52%	++ 65%	62%	55%
hurricanes	44%	49%	<b>62%</b>	** 44% ↓
water cycle (evaporation, condensation, etc.)	42%	36%	35%	35%
coral reefs	44%	51%	37%	44%
water supply for cities, reservoirs	30%	36%	39%	30%
household water use	30%	31%	25%	** <b>39%</b> ↑
barrier islands	23%	30%	23%	17%
the quality of drinking water	19%	17%	21%	26%

#### Reminder of notations about statistical significance:

\*\* = statistically significant differences ( $p < .05$ ) between columns of figures.

++ = patterns of differences which are not quite statistically significant ( $p < .10$ ).

## **D. Perceptions of Climate Change**

In addition to evaluating *Water*, this study sought to inform the development of educational programs for the upcoming exhibition about climate change. Some information was collected about the extent of visitors' concern about climate change, their interest in coming to the new exhibition, and their interest in several topics and educational programs that could be associated with this exhibition.

Highlights of the results are:

- Visitors expressed moderately strong interest in coming to an exhibition about climate change. The ratings were the same whether they were interviewed before or after seeing the *Water* exhibition.
- Half of the visitors leaving the exhibit rated their concern about global warming & climate change as 'high' while 20% indicated that they were not very concerned.
- Visitors expressed more interest in finding out how to reduce global warming than in learning about impacts or causes of climate change. The least important theme was 'whether climate change is real or not' (22% want to know this).
- The proposed educational programs elicited varying degrees of interest among different audience segments. The top three ideas were: online information, family-friendly conservation programs, and debates on resource management issues.

**D.1. Interest in seeing an exhibit about climate change**

**ENTRANCE vs. EXIT**

OVERVIEW: Visitors expressed moderately strong interest in coming to see an exhibit about global warming – nearly half indicated they were very likely to come (a ‘9’ or ‘10’ rating). Their interest did not change as a result of seeing the Water exhibit (similar ratings among visitors entering and exiting the exhibit). Those who are ‘active’ environmental supporters expressed higher interest than ‘sympathetic but not active’ visitors. Also, repeat visitors gave higher ratings than first-time visitors (but residence was not a factor). There were no differences by age or gender.

*(if you were in NY) If there were a new exhibit specifically about climate change and global warming, how likely is it that you would come see it? on a scale of 1 to 10)*

	<u>Entrance</u>	<u>Exit</u>
highly likely (9,10)	48%	46%
moderately likely (7,8)	25%	27%
not very likely (1-6)	27%	27%

**Who has ‘high’ interest? (EXIT)**

- \*\* 62% of ‘active’ environmental supporters (63% at Entrance)
- 41% of ‘sympathetic but not active’ (37% at Entrance)
  
- \*\* 52% of repeat visitors
- 38% of first-time visitors

## D.2. Degree of concern about climate change

OVERVIEW: Visitors expressed moderately high concern about global warming – 50% indicated very high concern, while 20% are not very concerned. The ‘active’ environmental supporters are significantly more concerned than ‘sympathetic but not active’ visitors. There were no significant differences between men and women, or between people of different ages or residences.

*On a scale of 1 to 10, how concerned are you about global warming and climate change?*

	<u>Overall</u>		<u>Active</u>	<u>Sympathetic</u>
high (9-10)	50%		74%	** 41%
medium (7-8)	30%		17%	36%
low (1-6)	20%		9%	23%

### D.3. What do people want to know about climate change?

OVERVIEW: Visitors are more interested in finding out how to reduce global warming than they are in the causes or effects on ecosystems. Given a list of seven topics, the top two that people want to know about are ‘alternative energy sources & future technology’ and ‘recommendations of what we can do to reduce our impact.’ Only 22% want to know ‘whether climate change is real or not,’ suggesting that most people have accepted it as fact, but there is a segment of the audience who aren’t sure. There were no significant differences by age, gender, residence, or familiarity with the museum.

*Is there something that you would like to know about climate change, perhaps something on this list, or something else that’s on your mind?*

Alternative energy sources & future technology	62%
Recommendations of what we can do to reduce our impact	54%
How humans are likely to adapt to climate change	45%
What are the biggest human impacts on climate?	44%
How climate change is already affecting ecosystems & animals	33%
What’s causing climate change?	25%
Whether climate change is real or not	22%
something else	6%

<b><u>Analyzed by Environmental Orientation:</u></b>	<b><u>Active</u></b>		<b><u>Sympathetic</u></b>
Alternative energy sources & future technology	71%	**	58%
Recommendations of what we can do to reduce our impact	67%	**	47%
How humans are likely to adapt to climate change	45%		45%
What are the biggest human impacts on climate?	47%		44%
How climate change is already affecting ecosystems & animals	36%		33%
What’s causing climate change?	29%		22%
Whether climate change is real or not	17%		24%

### D.4. Interest in programs related to the climate change exhibition

OVERVIEW: There is likely to be some audience for all of the educational programs that could be offered in conjunction with a climate change exhibit. People expressed the most interest in two of the eight suggested programs– online information and family-friendly conservation programs. Some people are interested in debates or evening lectures. ‘Active’ environmental supporters expressed higher interest in three of the ideas, compared to ‘sympathetic but not active’ visitors – family conservation programs, organizations to join, and books. There were also some differences among first-time vs. repeat visitors, men vs. women, and local vs. non-local residents (analyses on the next page).

*Would you be interested in any of these that the museum might create in conjunction with a climate change exhibit?*

Online information from the exhibit’s web site	49%
Family-friendly hands-on conservation programs	44%
Debates on solutions & resource management issues	38%
Evening lectures & presentations by scientists & authors	30%
Podcasts from the exhibit	21%
Advocacy organizations I could join or contribute to	20%
Dance or music performances about climate change	19%
Finding out about books that I could buy about climate change	15%

<u>Analyzed by Environmental Orientation:</u>	<u>Active</u>		<u>Sympathetic</u>
Online information from the exhibit’s web site	49%		51%
Family-friendly hands-on conservation programs	50%	++	40%
Debates on solutions & resource management issues	44%		36%
Evening lectures & presentations by scientists & authors	36%		27%
Podcasts from the exhibit	26%		19%
Advocacy organizations I could join or contribute to	30%	**	15%
Dance or music performances about climate change	16%		19%
Finding out about books that I could by about climate change	21%	++	13%

<< additional analyses on the next page >>

**Who is most interested in ONLINE INFORMATION?**

- \*\* 56% of first-time visitors
- 44% of repeat visitors

**Who is most interested in FAMILY CONSERVATION PROGRAMS?**

- \*\* 49% of repeat visitors
- 36% of first-time visitors
  
- \*\* 54% of NYC residents
- 59% of other NY, NJ, CT residents
- 40% of other US residents
- 29% of foreign visitors
  
- \*\* 49% of women
- 38% of men

**Who is most interested in DEBATES ON SOLUTIONS?**

- \*\* 44% of repeat visitors
- 30% of first-time visitors
  
- \*\* 48% of men
- 32% of women

**Who is most interested in BOOKS?**

- \*\* 19% of repeat visitors
- 9% of first-time visitors

**Who is most interested in ORGANIZATIONS TO JOIN?**

- \*\* 24% of repeat visitors
- 13% of first-time visitors
  
- \*\* 29% of NYC residents
- 24% of other NY, NJ, CT residents
- 18% of other US residents
- 11% of foreign visitors

**Who is most interested in DANCE/MUSIC PERFORMANCES?**

- \*\* 26% of women
- 11% of men



## **E. Characteristics of the Samples**

Both samples (Entrance, Exit) were demographically similar, and included a good variety of types of people: first-time visitors and repeat visitors, locals and tourists, men and women, and people of all ages. It is not known how well they represent the Museum's general public audience. It is possible that families with children are under-represented due to interviewing primarily on weekdays; however, there were still sufficient numbers of family groups to provide a reliable analysis.

## Characteristics of the Samples

OVERVIEW: The main exit sample consisted of somewhat more repeat visitors to the museum (60% repeat; 40% first-time) and yet also more tourists (57%). Only one-third of the groups included children (probably not representative, may be due to a lack of weekend interviewing, or perhaps to the appeal of this exhibition). The proportion of men and women was fairly equal. The age distribution was very even – all age groups were well represented.

The Entrance and Exit samples were similar, demographically. One notable difference between the two samples was on the visitors' orientation toward environmental issues. More people said they were 'active' going into the exhibit than did on the way out (43% vs. 34%). It's possible that seeing the exhibit made people feel that they weren't as 'active' as they could be. (The proportion of visitors who rated themselves as 'active' is substantially higher than we have seen in previous studies at aquariums and zoos).

	<u>Entrance</u> (n=152)		<u>Exit</u> (n=316)
<u>Seen Water exhibit before:</u>			
yes	7% <sup>2</sup>		n/a
no	93%		
<u>Familiarity with AMNH:</u>			
first-time visitor	40%		40%
repeat visitor	60%		60%
<u>Residence:</u>			
NY city	33%		28%
other NY, CT, NJ	18%		15%
other US	29%		33%
other countries	20%		24%
<u>Group composition:</u>			
adults-only	74%		68%
families with children	26%		32%
<u>Gender:</u>			
male	37%	++	46%
female	63%		54%
<u>Age:</u>			
20's	18%		20%
30's	25%		20%
40's	21%		18%
50's	22%		19%
60+	14%		23%

<sup>2</sup> This figure comes from the original Entrance sample of 167 people; those who had already seen the exhibit were omitted from all additional analyses resulting in a sample of 152.

	<u>Entrance</u> (n=152)	**	<u>Exit</u> (n=316)
<u>Attitude toward environment:</u>			
very interested & active	43%		34%
sympathetic but not active	48%		61%
somewhat or not interested	9%		5%
 <u>Belong to environmental organizations:</u>			
no	n/a		49%
yes, 1 or 2			36%
yes, 3 or more			15%
 <u>Day type:</u>			
weekdays	77%		80%
weekends	23%		20%