The background is a dark blue, semi-transparent image of an aquarium tank. It features a variety of fish, including a large shark on the right side, and some rocky structures at the bottom. The overall scene is dimly lit, creating a deep blue and black color palette.

Conveying Conservation Threats & Cultivating Personal Agency in the New York Aquarium's *Ocean Wonders: Sharks!*

Sarah Hezel, Sarah Edmunds

Fig. 1. The New York Aquarium's *Ocean Wonders: Sharks!* exhibition bridges the aquarium's Brooklyn campus and Coney Island's iconic boardwalk beside the ocean.



The New York Aquarium's most recent permanent addition and most ambitious project to date, *Ocean Wonders: Sharks!*, opened to the public in June 2018.

Bridging the aquarium's Brooklyn campus and Coney Island's iconic boardwalk beside the ocean, the building houses an immersive, interactive, 57,500-square-foot exhibition, 800,000 gallons of water, and more than 100 species of marine animals including sharks, rays, other fish, sea turtles, and marine invertebrates (fig. 1).

The project was designed to be transformational for the New York Aquarium on multiple levels: increasing reach and impact in the community, engaging and influencing visitors to see themselves as ocean stewards, increasing awareness of critical conservation issues, and expanding the aquarium's capacity to care for collections. The resulting exhibition is a physical embodiment of our mission at the

Wildlife Conservation Society (the aquarium's parent organization) to save wildlife and wild places by inspiring people to value nature, and our commitment to stop the global decline of sharks and rays and to reconnect New Yorkers to the ocean and its inhabitants.

The public trusts zoos and aquariums, and our audiences are counting on us to give them honest and useful information about what they can do to help wildlife and the ocean.¹

1 Colleen Dilenschneider, "People Trust Museums More Than Newspapers. Here is Why That Matters Right Now (DATA)," *Know Your Own Bone*, April 26, 2017, www.colleendilenc.com/2017/04/26/people-trust-museums-more-than-newspapers-here-is-why-that-matters-right-now-data/; Douglas Meyer, Alyssa Isakower, and Bill Mott, *An Ocean of Opportunities: Inspiring Visitors and Advancing Conservation, The Ocean Project* (January 2015). You can find this summary report at <http://theoceanproject.org/wp-content/uploads/2016/07/OceanofOpportunities-SummaryReport2015.pdf>.

As professionals in zoos and aquariums, we have a responsibility to encourage eco-friendly behaviors and to foster future generations of conservationists. In creating *Ocean Wonders: Sharks!*, we took to heart words of caution from author and environmental educator David Sobel, who warns against instilling “ecophobia” – the fear of ecological problems or dissociation from the natural world that can occur when people, especially children, are confronted with too much of the devastating reality about the state of the environment.² Sobel has coached us to instead cultivate “ecophilia,” our biological tendency to bond with the natural world. In *Ocean Wonders: Sharks!* the exhibition development team has sought to create spaces of deep immersion for visitors that cultivate ecophilia or biophilia, the innately emotional affiliation of human beings to other living organisms,³ and spark wonder and appreciation for the ocean and its inhabitants. We have also designed the exhibition to highlight local wildlife to foster a sense of ownership and stewardship among New York visitors who have largely lost their connection to the ocean wilderness in their own “backyard.”

Our findings – that visitors want and expect productive information about what they can do to help the environment – align with Sobel’s understanding of environmental behavior. He writes: “a sense of agency and control leads to the knowledge of issues and action strategies, which lead to an intention to act, which under the right precipitating conditions, leads to environmental behavior.” In *Ocean Wonders: Sharks!* we’ve created spaces and opportunities for visitors to embrace a sense of personal agency and learn about specific actions that they can take in their everyday lives to support

2 David Sobel, *Beyond Ecophobia: Reclaiming the Heart in Nature Education* (Great Barrington: The Orion Society, 1996), 6.

3 Edward Osborne Wilson, “Biophilia and the Conservation Ethic,” in Stephen R. Kellert and Edward O. Wilson, eds., *The Biophilia Hypothesis* (Washington, DC: Island Press, 1993), 31.

Our front-end evaluations...revealed that nearly 50 percent of respondents were unaware of conservation issues affecting sharks.

ocean conservation. Our summative evaluation has demonstrated that visitors to the exhibition learned about the need for ocean conservation and that their personal choices affect the ocean; that they came to see sharks as vulnerable, not as voracious predators; that the ocean health issues described in the exhibition – plastic pollution, overfishing, finning, and bycatch – were personally relevant to audiences; and that visitors left the exhibition intending to take action to reduce these threats by reducing their own consumption of unsustainable seafood and single-use plastics.⁴

At the project’s outset, the design team faced troubling findings pertaining to the exhibition’s “stars” and subject matter: sharks, as well as the aquarium’s primary audience – New Yorkers. Wildlife conservationists were reporting devastating losses to shark species globally, largely due to a market-driven practice called finning, in which sharks are harvested, their fins are cut off, and the sharks (often still living) are dumped back into the ocean – unable to swim and doomed to die.⁵ In addition to being overharvested for their parts, sharks and

4 Su-Jen Roberts and Shelley Rank, *Ocean Wonders: Sharks Summative Evaluation Report* (prepared for the Wildlife Conservation Society, March 2019).

5 Susie Watts, *Shark Finning: Unrecorded Wastage on a Global Scale* (San Francisco: WildAid, 2003), 3.

their relatives, rays and skates, are often caught and killed as “bycatch” from indiscriminate, large-scale fishing practices targeting other species.⁶ These losses are inextricably linked to the health of the ocean and to human well-being because sharks, as top predators, keep entire ecosystems in balance. Removing them can cause some populations of fish to multiply while decimating others, collapsing delicate ecosystems, such as coral reefs, and impacting human livelihoods dependent on commercial fishing and ecotourism.⁷

Meanwhile, in New York City – surrounded by the ocean with unique and little-known marine habitats just off shore – residents’ identities are more distantly connected to the ocean than ever. New York is seen as a center for finance, for fashion, for entertainment, but has largely lost popular recognition as a place connected to the ocean. Furthermore, our front-end evaluations – during which visitors to the New York Aquarium, Bronx Zoo, and Brooklyn Children’s Museum were interviewed about their perceptions of sharks and their awareness of and interest in environmental issues – revealed that nearly 50 percent of respondents were unaware of conservation issues affecting sharks. Specific issues such as finning and bycatch were mentioned by a few visitors, but were unfamiliar to the vast majority.⁸ When questioned about the role that zoos and aquariums play, respondents felt strongly that

their responsibility is to educate the public and raise awareness about conservation issues.⁹

Driven by our mission and insights from visitors, as well as from the fields of environmental education and zoos and aquariums, in 2007 the design team began a process of interpretive development, design, construction, and evaluation that would span a decade.¹⁰

On the Use of Disturbing Images of Ecological Destruction in Conservation Messaging

Very little has been published about the use and impact of images depicting ecologically destructive and disturbing practices in conveying environmental issues in exhibitions. Of existing research, the conclusions vary. One study, conducted by Zoo Atlanta, found no difference between the effect of “disturbing” images or “benign” images on the retention of information about the conservation issue.¹¹ In another study (conducted not in a zoo context but for graduate research at the University of the Witwatersrand, Johannesburg, South Africa), photographs with “shock value” – including a poached elephant, a poached

6 Sara Bonanomi, Jure Brčić, Alessandro Colombelli, Emilio Notti, Jacopo Pulcinella, and Antonello Sala, “Fisheries Bycatch of Chondrichthyes,” in *Chondrichthyes - Multidisciplinary Approach* (IntechOpen: December 2017), <https://doi.org/10.5772/intechopen.69334>.

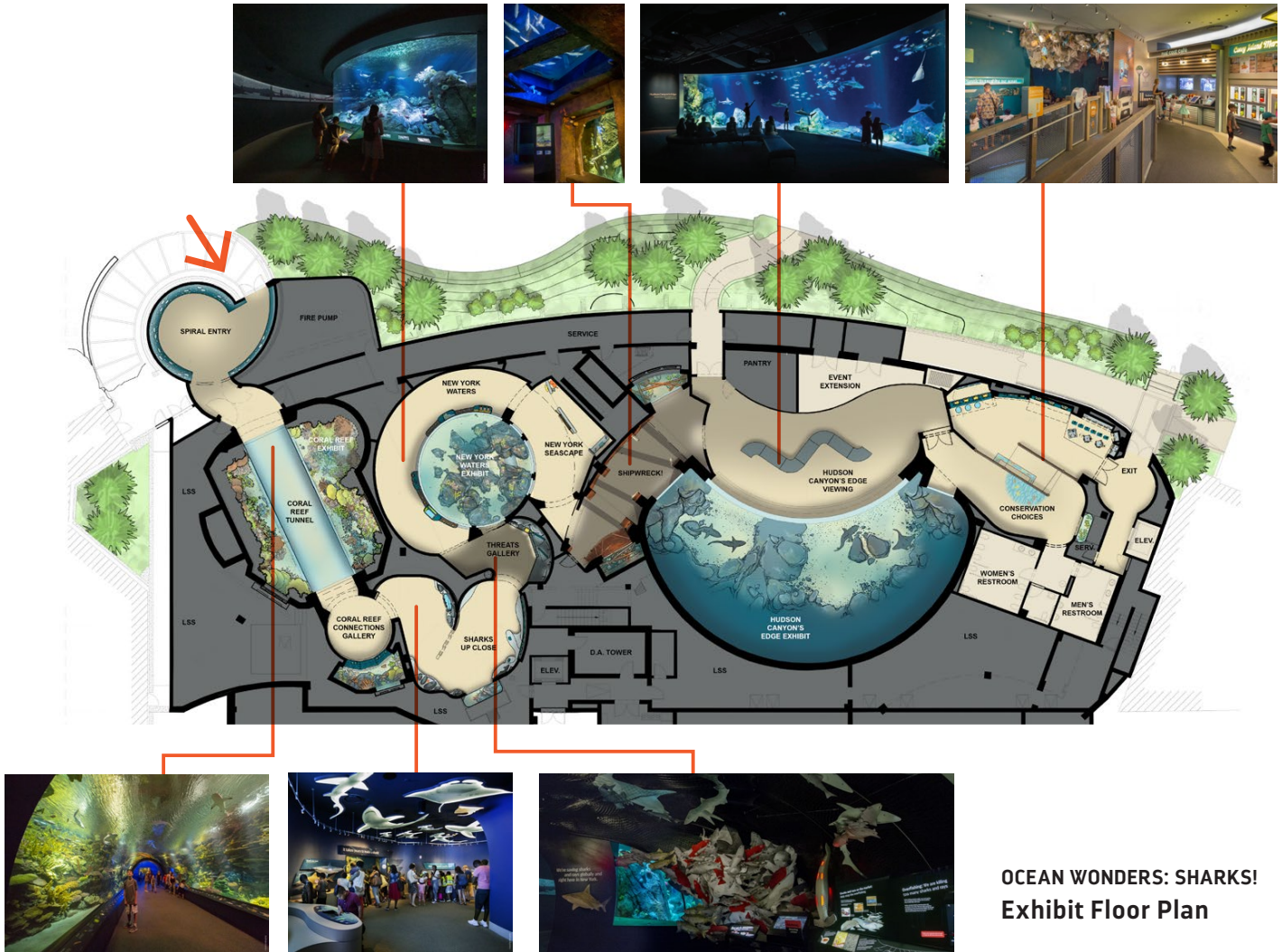
7 Jonathan L. W. Ruppert, Michael J. Travers, Luke L. Smith, Marie-Josée Fortin, Mark G. Meekan, *Caught in the Middle: Combined Impacts of Shark Removal and Coral Loss on the Fish Communities of Coral Reefs* (2013), <https://doi.org/10.1371/journal.pone.0074648>.

8 Amy Perron, John Fraser, A. Taylor, S. Yalowitz, and H. Petri, *A Study of the Relationship Between Value-based Environmental Concerns and Public Attitudes Towards Sharks: A Front-End Evaluation* (prepared for the Wildlife Conservation Society, May 2007).

9 Ellen Giusti, *Front-end Study: Audience Perception of Oceans and Sharks* (prepared for the Wildlife Conservation Society, November 2009).

10 The *Ocean Wonders: Sharks!* design team was led by Susan A. Chin, WCS Vice President of Planning and Design & Chief Architect; the building and the exhibit were designed in a collaborative effort between the Wildlife Conservation Society’s Exhibition and Graphic Arts Department, *Exhibit Design, Graphic Design and Interpretation*; Edelman Sultan Knox Wood, *Architect of Record*; The Portico Group, *Architects*; Ned Kahn, *Shimmer wall artist*; Doyle Partners, *Graphic Design for Exterior Signage*; MLA Engineering, *Structural Engineering*; K & L Consulting Engineers, *MEP Engineers*; Viridian Energy & Environmental, LLC, *LEED Consultant*; Leonard J. Strandberg and Associates, *Civil Engineering*; Focus Lighting Inc., *Lighting (Base building and Exhibit lighting)*; TJP Engineering - *Life Support Systems Engineering*; Chocklog Productions, *Media Producer*; Unified Field, *Media Integrators*; Jonathan Woodward Studio, Ned Drummond, Sarah Knotz, *Illustrators*; Michael Rigsby, *Writer*.

11 T. S. Stoinski, M. T. Allen, M. A. Bloomsmith, D. L. Forthman, and T. L. Maple, “Educating Zoo Visitors about Complex Environmental Issues: Should We Do It and How,” *Curator* 45, no. 2 (2002): 137.



**OCEAN WONDERS: SHARKS!
Exhibit Floor Plan**

Fig. 2. The challenging content about threats to sharks and oceans is strategically placed within the exhibition’s narrative and experiential arc.

gorilla, and a turtle entangled in fishing net – were seen as having the most success in “[creating] awareness around the subject and [promoting] the intervention for the protection thereof.”¹² A study at Chester Zoo in Upton-by-Chester, England concluded, in spite of some objections by visitors and staff to the display of disturbing images in their *Hard Rain* exhibition about human-made environmental crises, “that it is possible for Chester Zoo and perhaps all zoos to deliver a challenging environmental educational agenda.”¹³

12 Prelena Soma Owen, “Conservation Photography: Evaluating the Impact of Photographic Images in Conveying Conservation Related Messages” (M.S. diss., University of the Witwatersrand, 2018).
 13 Maggie Esson and Andrew Moss, “The Risk of Delivering Disturbing Messages to Zoo Family Audiences,” *The Journal of Environmental Education*, 44:2 (2013): 91.

Ultimately, the authors of the Chester Zoo study encouraged zoos to influence the way visitors *feel* as well as what they *know*, and suggested that an appropriate next step for the zoo would be developing “take home messages that relate specifically to attitudinal and behavior change.”¹⁴

The few studies that have examined visitor response to such images in zoo contexts have been devoted to exhibitions composed solely of static photography and text panels.¹⁵ While these studies surfaced questions about the efficacy, responsibility, and comfort level of

14 Esson, Moss “The Risk of Delivering,” 91.
 15 T. S. Stoinski et al., “Educating Zoo Visitors,” 137; Esson, Moss, “The Risk of Delivering,” 91; Owen “Conservation Photography.”

various zoos in displaying upsetting content, none of the studies reflects an analysis of the content within a more robust exhibition setting that includes views of animals, immersive naturalistic design, and physical and digital engagement tactics – in other words, the interpretive approaches that reflect current experiences in many zoo, aquarium, and museum exhibitions.

The “Threats Gallery”: Presenting Challenging Content within a Larger Narrative Experience

In *Ocean Wonders: Sharks!*, our design team approached the topics of finning and destructive fishing practices by presenting them in a powerful but brief exhibit, the “Threats Gallery,” strategically positioned within the choreography and narrative of the entire exhibition experience (fig. 2). Rather than leading with this dire content and in turn potentially instilling ecophobia in our visitors, we sought to first provide visitors

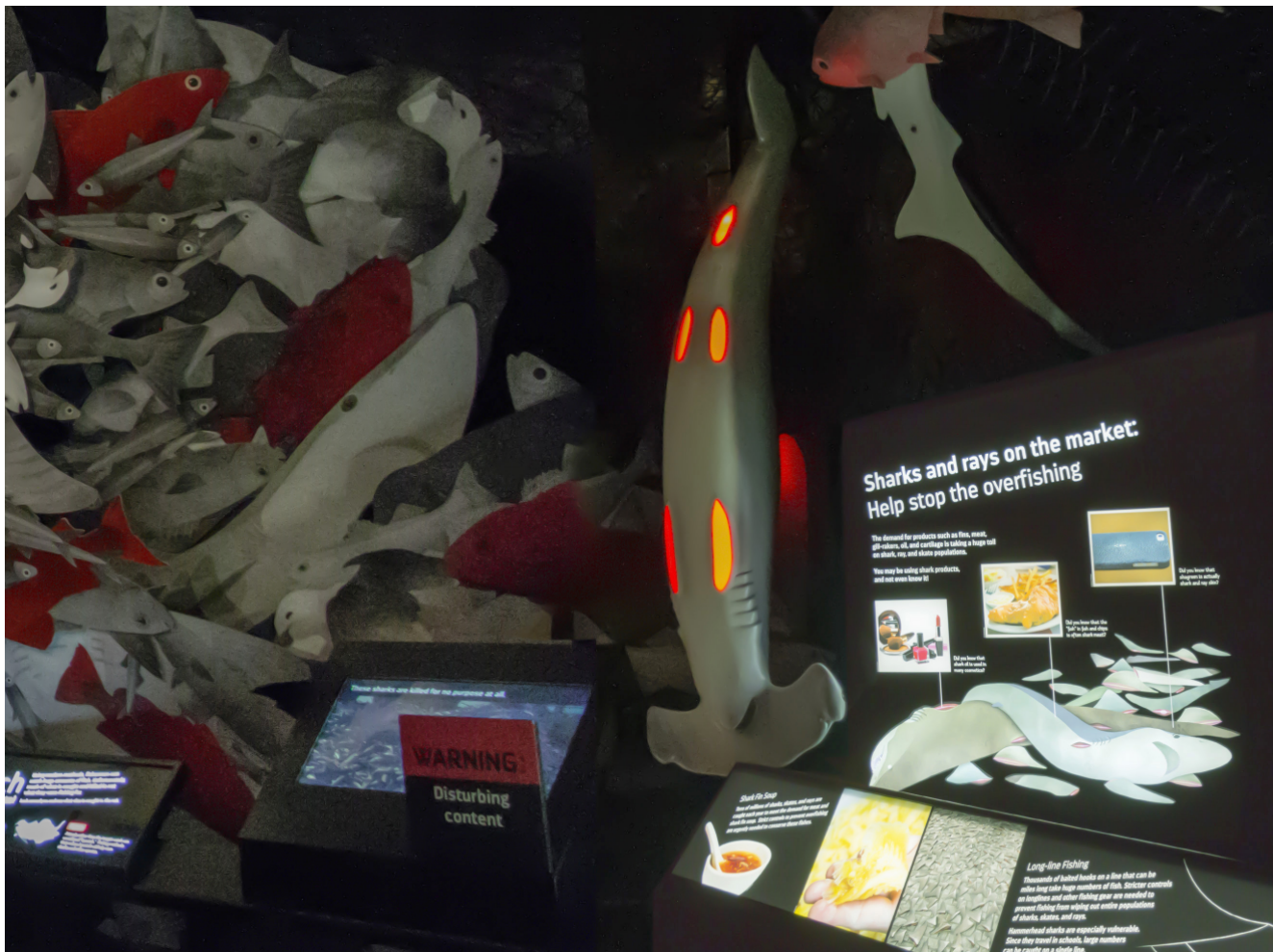
with opportunities for deep appreciation and empathy for sharks. Upon entry into the exhibition, visitors are immediately immersed in a beautiful, rich coral reef ecosystem, the “Coral Reef Tunnel,” with sharks and dozens of other colorful species swimming overhead and all around them. The beauty of the coral reef and the jewel-like quality of its diverse wildlife help visitors to forge an emotional bond with the animals and see the interconnectivity of reef ecosystems, of which sharks are a crucial part. In the subsequent gallery, “Sharks Up Close,” we invite visitors to take a closer look at what makes a shark a shark – such as shark physiology, behavior, and diversity – through an array of tactics including live animals, video, interactive media, mechanical interactives, and compelling graphics. Here, we deliver important information about sharks’ reproduction methods and slow growth rate, allowing visitors to see sharks as vulnerable and particularly susceptible to overfishing (fig. 3).

Fig. 3. In “Sharks Up Close,” visitors explore the diversity and biology of sharks and learn about their vulnerability to human activity.





DAVID SUNDERBERG/ESTO



KIMIO HONDA © WCS

Fig. 4. The “Threats Gallery” is a small, compressed, darker space. The quality of the space supports the story of human practices such as bycatch and finning that are devastating shark and ray species.

Fig. 5. In our “Threats Gallery,” the monitor with the most troubling content depicting shark finning is set back with a baffle and warning. Visitors for whom the content is too challenging or disturbing can choose to bypass directly to the left for a story of discovery about species flourishing in local waters.

Only after visitors have had opportunities for deep appreciation and empathy for sharks do they encounter the solemn “Threats Gallery.” Here, we made the distressing content about finning and bycatch more visceral and memorable with a dark and compressed physical space that evokes being caught in a net in the ocean alongside fish and sharks (fig. 4). To deliver content in the dim lighting, we used backlit graphics and monitors. Weighing our team’s responsibility to present accurately the very real threats harming shark species with research from the fields of conservation psychology and environmental education, the design team was careful not to make this experience overwhelming. To balance the experience and content, we used illustration in places rather than photography, and we used a baffle and warning to allow visitors to choose whether or not to view the most disturbing content: a screen showing footage of shark finning (fig. 5) obtained from stock media agencies. Formative evaluation with a test sample of visitors (which we describe later in this article) informed these decisions.

But there is hope – as guests step out of the “Threats Gallery” and into the “New York Waters” exhibit, they are met with a beautiful and dramatic view of the ocean floor teeming with active marine life surrounded by a mural of the New York skyline. Interactive experiences show what aquarium scientists are doing to study and help protect the sharks in New York waters. After passing through a shipwreck exhibit, visitors then move into the exhibition’s most expansive space: the “Hudson Canyon’s Edge.” With an enormous view into the dark, quiet ocean with large sharks, rays, sea turtles, and schools of fish swimming

in and out of shafts of light, this space offers guests an opportunity to slow down and have a more introspective moment; to be absorbed by the view and to process and catalyze all the experiences leading up to this gallery; to form deep appreciation for the marine life and marine environment that exists right outside in the waters around New York City (fig. 6, p. 101).

Guests then leave the dark, quiet ocean floor for the bright, busy New York streets in the “Conservation Choices” gallery, a highly interactive space with a background that mimics our local cityscape, emphasizing the city’s connection to the ocean. But as guests pass from one gallery to the next, they walk under a pile of plastic debris “floating” overhead, simulating one of the giant garbage patches currently floating in the ocean, known as global trash gyres. Here visitors see the consequences of our lives dependent on plastic and learn about the global scale of the problem. Three interactive screens show an animated sequence about the impact of plastics on the ocean, and provide opportunities to pledge to use reusable bags, to properly dispose of trash, and to refuse single-use plastics. Each station displays the cumulative count of how many people have pledged that day and in the last year. Nearby, a “Real Cost Café” interactive, developed by the Monterey Bay Aquarium, shows visitors how to order sustainable seafood, and a “Coney Island Market” exhibit – representing one of New York City’s ubiquitous bodegas – shows visitors how to be ocean-conscious consumers for everyday items from produce and soap to lightbulbs. Keeping in mind Sobel’s understanding of the importance of agency and control in preceding conservation behavior, we deliberately

Fig. 6. The 387,000-gallon “Hudson Canyon’s Edge” tank is an awe-inspiring centerpiece that connects visitors to local waters. It replicates the edge of the Hudson Canyon, an underwater expanse off New York’s coast that is as deep as the Grand Canyon and home to 26 species of sharks.

planned to end the exhibition with a positive, fun, uplifting experience that informs and empowers visitors with solutions and to show the cumulative positive impact of small individual actions.

Insights from Formative and Summative Evaluation

During design development of *Ocean Wonders: Sharks!*, we conducted iterative formative evaluation, in which we prototyped numerous interactives to gather feedback on the inclusion of disturbing footage of finning and the impact of coupling messaging about threats with conservation actions, on the interactives’ usability and engagement, and on visitor comprehension.¹⁶ Prototyping showed that the video depicting shark finning, which featured the most disturbing content, was emotionally powerful for visitors and that they did not object to it being included. However, they did recommend including a warning for those who may find the content disturbing, which we included in the final design of the “Threats Gallery.” Observational and interview data showed high engagement and confirmed a preference for learning from screens over text in static graphics. Regarding the balance of messaging on threats and visitor conservation actions, several groups mentioned that they specifically liked the messaging that offered conservation actions they can practice in their daily lives, such as avoiding products made with shark and shark fin, to help with this global decline in sharks and rays. This provided

a positive take-home message in the face of an emotionally disturbing issue.

Our summative evaluation combined qualitative and quantitative data.¹⁷ We conducted interviews with 101 visitors to the exhibition at the exit of the experience, as well as timing and tracking observations of 105 visitors to understand time spent and behavior in the exhibition. Additionally, we administered four surveys: one online baseline survey to 541 New York Metropolitan residents, one on-site survey to 532 aquarium visitors before they visited the exhibition, one on-site survey to 533 aquarium visitors immediately following their visit to the exhibition, and one online survey to 55 aquarium visitors two weeks to three months following their visit to the exhibition. Because our design approach is based in a consideration of the affective or emotional experience, the cognitive experience, and personal relevance, the evaluation was devised to explore all of those facets of the exhibition along with our interpretive goals.¹⁸

The summative evaluation demonstrated that visitors to *Ocean Wonders: Sharks!* were more aware that sharks hold an important place in ecosystems and that sharks are being killed

16 Jessica Sickler and Erin Johnson, *New York Aquarium Shark Exhibit Formative Evaluation Synthesis Report* (prepared for the Wildlife Conservation Society, November 2011).

17 Roberts and Rank, *Summative Evaluation Report*.

18 The Wildlife Conservation Society’s Exhibit and Design team employs a holistic design approach and our work is informed by the role of affect, cognition, and personal relevance in creating meaningful experiences for visitors to our exhibits. See S. Chin, S. Hezel, K. Honda, and S. Edmunds, “Designing to Foster Connections and Inspire Action,” *Exhibition* 36, no.1 (Spring 2017): 32–41; John A. Gwynne, “Inspiration for Conservation: Moving Audiences to Care,” in *Zoos in the 21st Century: Catalysts for Conservation?* Alexandra Zimmermann, Matthew Hatchwell, Lesley Dickie, and Chris West, eds. (New York: Cambridge University Press, 2007): 51–62; Sharon Kramer and John Gwynne, “Designed to be Interpreted” *Journal of Museum Education*, 16, no. 2 (Spring/Summer 1991): 8–9.



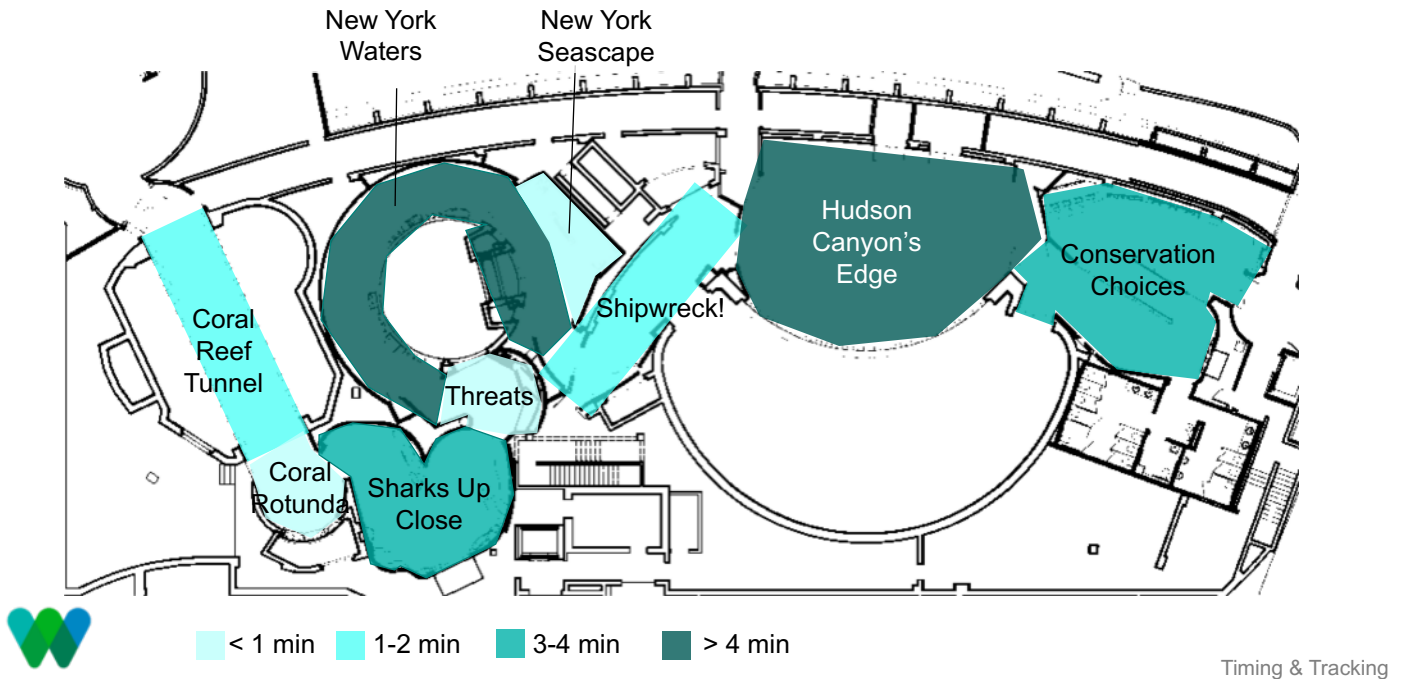


Fig. 7. Our summative evaluation showed that on average, visitors spend less than one minute in the “Threats Gallery,” yet in post-visit interviews, approximately 25 percent of respondents mention a specific piece of information that is only delivered in this space.

OCEAN WONDERS: SHARKS! Stay Time by Gallery

at an enormous rate.¹⁹ When asked about anything “surprising” they learned in the exhibition, more than one third of respondents described learning about shark biology, with many describing something about shark reproduction and expressing surprise about “how long it takes to make a shark.” This demonstrates that one of the key points of the exhibition’s narrative was received by visitors.

Additionally, respondents to the post-exhibit survey were significantly more likely to agree that their personal actions affected the ocean and marine wildlife than were the pre-exhibit respondents. This suggests that visitors see themselves as having a sense of agency and a role in conservation solutions and that the exhibition experience helped to move that needle.

The summative evaluation’s timing and tracking study ([fig. 7](#)) shows that on average,

visitors to the exhibition spend less than one minute in the “Threats Gallery” (which is consistent with what we observed in formative evaluation) of their mean 23 minutes in the entire exhibition. Yet, in post-visit interviews, approximately 25 percent of respondents mention a specific piece of information that is only delivered in the “Threats Gallery.” That 25 percent becomes even more significant when compared to the almost complete lack of visitor awareness of the threats of finning, overfishing, and bycatch in our front-end evaluation.²⁰ Seeing the way visitors engaged with this space so briefly – and yet retained the information delivered there – could point to the fact that the tactics, tone, and placement within the whole of the exhibition experience and narrative effectively conveyed key messaging points, and that it was a memorable message for our visitors, who left without feeling hopeless or overwhelmed.

¹⁹ Roberts and Rank, *Summative Evaluation Report*.

²⁰ Perron et al., *Public Attitudes Towards Sharks*.

Taken together, these findings demonstrate that a visit to the exhibition has impacted visitor knowledge and attitudes with its overarching narrative and flow of experiences and messages conveying 1) that sharks are essential to healthy ocean ecosystems; 2) how susceptible sharks are due to slow reproduction; 3) that shark and ray species are dramatically declining due to by finning and bycatch; and 4) how humans can take actions to avoid consuming products containing sharks and can address ocean health through a number of choices they make in their everyday lives.

Conclusions & Recommendations

1. Do not shy away from presenting challenging information about environmental threats in your exhibits as we did in the “Threats Gallery,” because audiences trust us and expect that from our institutions. But, when the interpretative plan touches on subject matter with imagery that is troubling or content that might not be developmentally appropriate for everyone, consider content warnings, how to position the content so visitors can choose to engage, and always test with a sample group.
2. Present conservation problems along with solutions where possible, ideally with recommendations and actions that visitors themselves can take. If you can, show how many smaller actions aggregate to create an even bigger win for that conservation cause.
3. Consider the overall flow of narrative and experience, and how you can balance opportunities for connection to, and enjoyment of, the natural world, with messages about the threats facing ecosystems.
4. Finally, remember that a lot can transpire in a single well-crafted minute within your exhibitions. Some of the most memorable and emotional experiences within our *Ocean Wonders: Sharks!* exhibit took place in that much time.

Ocean Wonders: Sharks! provides opportunities for our audiences to learn through observation and by engaging with audio, physical, digital, textual, and tactile content; to have close and novel views and experiences with aquatic species; to encounter awe-inspiring spaces that allow for contemplation and reflection; and to learn about conservation behaviors that anyone can take on to impact the health of the ocean. These opportunities taken together, and with careful consideration of our audiences’ comfort level and expectations, have allowed us to cultivate a sense of personal agency, fulfill our responsibility to honestly and directly show specific conservation threats facing sharks and rays in tactics within the “Threats Gallery,” and provide our visitors with specific guidance on what they can do to help wildlife.

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