Table of Contents

List of Tables

DISCUSSION OF FINDINGS AND CONSIDERATIONS FOR DEVELOPMENT

This report presents the findings from a front-end evaluation for an exhibition about tuna, which is currently under development at the Monterey Bay Aquarium. Visitors were intercepted on the second floor of the Aquarium and invited to view tuna in the big tank from the lower level of the Aquarium and to review, and ultimately select, one of six prototype interpretive panels, all of which were about different aspects of tuna. The evaluation goals for this study were to determine:

- what visitors overall reactions are when they view the tuna in the big tank from the lower level of the aquarium
- the specific characteristics visitors notice about tuna
- what in the tank attracts visitors' attention
- which interpretive panel visitors find most intriguing and why.

Visitors who viewed the tuna and reviewed the interpretive panels (see Appendix A) were asked a series of specific questions to determine their reactions to the tuna and opinions about the panels. An open-ended interview questionnaire was used to guide the flow of the conversations (see Appendix A).

This study took place on the lower level of the Aquarium in a nonpublic area that was reconfigured for the purpose of this study. A wall was built to create a barrier between a small viewing area for the large tank and an interpretive display. All visitors who participated in the study were invited to view the tuna, but only the first thirty visitors were asked questions about what they were seeing in the tank. After visitors spent time viewing the tank, they were led outside the viewing area where six individual interpretive panels were displayed. Visitors were asked to review all of them, select the one they found most intriguing, and provide a rationale for their selection. A total of 111 visitors participated in this part of the study.

FINDINGS

All interviewees were given the opportunity to view the tuna and other fishes in the large tank, although only thirty were asked to describe what they were seeing. All of the interviewees appeared delighted to have had the opportunity to see the fishes from what felt to be "the bottom of the ocean." The view from the bottom of the tank, in combination with how the light from above reflects on the fishes, offers visitors a new viewing experience that enhances the qualities of the fishes. In particular, interviewees were impressed by the tuna. Even though nearly all thirty interviewees knew that they were looking at tuna, they were seeing features and characteristics that they had never noticed before, and it was like they were seeing tuna for the first time. For example, more than half of the interviewees commented on the yellow color and shape of the dorsal fin. Whether interviewees described them as "teeth," "spikes," or "triangles," the visual qualities of the dorsal fin, as seen from this vantage point, attracted attention. Half of interviewees were also impressed by the size of the tuna and several noted their swimming behavior (e.g., "speed," "swimming in circles"). When interviewees were given the opportunity

to ask questions about what they were seeing, several interviewees wanted to know how the fishes in the tank could coexist so peacefully.

Interviewees were delighted and mesmerized by the view and the tuna. In fact, after seeing the fishes in the tank and the images of those very same fishes on the panels, for a few interviewees the endangered status of all the fishes that they were viewing became accentuated.

Caught in the Net was the top-ranked panel among interviewees in that it piqued their interest the most. It was selected by one-quarter of all interviewees, and it was selected by about one-third of the females in the sample. Additionally, among those who selected Caught in the Net, all except one were able to describe the main message of the panel correctly. In comparison, four of the interviewees who selected Troubled Seas, nine who selected Amazing Giants, and seven who selected Tracking Tuna were not able to describe the main message of the respective panels. Thus, Caught in the Net was the most popular of the six panels and the most successful in conveying the message.

Caught in the Net used individuals' love of dolphins and familiarity with the dolphin-safe tuna story to capture attention, but it also contained new and startling information: dolphin-safe tuna fishing methods endanger other ocean animals. Caught in the Net started with people's existing knowledge (e.g., dolphin-safe tuna story) and interest (e.g., love of dolphins) and moved them to new territory (e.g., tuna fishing threatens other ocean animals). Caught in the Net struck the right balance between alluring visitors with what they know and love and then providing them with information that was contrary to their beliefs. There was a strong connection among the information that people knew, the information that people did not know, and the conservation message.

One-fifth of interviewees selected Troubled Seas as the panel that piqued their interest the most. The main message of Troubled Seas was similar to that of Caught in the Net, as both were about how tuna fishing threatens other ocean animals. The difference was that Troubled Seas accentuated other sea animals that are threatened (besides dolphins) while Caught in the Net accentuated dolphins. Those who selected Troubled Seas liked learning about "more than just dolphins." They also appreciated seeing the photographs of the tuna, sunfish, turtle, and shark.

Amazing Giants was selected by about one-fifth of interviewees and one-quarter of all males, although, as noted above, it was not very effective in communicating its main message. The facts about tuna that were presented (e.g., are warm-blooded, can swim up to 100 miles per hour, etc.) may have dwarfed or overshadowed the conservation message, but for a few interviewees, they helped raise tunas' stature among other fishes. Compared to Caught in the Net, which linked what visitors already know about dolphin-safe tuna to a new conservation message, Amazing Giants did not present a logical bridge between the facts and the conservation message. The onus was on visitors to add the few missing steps to create the bridge that would lead them to the idea of conservation. Only visitors who read the panel thoroughly and slowly would realize the conservation message.

Tracking Tuna, which was selected by about one-seventh of the sample, was similar to Amazing Giants in that its conservation message was weakened by the presence of other materials on the panel. In the case of Tracking Tuna, it was the satellite map and the science and technology part of the story that caused some interviewees to miss the conservation message.

This study suggests that there is a progression of three elements that can affect the success of an interpretive panel. For example, Caught in the Net was successful in conveying the conservation message and in being appealing to visitors because it included information that was both familiar (element 1) and new (element 2), and it logically connected (element 3) the familiar and new information to the conservation message. While Troubled Seas was almost as successful as Caught in the Net, there was perhaps too much focus on the other fishes and not enough on linking the familiar and new information to the conservation message.

CONSIDERATIONS FOR DEVELOPMENT

- Seeing the tuna and other fishes from the bottom of the tank allowed interviewees to experience tuna in a new way. This new experience brought tuna to a new height and bolstered the interpretive messages displayed on the panels. As an ideal site for viewing tuna, this lower-level area is the perfect location for a tuna exhibition.

- There was a stark contrast between the calm of the viewing tank and violent reality of some of the interpretive panels. Interestingly, this contrast worked for some interviewees in that they realized that the tank environment and the fishes swimming in it might be a thing of the past unless fishing regulations are altered to protect the fishes. Presenting an interpretive exhibit is this lower-level area would bolster any exhibition that has a conservation message.

- Several of the panels included new and exciting information that interviewees found compelling. Interviewees enjoyed being presented with information that they did not know. They also liked being presented with information that was contrary to what they thought they knew—in other words, they enjoyed being challenged. Continue to challenge visitors' intellect by presenting them with new information, but be careful about presenting it in isolation. New information that is not carefully woven into the conservation message will be experienced independently from the conservation message. Interviewees' understanding of Amazing Giants showed that visitors can repeat the interesting facts, but unless there is a strong relationship between the facts and the conservation message, the message gets lost.

- Seeing the photographs of dead fishes in Troubled Seas shocked viewers and made them aware of the grave situation surrounding tuna fishing. While these kinds of photographs worked advantageously for some viewers, they were problematic for others. Be cautious about displaying photographs that adults with children might find frightening to their children. A simple "caution" label in the exhibit area might alert parents to the presence of potentially problematic photographs.

INTRODUCTION

This report presents the findings from a front-end evaluation for an exhibition about tuna, which is currently under development at the Monterey Bay Aquarium. Visitors were intercepted on the second floor of the Aquarium and invited to view tuna in the big tank from the lower level of the Aquarium and to review, and ultimately select, one of six prototype interpretive panels, all of which were about different aspects of tuna. The evaluation goals for this study were to determine:

- what visitors overall reactions are when they view the tuna in the big tank from the lower level of the aquarium
- the specific characteristics visitors notice about tuna
- what in the tank attracts visitors' attention
- which interpretive panel visitors find most intriguing and why.

Visitors who viewed the tuna and reviewed the interpretive panels (see Appendix A) were asked a series of specific questions to determine their reactions to the tuna and opinions about the panels. An open-ended interview questionnaire was used to guide the flow of the conversations (see Appendix A).

METHODOLOGY

This study took place on the lower level of the Aquarium in a nonpublic area that was reconfigured for the purpose of this study. A wall was built to create a barrier between a small viewing area for the large tank and an interpretive display. All visitors who participated in the study were invited to view the tuna, but only the first thirty visitors were asked questions about what they were seeing in the tank. In-depth responses provided information about visitors' observation and thinking skills regarding the tuna and other fishes in the tank. After visitors spent time viewing the tank, they were led outside the viewing area where six individual interpretive panels were displayed. Visitors were asked to review all of them, select the one they found most intriguing, and provide a rationale for their selection. A total of 111 visitors participated in this part of the study.

The in-depth interview methodology was selected as the best way to explore and understand visitors' observations and thoughts about the fishes and interpretive panels. In-depth interviewing is a qualitative research method in which a limited number of visitors engage in a discussion about topics presented by an interviewer. Visitors were intercepted on the second floor of the Aquarium and invited to participate in this study. Because the testing area was removed from the public area, visitors were enticed into participating in the study by telling them they would have an opportunity to see a non-public area of the Aquarium. Those visitors who agreed to participate in the study were escorted to and from the study area. Individual interviews lasted from ten to twenty minutes and all conversations were tape-recorded with visitors' awareness. The tapes were transcribed to facilitate analysis.

DATA ANALYSIS AND METHOD OF REPORTING

Two data sets emerged from this study. One data set is qualitative, meaning that results are descriptive, following from the conversational nature of the interviews. In analyzing qualitative data, the evaluator studies the responses for meaningful patterns. As patterns and trends emerge, similar responses are grouped together. Verbatim quotations (edited for clarity) are provided in this report to illustrate participants' thoughts and ideas as fully as possible. The interviewer's remarks appear in parentheses. Following the qualitative tradition of data reporting, trends and themes within the data are presented from most to least frequently occurring.

To assist readers in the processing of the qualitative data, in some instances frequencies were tabulated and are presented in table format. For all of the qualitative data, the frequency of response categories is conveyed by citing the proportion of interviewees who gave the response (e.g., one-half) when a significant number of interviewees are involved. When responses were given by a smaller number of interviewees, the phrase "a few" is used in the text to refer to 3 - 4 interviewees, "some" represents 5 - 9 interviewees, and "several" means that 10 - 14 interviewees gave that response.

The second data set is quantitative. Because each of the 111 visitors selected one interpretive panel as his or her favorite, those selections, along with gender and age data, allowed for statistical analyses to be performed to determine selection differences between men and women and among ages. Percentages were calculated for all categorical variables. (Within tables, the percentages may not always equal 100.0 due to rounding.) To answer specific questions about the relationship between two variables, cross-tabulation tables were computed to show the joint frequency distribution of the two variables. For all statistical tests, the significance level was set at $p = 0.05$.[1]

PRINCIPAL FINDINGS

A total of 181 visitors were approached and invited to participate in this study, and 71 declined to do so. Hence, the refusal rate was 39 percent, a relatively high refusal rate for on-site surveys. However, cross-tabulations between the actual and refusal samples show no differences in gender and age ratios between the two samples.

As noted above, this study includes two data sets. Table 1 provides the gender and age of individuals from both data sets (e.g., the total sample). The total sample ($n = 111$) responded to questions about the interpretive panels, whereas about 27 percent of the total sample ($n = 30$) responded to questions about the tuna as they were viewing the tank. In the total sample, there were slightly more females than males (54 percent and 46 percent, respectively), and more than half were between the ages of 30 and 49 years (59 percent). In the tank sample, half were male

[1] Setting the level of significance (p) at 0.05 means that the researcher is willing to accept as meaningful any relationship that occurs with less than a 5 percent probability of being caused purely by chance.

and half were female, and nearly two-thirds were between the ages of 30 and 49 years of age (63 percent).

Table 1.
Gender and Age of Interviewees in Percent

Characteristics	Tank Sample (*n* = 30) %	Total Sample (*n* = 111) %
Gender		
Female	50	54
Male	50	46
Age		
29 years and under	17	21
30 to 49 years	63	59
50 years and over	20	20

VISITORS' DESCRIPTIONS OF THE BIG TANK

Thirty visitors were brought into the viewing area for the big tank and asked to describe what they were seeing. The interviewer said, "I am going to turn my back, and I want you to describe to me what you are seeing." This question was asked so developers could begin to understand how visitors experience the big tank when viewed from this vantage point (i.e., the bottom of the tank) and whether they notice the tuna. For example, do visitors realize they are looking at tuna? What details do they see on the tuna? And, what do they notice about the big tank environment?

Table 2 lists the range of topics discussed by interviewees. A discussion of the most frequently occurring topics follows.

Table 2.
Topics Discussed by Interviewees (*n* = 30)

Topics	*n*
Dorsal fin description	16
Size of tuna	15
Circular swimming direction	12
Lighting	10
Skin color and texture	9
Speed of fishes	6
Bleak environment	5
Depth of space	5
Viewing perspective	5
Peaceful feeling	2
Miscellaneous responses	2

Nearly all of the interviewees recognized that they were looking at tuna (*n* = 27), and just over half noted details about the tuna's dorsal fin. Interviewees used an array of colorful adjectives and nouns to describe the dorsal fin. For example, some used the word "triangles" (see the first quotation), some used the word "spikes" (see the second quotation), and some used the word "teeth" (see the third quotation).

> Well, the reflection with the fish going . . . south, it looks like the sun coming through. . . . The reflection is pretty intense. They're moving quickly. There's a little scramble inside the tank. Lots of tuna. Big tuna, too. . . . Real silver, silver with yellow tails and yellow fins on them, with the little spiky triangles. The triangles are kind of cute. He's got a dark back.

> Gosh, huge fish, wonderful creatures, swimming in circles, all going to the left, pretty much. Then there's some doing their own thing in the center, and there's fish of all sorts of sizes. Oh, silvery and very flashy and, the tuna have the yellow tails and their little yellow spikes on the back of them. They're just massive creatures. They're so thick. (Is that surprising to you?) Yes, very surprising. It's like almost as if they're miniature dolphins. They're magnificent. They're really interesting. And then there's thinner, long fish, at the top. And I think they have yellow tails, they do have yellow tails . . . and they have very, very pointy noses or faces.

> I see light shining from above. It looks like there's a bunch of fish of varying sizes, barracuda. Some look like they are silver in color. They're moving around. It looks like . . . I am standing below the ocean floor, kind of looking up and seeing how the fish might be in their normal habitat. . . . I don't know the names of any of them, except the barracuda. There are some fish that are three, four feet in length that are kind of a dull shiny, a grayish shiny color, that have, it looks like golden shark teeth on the rear of their back. I also see some very shiny fish that look as if they're covered in aluminum foil, kind of silvery and

> shiny. Those actually look to be the same fish that I just described, except from one side when they're swimming toward the right, they look very silvery. And when they're swimming to the left, the silver looks a little duller.

Half of the interviewees noted the large size of the tuna, but their remarks were short and simple (e.g., "huge fish," "big tuna fish," and "awesome big fish."). Several interviewees noticed that the tuna were swimming in one direction and concluded that they were "swimming in circles." As shown in the first quotation, this interviewee, who was asking a lot of questions about what she was seeing, wondered why the fishes were moving in a circle because she noticed, as did others, that not all the fishes in the tank were swimming around and around. Several interviewees also noted the light coming from the top of the tank. As shown in the second quotation, this interviewee's experience with snorkeling has made him particularly sensitive to the way sunlight hits the water and fishes.

> It looks like I'm on the bottom of the ocean and I'm watching a school of [what] looks like tuna. And up on the top it looks like a bunch of barracuda just milling around the surface. [There are] sunfish just kind of breezing along. I think this is kind of stark. . . . You've got a shark on the bottom breezing along. . . . The blue sheen is very interesting. It looks to me like it's iridescent, so I'm getting some kind of refraction of the colors or the light to produce color. That's something I might want to read about in a display, for instance. And the skin is very smooth. I don't see scales like I would expect to see on a fish. So I might want to see something about if there are scales or are they really small and you just can't see them. They seem to be swimming with their mouths open. I don't see the gills opening and closing like I would on an aquarium fish. So I'm wondering why not. They seem to be swimming in one direction, going to the back of the tank and moving in a circle. So I'm wondering why are they doing that. Is there a current in there? And why are there skinny fish on the top not doing the same?

> Sunlight and fish, I think those are tuna. Are they tuna? (Yes. What made you think they were tuna?) Because I know. I can identify some fish. I don't know what those ones are at the top, though. [The tuna are] beautiful, they're fat and happy and beautiful, very shiny. Good looking**. (**Any other details that you see that you can tell me about?) Well, obviously the water, but when I dive and snorkel, it's the sunlight that I notice the most. [I notice the] sunlight on the fish and sunlight on the water, and sunlight coming through.

Some interviewees observed other characteristics of the tuna. For example, some described the quality and color of the tuna's skin (see the first quotation), while others, as shown in the second quotation, were impressed by the speed the tuna displayed. Some interviewees talked about the tank environment. For example, some described the tank as "bleak," because it was devoid of plant life (see the third quotation), while others appreciated the sense of depth the large tank conveyed (see the fourth quotation). Some other interviewees, as illustrated in some of the previous quotations, enjoyed the perspective from which they were viewing the fishes (i.e., the bottom of the tank).

I'm seeing silver fish, large silver fish, approximately two and one-half feet long in a blue tank, blue water, clean, little red light, little laser beam light. . . . Some smaller fish also, silver, fat fish. I can't tell what color he is, though, and I see spotlights in the water, and I see some barracuda near the surface. I think they're barracuda. Silver tuna and that's all I see are tuna and barracuda. It looks like they have gold, not the fins, but the little things that go on their back are gold. It's just strange. It's cool. It looks like they're wearing silver suits. Silver Spandex. It's a cute outfit. Let me see what else I notice. The littler fish have stripes down the sides, but I don't know what you call them, stripers? Oh my goodness, and there are smaller fish that are about two-feet long that are just zipping along really, really fast. They're faster. The tuna just glide. The barracudas just hang. They're shopping, I think. Looking for something to bite.

I'm seeing [what] I'd see if I was in the middle of the ocean. Maybe the deep-sea fish. I know that these are tuna, so I got the feeling this is what you would see if you were a deep-sea diver or experiencing life of the deep sea. I know I've got tuna here, this coming upon us is some type of shark, I can't see what the fish are at the top. That's all. Oh, there's a turtle. That's all I recognize. (Any other details about what you see?) Let's see, just with tuna. I was really impressed by their size, their shape, and how fast they move. I mean you really get an impression that all these fish are designed basically for being predators. They're designed for speed and they've got a big mouth. [This tank] just [gives] the impression of space. It's enormous. It's teeming with fish. You begin to appreciate . . . just how vast the ocean is [on] the Earth. We're [land masses are] only a third of the size of Earth, so you also get the impression that we're really the minority here on this planet, you know? The ocean is definitely the majority of the population on this Earth.

I see tuna and other fish swimming around. Looks a little bleak to me. It's the first thing I noticed [in the tank] upstairs . . . was [that there was] no plant life or anything else. And I'd say that's about it. (Any other details about what you see?) No not really. Just that it [the tank] seems rather bleak.

Lots of fish and perspective with glass being overhead. It's like I'm underneath them, which is actually the main perspective. They seem to be swimming quite a bit. One thing that I notice is . . . that I don't see an opposing wall or anything. It's sort of like it goes straight out which is nice. (Do you recognize any of the animals that you're seeing?) I'm seeing most of these guys swimming past me right now are tuna. (What do they look like? If I'd never seen a tuna, how would you describe a tuna to me?) Fairly large size, . . . [the] upper third is kind of black with gold triangles going from the dorsal fin to the tail fin. Pretty neat looking.

What in the Tank Attracted Interviewees' Attention

To obtain additional, and perhaps more specific information about visitors' reactions to what they saw in the tank, they were asked, "What, if anything, attracts your attention the most?" The three most prominent responses included remarks about the fishes circular movement inside the tank, the unique feeling of looking up at the fishes from the bottom of the tank, and the effect of the light on the tuna. Table 3 lists the range of topics interviewees mentioned. The most frequently mentioned topics are discussed below.

Table 3.
What Attracted the Attention of Interviewees
(*n* = 30)

Topics	***n***
Circular swimming direction	9
Viewing perspective	7
Lighting	7
Size of tuna	5
Peaceful feeling	4
Skin color and texture	3
Speed of fish	1
Depth of space	1
Quantity of fishes	1
Shark	1

Some interviewees enjoyed watching the fishes "swim in circles." A few interviewees described the swimming behavior as calming, as shown in the first quotation, while others simply liked watching the fish "follow one another." Some interviewees, as illustrated in the second quotation, commented on the perspective from which they were seeing the fishes and noted that they felt as though they were "right under the ocean . . . looking up towards the surface." The lighting from above impressed other interviewees, with a few thinking it was sunlight (as in the first and third quotation). Others liked how the light affected the look of the tuna's skin (see the fourth quotation). Some interviewees also noted the "huge" size of the tuna. The other fishes in the tank (e.g., shark, turtle, sunfish) were also mentioned, though infrequently.

> The motion of the fish swimming past. I like seeing the sunlight coming from the surface, and the fluidity of the fish going past. [It is] a calming sensation.

> I think it's the fact that it seems like it just goes back a ways and you can see and get so close to them, and you get to look at them in a different angle than you normally do, like the underneath of them. It's just that you get a different perspective, I guess. And the angle of

the glass is nice because you really get to be underneath them. That's what I'm noticing, and the rays of light are, like I said in the beginning, heavenly almost.

Just the closeness of the fish and seeing them by looking up, not looking down. You get a clear view looking up. With the sun coming through, with the light. . . . It's like you're underneath them and they're floating above you and you're underwater.

I like the blue in the background. I think it really brings the fish out because they're silver, and on the blue background with the light, it really makes them appealing.

Visitors' Questions about What They Were Seeing

The viewing of the tank concluded with interviewees being given the opportunity to ask questions about what they were seeing in the tank.

Table 4 summarizes the range of questions asked by interviewees. The most frequently occurring questions are discussed below.

Table 4.
Questions Asked by Interviewees
(*n* = 30)

Questions	*n*
How do these fishes live together?	8
No questions	5
Why do they swim in a circular direction?	4
Questions about other fishes (e.g., shark, turtle)	4
Questions about adaptations (e.g., skin color, eyes)	3
What do they eat?	3
What kind of fish is that?	3
Exhibit-related questions	3
Why aren't there plants in the tank?	2
How do you keep the water the right temperature?	1
Why do they swim in groups?	1

Some interviewees wondered how the different fishes could coexist in the same environment without being eaten by their tank mates. A few interviewees assumed that the shark would prey on the tuna, as shown in the first quotation, but others, realizing that the tank environment was calm, simply wanted to know "why these particular fish can live together without eating each other?" One interviewee, after recognizing that the small and large fish were swimming together peacefully, noted that fishes of the same species were swimming in groups and wondered why

this was so (see the second quotation). Some interviewees did not have any questions about what they were seeing because they said they visit the Aquarium to look at the fishes.

> I guess I wondered how you got all the water in here. How was it pumped in? How do you keep it clear? How is the oxygen put in the water for the fish? How do you know which fish to put in together that won't fight or attack each other? I find that real interesting that they get along so well. Personally, if I was a fish and I knew that there was a shark in there, I would say "Oh, he's got to go. No chance. I'm not going in there." But it's interesting. What else? How come there's no plant life? I don't know if they eat any of the plant life, but I'm sure that would . . . contribute to the real thing down here. I know it's clean and it's a good habitat for them, but there's no sand or anything like that. That's what I notice.

> Well, I just think it's odd that the small fish and big fish are able to swim together, but they're always herded in their own group, like the barracudas [are swimming together]. Maybe it's their . . . nature to be that way, that [might] be a question. Why do they do that?

A few interviewees, as discussed earlier, were interested in the fishes circular swimming behavior (see the first quotation below). A few interviewees asked questions about the other fishes in the tank (e.g., What kind of shark are they? Are they bottom dwellers?), and a few asked about adaptive characteristics of tuna. For example, two interviewees were curious about the tuna's silvery skin color, with one thinking that their skin should be "more camouflaged" and another wondering why they are silver with "yellow teeth" on their dorsal fin. Another interviewee wanted to know more about tunas' eyes (see the second quotation). A few interviewees also wanted to know what tuna eat. One interviewee said he knew what barracuda eat but he was unsure about tuna and shark. In addition, few interviewees wanted all the fishes they were seeing in the Aquarium to be identified for them (apparently not realizing that the Aquarium already provides this service), and a few others asked exhibit-related questions (e.g., How thick is the glass? How was the water pumped in? How does the Aquarium maintain the appropriate water temperature?)

> What kind are those skinny fish at the top there? Oh, I always wonder why they're doing what they're doing. I always like to know more about the behavioral aspect of what I'm looking at, so here are fish in a tank, but why are they swimming in one direction or why are some of them going in the opposite direction? Why do some of them break ranks and go around the other way? Those kinds of things. Oh, it's just something that doesn't usually get answered.

> Well, the other thing that strikes me about these, I guess they're tuna, is the size of the eyes. They're huge. Huge black eye. It almost looks like a shark eye. Yeah, I'd like to know something about their eyes. Like obviously they live up near the top of the ocean I guess, where they can see, as opposed to being blind.

INTERPRETIVE PANELS

All interviewees were asked to review the six interpretive panels and select the one that piqued their interest the most. Statistics were calculated to determine differences between males and females and among age groups. Those findings, which appear in the tables below, are followed by a summary of interviewees' qualitative remarks about the top four interpretive panels. Interviewees' qualitative remarks were analyzed to determine the following:

- the rationale behind their selection,
- whether interviewees grasped the main message of the panel,
- positive and negative attributes of each panel
- which panels contained information that was boring or uninteresting.

Readers should realize that all interviewees viewed all six panels, and it was not possible to control for the effect that all of the panels may have had on their understanding of the one panel about which they were asked. In some responses, there is evidence that an interviewee's understanding of one panel was affected by the content in the other panels. Nevertheless, some messages were clearer to visitors than others, as is shown below.

Panel Selection

As shown in Table 5, among the six interpretive panels, no single panel was selected by a majority of interviewees. The three most frequently selected panels were Caught in the Net, Troubled Seas, and Amazing Giants (25 percent, 22 percent, and 21 percent, respectively). Interestingly, nearly half of interviewees selected either caught in the Net or Troubled seas, two panels having similar messages. The Tuna at the Aquarium panel was selected by the fewest number of interviewees (7 percent*; n* = 8).

Statistical analyses were calculated to determine selection differences between males and females and among age groups. While no statistical differences emerged, some tendencies or trends did. For example, Table 6 shows that more women than men selected Caught in the Net (36 percent and 14 percent, respectively) and more men than women selected Amazing Giants (27 percent and 15 percent, respectively) Regarding age, Table 7 shows that more interviewees aged 40 and older selected Tracking Tuna than did interviewees under 40 (23 percent and 8 percent, respectively).

Table 5.
Interpretive Panel Selection

Panels	(*n* = 111) %
Caught in the Net	25.2
Troubled Seas	21.6
Amazing Giants	20.7
Tracking Tuna	16.2
Beyond the Can	9.0
Tuna at the Aquarium	7.2

Table 6.
Panel Selection by Gender

Panels	Male (*n* = 52) %	Female (*n* = 59) %
Caught in the Net	**13.5**	**35.6**
Troubled Seas	23.1	20.3
Amazing Giants	**26.9**	**15.3**
Tracking Tuna	17.3	15.3
Beyond the Can	11.5	6.8
Tuna at the Aquarium	7.7	6.8

Table 7.
Panel Selection by Age

Panels	Under 40 (*n* = 49) %	40 + (*n* = 61) %
Caught in the Net	28.5	24.6
Troubled Seas	26.5	18.0
Amazing Giants	22.4	18.0
Tracking Tuna	**8.2**	**23.0**
Beyond the Can	10.2	8.2
Tuna at the Aquarium	6.1	8.2

Caught in the Net

Main Message: Despite our success at protecting dolphins, tuna fishing now threatens the survival of other ocean animals.

Among interviewees who selected Caught in the Net as the panel that piqued their interest, about half talked about their not knowing that dolphin-safe catch methods harm other fishes. Some interviewees, as shown in the first quotation, were surprised that the laws designed to protect dolphins endangered other fishes. A few interviewees noted that while they were surprised by what the panel said, they also wanted to know how or why dolphin-safe catch methods endangered other fishes (see the second quotation). Some interviewees were more focused on the other fishes than they were on the dolphins, as shown in the third quotation. A few interviewees were attracted to the two photographs of dolphins and the fact that dolphins were mentioned in the text. These individuals talked about how much they like dolphins and did not really acknowledge the specific content of the panel.

> It just piqued my interest because they made some laws to protect the dolphins . . . but they didn't take into consideration the other animals that they might be harming in the process of that regulation that they created. . . . I didn't know that. I thought if they were protecting the dolphins, maybe they were looking out for the other critters. . . . So it brought that to my attention. I didn't know the so-called dolphin-safe products were actually not turtle-safe or shark-safe.

> [When] people buy tuna and it says dolphin-safe, they think they're doing the right thing. This one was the most informative as far as letting people know that just because it says dolphin-safe doesn't mean that it's politically correct, because there are other animals that are now getting caught. I think it would be interesting to know what the methods are and why these animals are getting caught as opposed to the dolphins. It's a good question.

> Because even though it seems that the majority of the displays are talking about tuna, the processes that a tuna goes through, and Caught in the Net interested me more because you see [that] a lot of other fish life are endangered because of catching the tuna.

Of the 28 individuals who selected Caught in the Net, all but one were able to describe, in their own words, the idea embodied in the main message. The one interviewee whose response did not meet the standards of a "correct" response did not acknowledge that tuna fishing threatens the survival of other fishes, in addition to dolphin. A sample of "correct" responses appears below. Readers will note the range of quality among responses.

> That there's still a lot of work to be done to preserve a lot of life at sea—with catching fish.

> Maybe be more aware of what [other fishes are in] the surrounding area. . . . Like [what] goes on in that area and see if there's a dolphin around, a dolphin pod that they should like be concerned about what's going on in that area, you know fishing and stuff.

> They need to know that it's depleting sharks. I mean it's killing them off. And turtles. I never even thought about turtles being caught in the nets, and it does emphasize that. I mean it brings you aware of things that you don't think about. I've heard of them killing the sharks in the nets, too, besides the dolphins, but the sharks are still a part of our existence, even though some people don't think they should exist.
>
> It's really hard because personally, [I] like tuna but I don't like the fact that a lot of other animals are suffering in order to provide me with that food. So, maybe [there needs to be] more awareness for the fishermen or different regulations, or something that could be set so the fishermen who are catching the tuna would be more careful, not just for the dolphins, sharks, and turtles, but every other sea life that is being endangered or put into danger because of their fishing practices.
>
> [Visitors] should realize that the earth's a small place and there's a lot of people on it, and we have pay attention to our behavior. We're not going to be able to do anything we choose without consequences.
>
> That sea life is threatened by our consumerism.

Positive Attributes of Caught in the Net

Interviewees are familiar with the dolphin-safe tuna story, and they love and care about dolphins. That is, interviewees were initially attracted to Caught in the Net because the text and photographs focused on dolphins (see the first quotation below) and because the panel mentioned that while tuna may be dolphin-safe, it is not turtle- or shark-safe. To some interviewees this was new and surprising information (see the second and third quotations). The element of surprise captured interviewees' attention, and they liked having new information and feeling as though they had learned something important. Even though so much of the text and so many of the photographs were devoted to dolphins, the dolphin-focus strategy worked in this case because the conservation message of the panel was closely tied to the dolphin-safe tuna story. Some interviewees were even motivated to think beyond what the text had provided them. For example, a few interviewees noted that the panel does not explain "why protecting dolphins endangers turtles and sharks."

> I like the dolphins and I saw the picture of them. That was great.
>
> There are other fish and creatures that were being destroyed other than the dolphin [but] everybody talks about the dolphin-safe thing. It totally caught my interest to learn that.
>
> Because it [the panel] picks up off where my knowledge was regarding some of the conservation efforts, and it tells me more about how dolphin-safe fishing has [actually] increased the accidental catch of other ocean fish, which I had brief information about, but it was telling me more about that.

Negative Attributes of Caught in the Net

With so many interviewees being able to articulate the main message of the panel and being surprised by the fact that dolphin-safe tuna is problematic for other fishes, Caught in the Net did not have any visible qualitative negative attributes. However, as shown earlier, many more women than men selected Caught in the Net (36 percent and 14 percent, respectively).

Troubled Seas

Main Message: Tuna, turtles, sharks, and other ocean animals all face threats from current fishing practices.

Most of the 24 interviewees who selected Troubled Seas as the panel that piqued their interest, did so because the panel mentioned the other fishes that are affected by overfishing tuna. A few interviewees liked that the panel "talked more specifically about the animals that are getting caught" (see the first quotation). A few others appreciated being made aware of the consequences of overfishing tuna, in general, as well as the lax fishing regulations that endanger "more than just dolphins" (see the second quotation). A few interviewees made a connection between the fishes they saw in the tank and those depicted on the panel, and they were worried about not being able to see these fishes in the future (see the third quotation).

> Because it covers more variety of fish, not just tuna, but also turtles and sharks. . . . [It shows] sunfish being caught and then being dumped, so it shows the real thing and how they're being disposed of or wasted, I guess.

> Just the lack of fishing regulations [interested me]. I wasn't really aware that there were not regulations, because I thought with the Bumble Bee tuna and the dolphins and all that, that there were more regulations. So, it's just that now I'm realizing more people are becoming more aware of it. And it [the panel] talked about more than just the tuna.

> I think it was this one, how they're catching them and they were just throwing them back in, and it . . . makes you think about it more because of what was in your tank, you know, with the turtle and the sunfish . . . . Yeah, the information was good. . . . Troubled Seas gives me the most impact because I can relate [it] to what's in the tank. You know, watching them alive now, [and] here they are lying dead and thrown back. That's the way I look at it.

Of the 24 who selected Troubled Seas, 20 described the main message of the panel. The four interviewees who did not adequately describe the content of the panel were either fascinated by particular fishes (e.g., "[It had] more with sunfish," "I just find sharks more interesting than tuna") or they neglected to mention that tuna fishing endangers other fishes. One interviewee said that because the panel did not convey the reality of commercial fishing, he could not respond to the question. A sample of the "correct" responses appears below. As expected, there is a range in the quality of responses.

> Well if they're gonna go out and catch what they want, they should just catch what they need and not waste the other food. Don't waste the fish that can still live and survive. . . . They're killing for a purpose, but say, like in this picture here with the sharks: Just take so many of these and the rest they'll just dump back in the ocean, but they won't use them. (So how can they solve this problem?) Well, they can have their own hatcheries or grow em somewhere else what they want to consume in the market . . . . And the ones in the ocean leave be.
>
> There probably should be more regulation, because it was talking about lack of fishing regulation in terms of how people fish and what they fish with. Because I think if there were [regulations], those sea turtles wouldn't be caught and the fish at the bottom [and] the sunfish, [wouldn't be] killed for no reason.
>
> The present method of fishing produces a lot of waste. It kills species which ought not to be touched.

Positive Attributes of Troubled Seas

The photographs on the panel attracted interviewees' attention. Whereas the photographs on the Caught in the Net panel focused on dolphins, the Troubled Seas panel included four photographs—one each of a tuna, sunfish, turtle, and shark. After seeing the photographs and the fishes in the tank, some interviewees realized how large these fishes are and elevated them into a higher class: they were no longer fishes; they were "animals" (see the first quotation). One interviewee even noted how photogenic the sunfish is. Some interviewees expressed an urgency about making people aware about what is happening (see the second quotation), while others focused on the senseless death of so many fishes (see the third quotation). A few interviewees expressed empathy for the situation that the photographs and text depicted (see the fourth quotation).

> From this, something this big as far as the turtles and tuna, it's no longer just a fish, it should be considered an animal, and it's a life. It should be respected as that. Especially when you're talking about a fish getting up to 1,500 pounds or a turtle that lives up to 200 years, it's not just a pet. It's something that should be studied. And the shark, they've got a bad rap all the way around, but it's still a life.
>
> I think we all need to be more aware of what we're actually doing to our earth and our fishing and all that impacts other species besides what we're just after. . . . We need to be more aware of what's going on out there and our impact on the earth as humans.
>
> As things are caught and they don't need it, it's just thrown back as waste, and that's too bad. For example, sharks. I know it's a delicacy, shark fin soup, in Asian cultures. They cut the fin off and throw it back into the water. To me that's just ridiculous. How can animals be waste?
>
> The fact that the sunfish shouldn't be tossed over as waste, that's horrible. Someone should find some way to do their fishing, I guess, without . . . the side effects on other animals. It's

> sad that you see this and you see an innocent bystander, you could say, being [killed]. That's what got my attention with this because it's just not good. Troubled Seas, it's kind of troubling to me to see that, but it's like a wake-up call to people, I would hope.

Negative Attributes of Troubled Seas

Two interviewees thought that the photographs of the fishes on the Troubled Seas panel were "too much, especially for little children to see" because they showed "maimed fish." One interviewee felt that text, rather than graphic images, "can talk about how they get killed" as photographs "bring . . . bad impressions and bad feelings."

Caught in the Net versus Troubled Seas

Several individuals who selected either Caught in the Net or Troubled Seas had noted that deciding between the two panels was difficult because their content was similar. Sometimes these interviewees were asked what caused them to select one over the other.

Those who selected Caught in the Net over Troubled Seas gave the following reasons: Caught in the Net was "less horrible-sounding" than Troubled Seas; Caught in the Net mentions dolphins and interviewees said that they "worry about dolphins"; Caught in the Net "talks about . . . dolphin-safe, which is something that is in everyone's mind"; and Caught in the Net is a "little softer [graphically]."

Those who selected Troubled Seas over Caught in the Net gave these reasons: The Troubled Seas panel included photographs that let them "see the fish," and it mentions a variety of animals—not just dolphins.

Amazing Giants

Main Message: Big, strong, and fast, tuna are among the most amazing—and threatened—fishes in the sea.

More than two-thirds of the interviewees who selected Amazing Giants as the panel that most intrigued them said that they enjoyed learning the facts that were presented on the panel. Learning new information made Amazing Giants more appealing than the other panels, as shown in the first quotation. Some other interviewees were simply fascinated by some of the facts that were presented, as they had not realized how fast tuna swim and how large they are (see the second quotation). A few interviewees were specifically attracted to the fact that tuna are warm-blooded and were compared to whales on the panel (see the third quotation), while a few others noted that tunas' warm-bloodedness made them "feel more connected" to tuna. Finally, a few others preferred Amazing Giants because it was "more informative about the fish and less preachy" or "a little bit more positive."

> There was information about tunas that I didn't know before: how fast they were, that they're warm-blooded, and how large they can grow. I was aware of most of the other information that they're being overfished, that the law has changed, and that we eat a lot of tuna fish. . . . I guess the Tuna at the Aquarium was probably the next mock-up of interest because it explains a little more about what's going on inside the tank, but Amazing Giants was really the one I was most interested in.
>
> Actually there were two of them that I was most interested in. I didn't know that they're warm-blooded, and the fact that they swim 50 miles an hour and cover over a hundred miles. And then the thing about the size of them, I had no idea they could be ten-feet long and weigh that much. I knew they [were] big, but not that big.
>
> Just the information that the tuna can travel so far and the words, "Amazing Giants," work pretty well. They compare them to whales, which was pretty interesting to me because they're warm blooded and I didn't know that. And that's pretty much it for that one.

Of the 23 interviewees who selected Amazing Giants, almost two-thirds (n = 14) correctly noted that tuna are among the most threatened fishes in the sea. The nine individuals who did not talk about tuna being endangered simply marveled at the facts that were presented. As is shown in the sample of "correct" responses below, a few individuals spoke about the amazing facts as well as the endangered status of tuna in the sea.

> I think it's a combination of the fact that tuna are really amazing fish. There was information there that I didn't know about, and it was very interesting combined with the fact that they're at risk. I guess I think of some fish being at risk and I'm so-so concerned. I'm not so interested because they're just fish. But these are *interesting* fish and their speed, and the fact that they're warm blooded. I think that was the most surprising thing. So a combination of the information about them with the fact that they're at risk.
>
> How big they are, speed and the distance that they travel. You know, these other ones [panels] are quite interesting, but . . . they're trying to get a message across that tuna are being over fished. I know I appreciate that and I'm really interested in that information. (Based on the information that is here, what is the most important idea that you think people should take away from this?) For me, it's the size and the 1,500 pounds and the distance that they travel. And the speed, 50 mph. That's amazing.
>
> I think the most important message is that they're at risk of being depleted.
>
> Just because . . . I always thought they were really a small fish and they were put in a little can, but when you see how big they really get, I don't know, that's a shocker. (When you look at the information on this panel, what would you say is the most important idea that you think people should take away from this?) Probably . . . the last part where it says that unfortunately tuna are at a great risk of being depleted by commercial fishing.

Positive Attributes of Amazing Giants

Just as interviewees who selected Caught in the Net were surprised to learn that dolphin-safe catch methods endanger other fishes, interviewees who selected Amazing Giants were surprised to learn the facts that were presented about tuna. As noted earlier, and as shown in the first quotation below, more than two-thirds of interviewees enjoyed learning the facts. Learning that tuna are warm-blooded raised tunas' stature among other fishes (see the second quotation), and as shown earlier, caused a few interviewees to feel more "connected" to tuna. A few interviewees also enjoyed the aesthetic quality of the photographs, noting that some of the other photographs on the other panels were "really gross . . . especially for little children to see." Comparisons between interviewees' observations of tuna in the tank and the facts that were presented on the panel show that some of what interviewees observed were reflected in the panels: one-half of interviewees who were asked to describe what they saw in the tank commented on the large size of tuna, and one-fifth noted how fast tuna swim.

> Because they had a lot of different facts about them that I didn't know, and that's kind of why I like coming here. I don't only like looking at them, but you find out they can do all these cool things.

> Just probably that they're huge and that we think of them as being really small animals that we eat, but they actually get really big and that they're different. They're warm-blooded, not cold-blooded, and they're just different animals than we think of them being.

Negative Attributes of Amazing Giants

The tuna facts dazzled interviewees, but they outweighed the conservation message for one-third of the interviewees who selected Amazing Giants. Additionally, just more than half of interviewees, upon looking at the tuna in the tank, were compelled to comment about the color and quality of the dorsal fin—an observation that was not addressed on the panel.

Tracking Tuna

Main Message: Using satellites and other technology, scientists are tracking bluefin tuna at sea to help conserve these threatened animals.

About one-half of the 18 interviewees who selected Tracking Tuna, did so because the content focused on solving a problem instead of just highlighting the problem (see the first and second quotations). A few interviewees were attracted to the color satellite map of ocean temperatures and how that image is connected to science and technology (see the third quotation), while a few others were amazed that tuna can be tagged and tracked (see the fourth quotation).

> It wasn't negative, . . . it was more positive, like showing what they do and how they could help and follow the growth rate . . . to help the depleting tuna. . . . It wasn't so much that everyone's doing everything wrong. Caught in the Net is more drastic, but at the same time, it didn't give any solutions to the problem.

> I guess it's of more interest to me because it handles the scientific aspect of it versus just the environmental impact of it. [It is] more in line of what it is we can do or what it is that's being done. (What do you think would be the most important idea that a person should walk away with?) Probably the fact that they are such a threatened species because of the overfishing. That there is something being done, but like the very last panel says, they are a declining population.
>
> [The map shows] the weather conditions and stuff like that, and you see the heat and the stuff from a satellite, and it attracted my attention.
>
> Well, [I selected Tracking Tuna] because of the scientific part of it. It's interesting that you guys can attach something to a tuna and then track it. Way out there. By satellite. That's interesting. (What would you say is the most important idea that people should take away with them?) The fact that you are proactive in trying to keep the tuna from being completely depleted from the ocean.

Of the 18 interviewees who selected Tracking Tuna, 10 grasped the main message[2]. The seven individuals whose responses were not scored as "correct" did not provide any indication that they were aware of the work that scientists are doing to help restore bluefin tuna populations. Their responses indicated that they understood there was a problem (e.g., "how tuna are being depleted"), but they did not allude to scientists' conservation efforts. As illustrated in the above quotations, those who grasped the message appreciated that Tracking Tuna focused on presenting a solution rather than a problem.

Positive Attributes of Tracking Tuna

Again, some interviewees liked Tracking Tuna because it presented a solution to a problem. In fact, as shown earlier, one interviewee selected it because "it wasn't negative . . . it was more positive . . . showing what they do. . . . It wasn't so much that everyone's doing everything wrong." Interviewees were also attracted to the mention of technology in the text as well as the image of the color satellite map showing ocean temperatures. In fact, one interviewee referred to the panel as "the satellite one."

<u>Negative Attributes of Tracking Tuna</u>

The technology focus of the panel, though appealing, was perhaps too strong, as it outweighed the conservation message for almost half of the interviewees who selected Tracking Tuna as their favorite panel. In fact, one interviewee, as shown below, recommended that the conservation message be highlighted because he had initially overlooked it. Additionally, while nearly an equal percentage of women and men selected Tracking Tuna, a higher percentage of interviewees aged 40 and over selected it (23 percent) than did interviewees under the age of 40 (8 percent).

[2] One interviewee's qualitative response is missing due to technical difficulties.

> Well, simply the idea that you could put a transmitter on one of these things. . . . I didn't realize they could do satellite tracking. That's pretty amazing. (Based on the information that is here, what is the most important idea that you think people should take away from this?) Why do it? And this message right here, "tracking [bluefin] tuna to help conserve these threatened animals." That really doesn't jump out at me. Even though it's up at the top right there. . . . I'd like to see that "conserve these threatened animals" somehow highlighted better. Something to draw my eye to it. It could be a different color. Reds and yellow. (You overlooked it the first time?) Yeah. When you skim a title you're looking at satellites and you're hitting conserving threatened animals down here. If that was highlighted I think that would help me figure that message out quicker.

BORING AND UNINTERESTING INFORMATION

The first thirty interviewees were asked to indicate which panel had information that was boring or uninteresting. As shown in Table 8, Beyond the Can was selected by almost half of interviewees (*n* = 13). A few interviewees felt it was "dry" or "blah," while others said that it appeared to be about "canning," "manufacturing," or the "more industrial part" of tuna fishing.

Table 8.
Boring and Uninteresting Information

Panels (*n* = 30)	***n***
Beyond the Can	13
All were interesting	5
Tuna at the Aquarium	4
Tracking Tuna	3
Amazing Giants	3
Troubled Seas	2
Caught in the Net	2

APPENDIX A

Interview Guide

1. First I want to show you the tank. I am going to turn my back, but I want you to look at the tank and describe to me, as best you can, what you are seeing.

   What else do you notice?
   Anything else you can describe to me?
   Any other details about what you see?

2. What, if anything, attracts your attention the most?

3. Do you have any questions about what you are seeing?

Okay, now we can step outside. We have six panels displayed. They are prototypes or mockups. They don't represent how the final exhibit will look. However, I would like for you to look at them as you normally would look at an exhibit at the aquarium. That is, you can read it or skim it—spend as little or as much time as you like. When you are done, we will talk about them. Our conversation will be focused on the information—not the design or look of the panels. One of the things I will ask you is to select the one that interests you the most. Okay?

4. Which one piques your interest the most?

   Why?

5. Based on the information that is here, what is the most important idea that you think people should take away from this?

6. Is there information on any of them that you find boring or uninteresting?

   What about the information didn't interest you?

Tracking Tuna

Main Message

Using satellites and other technology, scientists are tracking bluefin tuna at sea to help conserve these threatened animals.

Captions

((2-A; photo 2.6—fisherman loading tuna into crates))
Bluefin tuna have been severely overfished. Unfortunately, our lack of knowledge about their breeding and migration patterns makes it difficult to know how many bluefin should be caught.

((2-B; photos 2.4 and 2.5—researchers tagging and releasing giant bluefin))
To discover where a bluefin goes to breed, scientists attach a tag o the fish—then release it back into the ocean.

((2-C; photos 2.2 and 2.3—images of satellite, locator map and tag))
The tag signals the tuna's location to a satellite, which sends the information back to the scientists. Some tuna set out across the ocean to breed; others stick closer to shore.

((2-D; photo 2.1—school of tuna))
Knowing where different tuna breed will help fisheries managers set more realistic quotas—and restore declining bluefin populations.

Photos

2.1	Underwater view of large tuna school	Norbert Wu	V
2.2	Color satellite map of ocean temperatures	MBA/Graphics	H
2.3	Close-up of pop-off satellite tag	MBA/Graphics	V
2.4	TRCC researchers tagging tuna onboard boat	MBA/Graphics	V
2.5	TRCC researchers releasing a tagged tuna from boat	MBA/PR	V
2.6	Close-up of freshly caught albacore on a fishing boat	NGS/Philip Schermeister	V
2.7	View of satellite in space (artist's rendering)	NASA	H

Caught in the Net

Main Message

Despite our success at protecting dolphins, tuna fishing now threatens the survival of other ocean animals.

Captions

((3-A; photos 3.1 and 3.2—purse seiner and dolphins in net))
In the 1970s, American tuna boats caught and killed hundreds of thousands of dolphins each year.

((3-B; photo 3.6—beauty shot of dolphins))
Laws established in the 1980s forced tuna fisherman to reduce the number of dolphins caught.

((3-C; photo 3.4—dolphin-safe can))
Unfortunately, "dolphin safe" fishing methods have increased the accidental catch of other ocean animals.

((3-D; photos 3.3 and 3.5—turtle and shark caught in net))
Today, tuna fishing catches fewer dolphins, but kills thousands more turtles and sharks than it did a decade ago.

Photos

3.1	Purse-seiners deploying tuna nets	NGS or Greenpeace	?
3.2	Dolphins trapped in tuna net	Greenpeace	H/V
3.3	Dead blue shark (bycatch) hanging in net	Greenpeace/R. Grace	H
3.4	Close-up photo of tuna can with "dolphin-safe" label	MBA Kris Ingram	V
3.5	Dead turtle (bycatch) hanging in net	NGS or Greenpeace	H
3.6	Beauty shot of dolphin underwater	Norbert Wu	V

Amazing Giants

Main Message

Big, strong, and fast, tuna are among the most amazing—and threatened—fishes in the sea.

Captions

((5-A; photo 5.2—beauty shot of tuna))
Tuna can cover 100 miles of open ocean each day at speeds of up to 50 miles per hour.

((5-B; photo 5.3—fisherman next to large tuna))
Tuna are among the largest fishes in the sea; bluefin tuna can grow to be 10 feet long and weigh 1,500 pounds.

((5-C; photo 5.4—humpback whales))
Like whales, tuna are warm blooded—most fishes are cold-blooded.

((5-D; photo 5.6—overfishing shot))
Unfortunately, tuna are at great risk of being depleted by commercial fishing.

Photos

5.2	Beauty shot of tuna swimming near surface	Norbert Wu	H
5.3	Fisherman next to world-record yellowfin tuna	Norbert Wu	H/V
5.4	Underwater photo of humpback whale	Steve Webster	H
5.6	Box of albacore tuna being lifted from fishing boat	NGS/Philip Schermeister	V

Troubled Seas

Main Message

Tuna, turtles, sharks and other ocean animals all face threats from current fishing practices.

Captions

((6-A; photo 6.1—large tuna on boat))
The lack of fishing regulations in the open seas makes it easy for fishermen to overfish tuna.

((6-B; photo 6.2—fishermen tossing out turtle))
Sea turtles that are accidentally trapped in nets or hooked on fishing lines usually drown and are thrown overboard as wasted catch.

((6-C; photo 6.3—sharks on dock))
Sharks are among the most threatened of all ocean animals due to intensive fishing worldwide.

((6-D; photo 6.4—sunfish on hook))
When fishermen catch ocean sunfish, they toss the fish overboard as waste. Few of these sunfish survive.

Photos

6.1	Fishermen hauling up a large tuna (overfishing)	FAO	H
6.2	Fishermen handling dead sea turtle on deck (bycatch)	Anne Heimann	H
6.3	Rows of dead sharks lined up on dock (overfishing)	Aurora/Robb Kendrick	H
6.4	Dead ocean sunfish being hauled on deck (bycatch)	Anne Heimann	H

Beyond the Can

Main Message

As the demand for fresh and canned tuna increases, we risk losing this important food source.

Captions

((1-A; photo 1.1—plate of sushi))
Tuna represent 10 percent of all seafood eaten worldwide. Japan consumes about a third of the world's tuna.

((1-B; photo 1.3 tuna cans))
Americans eat more canned tuna than any other seafood.

((1-C; photo 1.5—deck of fish))
Tuna are being fished to the limit to supply the world's growing demand for food.

((1-D; photo 1.2—frozen bluefin))
Bluefin tuna have been so depleted by fishing that in Japan—where bluefin is prized—a single fish can sell for over $60,000.

Photos

1.1	Close-up of chopsticks next to plate of sushi	MBA/Kris Ingram	H/V
1.2	Rows of frozen bluefin tuna in Tsukiji fish market	NGS	H
1.3	Store shelves displaying cans of tuna	MBA/Kris Ingram	H
1.5	Fishermen hosing down a deck full of fish	Aurora/Robb Kendrick	H

Tuna at the Aquarium

Main Message

Studies on tuna at the aquarium help scientists better understand and conserve tuna in the wild.

Captions

((4-A; photo 4.5—MBA staff placing tuna in sling))
Tuna are difficult to study at sea, so scientists must rely on captive tuna to gather certain information—such as how fast the fish grow.

((4-B; photos 4.3 and 4.4—Tunabago parked in front of aquarium; view of tuna swimming inside truck))
The aquarium is one of the few places in the world that displays captive tuna. The fish are caught off San Diego and transported on a large truck—dubbed the "Tunabago."

((4-C; photos 4.1 and 4.2—Staff cutting up food and feeding it to tuna))
Aquarium staff monitor the tunas' size and diet over time to determine precise growth rates.

((4-D; photo 4.6—deck full of fish))
Knowing how fast tuna grow helps fisheries managers determine the number of tuna that can be fished each year—without depleting the population.

Photos

4.1	MBA staff preparing squid in food-prep area	MBA/Archives	V
4.2	MBA staff tossing food into tuna pool	MBA/Archives	H
4.3	Tuna transport truck parked on Cannery Row	MBA/Archives	H
4.4	Overhead view inside truck with tuna visible	MBA/Archives	V
4.5	MBA staff unloading tuna into tank using sling	MBA/J. O'Sullivan	H
4.6	Fishermen hosing down deck full of fish	Rob Kendrick/Aurora	H