

**Getting a Sense for the Place:
Visitor Use of and Reaction to the Underwater Dome Exhibit**

Seattle Aquarium
Summative Evaluation
New Directions in Audience Research Initiative
Yearlong Project 2012–2013

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New Directions Partner Institutions



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Executive Summary

This report details a nine-month summative evaluation of the Underwater Dome Exhibit at the Seattle Aquarium. The study was undertaken to inform the Aquarium's development of short-term, cost-effective updates to improve visitor satisfaction and experience in the dome. The study sought to develop a baseline understanding of how visitors use and react to the exhibit, as well as to determine whether or not visitors understand that the dome represents the Puget Sound. Data was collected using observational and survey instruments.

Key Findings:

- Visitors had a low sweep-rate of the dome, spending an average of 4:53 minutes in it.¹
- Visitors most often entered the dome from Puget Sound Fish (99%), visited the upper left quadrant, or rocky reef area (69%); and spent some time on the downstairs level (76%).
- Most visitors (74%) had no interaction with the dome's identification signs. Of visitors who did interact, 52% browsed the signs and 35% used them to look up a species.²
- Visitors most frequently reported liking specific species and the dome's physical structure. Dislikes most often related to crowding and the dome's physical structure.
- Most visitors (65%) did not have questions. Those who did mostly had questions about specific species, with the next most common questions about identification signs.
- Most visitors (25%) reported not knowing what underwater region the dome reminds them of, with the next most frequent response being related to the Puget Sound (18%). Overall, 45% of visitors reported an area encompassing the Puget Sound.

Implications

The dome is a mixed-use area that visitors linger in and enjoy for a variety of tangible and intangible reasons. Signage may be a valuable area to consider for future updates, with potential content relating to specific species and to the dome's representation of Puget Sound. Given the low usage of existing signage, front-end evaluation of updated signage is recommended, as is additional investigation of visitors' interaction with staff and volunteers in the exhibit space.

¹ The sweep-rate calculation is based on Beverly Serrell's (1997) research. More details about the sweep-rate index are provided in the discussion portion of this report.

² One of the three identification signs was missing for part of the data collection period. This may have affected findings. For more details, see "Limitations" under the Results" section of this report.

Introduction

Since opening in 1977, the Seattle Aquarium has provided marine exhibits and education from the waterfront district of Seattle, Washington. Under the mission of “inspiring conservation of our marine environment,” the Aquarium serves over 800,000 visitors a year through six major exhibits, including the Underwater Dome. These exhibits feature marine species from the Puget Sound as well as other non-local regions. The Aquarium’s 2011–2030 strategic plan addresses the need to “refresh” its exhibits. This goal is one of several aimed to help the Aquarium increase attendance, be recognized as a global leader in marine education, and be a core economic contributor to Seattle.

The Underwater Dome is one of the exhibits the Aquarium is looking to update. This exhibit has never been evaluated before. Built as part of the original Aquarium structure in 1977, the 688-square-foot dome is housed within a 400,000-gallon tank filled with Puget Sound fish and marine life. The exhibit has two entrances, one from the Puget Sound Fish Exhibit and one from the Orca Family Activity Center, and is two-tiered, with visitors entering on the top level and five sets of stairs leading down to a lower level. Signage in the dome includes three spinning species identification signs on railing of the upper level and several notices about the daily fish feeding at 1:30 pm on the cement support beams that crisscross the tank itself.³ Volunteers and staff are periodically present in the dome to talk with visitors and answer questions, and they sometimes have an activity cart with them.

Evaluation Purpose and Questions

This evaluation sought to develop a baseline understanding of how visitors use and react to the Underwater Dome Exhibit, as well as to determine whether or not visitors understand that the dome represents the Puget Sound. Findings from this study are intended to inform the development of short-term, cost-effective updates that can improve visitors’ satisfaction and experience, while connecting them to the Aquarium’s mission.

Specifically, this evaluation seeks to answer the following questions:

³ For images of the dome and the identification signs, see appendix A.

- 1. How are visitors using the space of the Underwater Dome?**
 - a. How long do visitors stay in the exhibit?
 - b. Where do visitors go in the exhibit?
 - c. To what extent and how are visitors using the animal ID signs?
 - d. How do visitors interact with staff and volunteers in the dome?
- 2. What reactions are visitors having to the Underwater Dome?**
 - a. How do visitors feel while visiting the exhibit?
 - b. What do visitors like and dislike about the dome?
 - c. What questions do visitors have after visiting the exhibit?
- 3. To what extent do visitors understand that the Underwater Dome represents the Puget Sound?**

This summative evaluation was conducted by four principal graduate student investigators as part of the *New Directions in Audience Research* initiative of the Museology Graduate Program at the University of Washington. Initially funded by the Institute for Museum and Library Services, *New Directions in Audience Research* is a special initiative of the University of Washington Museology Graduate Program partnering with the Woodland Park Zoo. *New Directions* is designed to train Museology graduate students to understand, support, and engage in audience research and evaluation within informal learning settings. A key component of the training is partnering with local museums that serve as learning laboratories where students work to conduct onsite audience research under the guidance of evaluation mentors and support staff.

Literature Review

“Summative Evaluation of California Condor Rescue Zone” (Randi Korn & Associates [RK&A], 2011) reports on an evaluation that examined the experiences of adults and children at the Los Angeles Zoo and Botanical Gardens. The study focused particularly on visitor experiences with the exhibits, including visitor behaviors within the exhibition; interactions between visitors and zoo staff and volunteers in the exhibition; overall visitor experiences, including high and low points; and affective response to the exhibition experiences. Data was collected for this study using observations and interviews. Naturalistic observations were chosen to provide “an objective account” of a range of visitor behaviors. In-depth, open-ended exit interviews further rounded out the data by providing rich information about personal experiences. According to the report, this type of interview was chosen because of its ability to “encourage and motivate visitors to describe their experiences, express their opinions and feelings, and share with the interviewer the meaning they constructed from an experience” (p.2). Because of the open-ended nature of the interviews, the conversations were recorded and then transcribed for analysis.

A summative evaluation conducted in 2003 by RK&A took a similar approach. In seeking to describe visitor use and impressions of the *Vanishing Wildlife* exhibition at Monterey Bay Aquarium, the study used timing and tracking observations and an exit questionnaire to collect data. A unique approach in this study was that Aquarium staff and volunteers were the ones who conducted the timing and tracking observations.

With a goal similar to the evaluations above, “Jellies: Living Art” was conducted by Monterey Bay Aquarium in 2004 (Yalowitz). The purpose of the “Jellies” evaluation was to investigate visitor behavior in and reaction to an exhibition. The evaluation sought to answer, in part, how visitors were using the exhibition, including what they were attending to and where they were spending their time, and what sorts of affective responses were occurring in the exhibition. To do this, observation and interviews were used. In addition to methodology that was similar to the two studies above, this study distinguished between “attending to” from “stopping at.” According to the report, “[t]he more traditional stopping measure fails to incorporate the time someone may be looking at an exhibit while walking through a space. . . . With ‘attending to’ this time is taken into account, allowing a more accurate measure of how long a person is

looking at an exhibit” (Yalowitz 2004, p.6). In the study, a visitor needed to spend two or more seconds looking at or interacting with an exhibit to be considered “attending to” it.

The evaluations described above helped the principal investigators of this study develop the methodology and instruments used to collect data about the Underwater Dome Exhibit.

Methods

Planning for this evaluation occurred from September through December 2012, and data was collected during January, February, and March 2013 by the four principal researchers and by 13 data collectors whom the researchers trained, including eight students from the Introduction to Audience Research course and five Aquarium staff members. Data was collected on all days of the week during normal business hours except from 1 to 2:30 pm to exclude the influence of the 1:30 pm daily feeding. The sample for this evaluation was all Aquarium visitors who spent time in the Underwater Dome.

Qualitative and quantitative data was collected using timing and tracking observations and two surveys, protocol for which included:

Timing and tracking map. A timing and tracking map was used to gain an understanding of visitors' use of the dome.⁴ Using a systematic sampling method, visitors of all ages were observed from the moment they entered the dome from either entrance until the moment they exited the dome from either entrance. Data collectors observed the second person to enter the exhibit, noting the path the visitor took through the space; the location of the visitor's attention stops; the location of visitor behaviors; visitor interactions with others and with the identification signs; and the total time the visitor spent in the space. When the visitor completed his or her visit, the data collector prepared to track the next eligible visitor.

Administered survey. An administered survey was used primarily to gain an understanding of visitors' reactions to the dome and whether or not they understood that the dome represents the Puget Sound.⁵ Data collectors stood between the dome and the Orca Family Activity Center and approached the first adult English-speaking visitor to exit the dome, asking the visitor to participate in a short survey. If the visitor agreed, the data collector read the questions and recorded the visitor's responses in writing on the paper survey form. Data collectors tracked refusals and reasons for refusal, if given. When the survey was completed, the data collector prepared to intercept the next eligible visitor.

⁴ See appendix B for a copy of the timing and tracking map.

⁵ See appendix C for a copy of the administered survey.

Fill-in-the-blank survey. A fill-in-the-blank, mad lib-like form was also used to investigate visitors' reactions to and their understanding of the dome as representative of the Puget Sound.⁶ Data collectors stood between the dome and the Orca Family Activity Center with a small cart with supplies and a brief sign informing visitors about the survey opportunity. The sign was not used to recruit visitors but was provided to notify visitors about the research being conducted. Using convenience sampling, data collectors verbally invited English-speaking adults exiting the dome to complete the survey. Visitors were also able to approach the cart on their own and complete the survey. Upon completing the paper survey, visitors returned it to the data collector.

⁶ See appendix D for a copy of the fill-in-the-blank survey.

Results

Timing and Tracking Map

A total of 231 timing and tracking behavior maps were collected, of which 179 were usable.⁷ Observations were primarily conducted Monday through Friday and in the afternoon. The most frequently observed visitors were either adults or part of an adult/child(ren) group.⁸ See tables 1 and 2 and figure 1 for additional information about the timing and tracking sample.

TABLE 1: Timing and Tracking Data Collection Days and Times (n=179)

Day of Week		Time of Day	
Monday–Friday	73%	Afternoon	60%
Saturday, Sunday	27%	Morning	40%

TABLE 2: Timing and Tracking Subject Representation (n=179)

Subject	Representation within Data
Adult	80%
Child	20%

⁷ Timing and tracking maps were considered unusable if any of the following information was missing: any portion of the conditions box at the top of the instrument, the group makeup, who was tracked, the time the visitor spent in the dome, or the direction the visitor took through the dome.

⁸ The high percentage of adult subjects may be due to the sampling method as it was anecdotally observed that children typically entered the dome first followed by their adult caretaker(s).

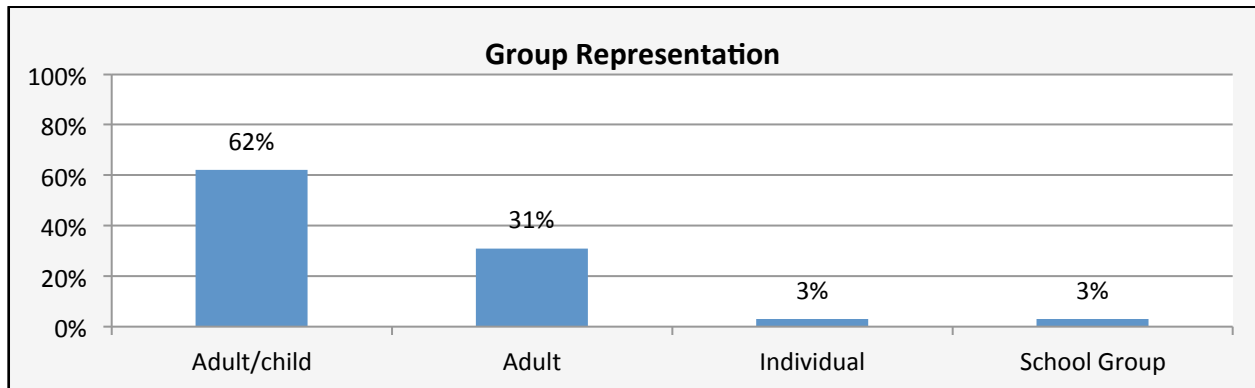


FIGURE 1. Timing and tracking group makeup (n=179).

Tracking. The majority of observed visitors entered the dome from the Puget Sound Fish exhibit (99%), and a majority (94%) also exited the dome on the opposite side through the Orca Family Activity Center. Visitors most frequently visited the upper portion of the dome, with the upper left quadrant being most visited (see figures 2 and 3).⁹ Of all visitors, 76% spent at least part of their visit to the dome in the downstairs portion.

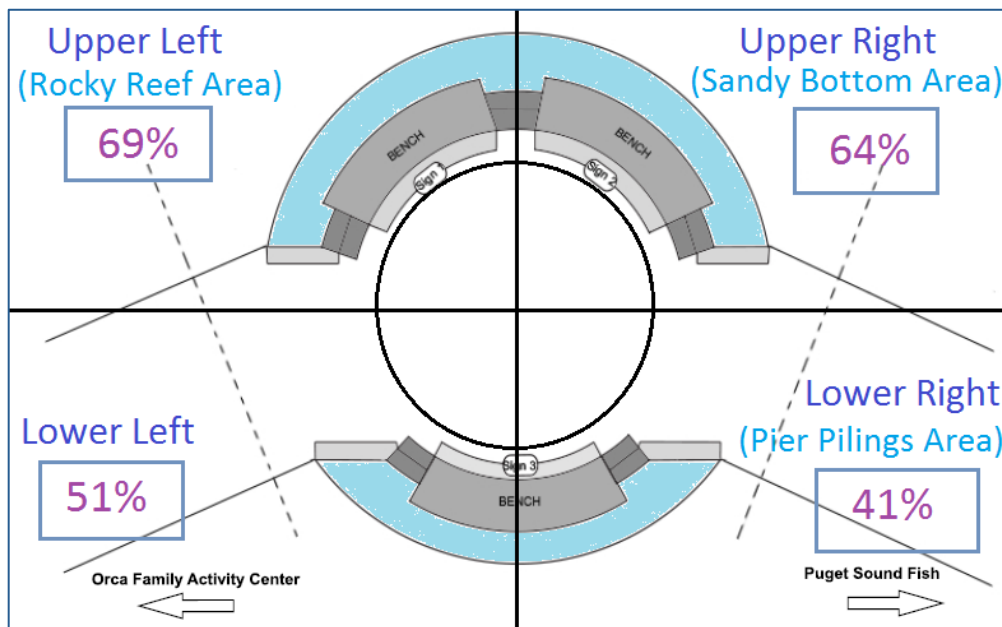


FIGURE 2. Diagram of the Underwater Dome by timing and tracking quadrants and frequency of quadrant visitation (n=170). Frequencies are also represented in Figure 3.

⁹ Of total visitors, 5% (9) walked through the middle of the dome only and were not counted as having visited any of the four quadrants.

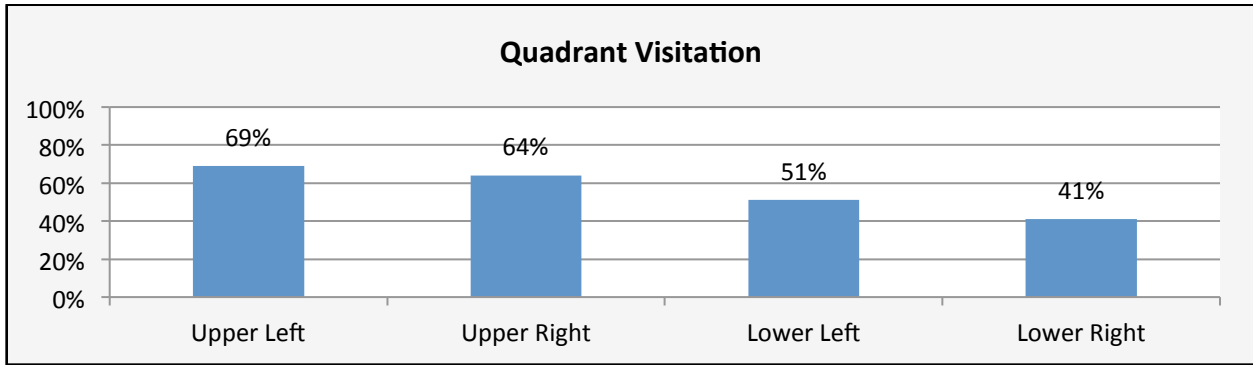


FIGURE 3. Frequency of observed quadrant visitation during timing and tracking, noting all that applied (n=170).

Stay time. On average, visitors spent 4:53 minutes in the dome, with the median amount of time being 3:57 minutes (see figure 4 for frequencies of time spent). The shortest amount of time someone spent in the dome was 7 seconds and the longest amount of time was 27:58 minutes. Children spent slightly more time in the dome than adults (an average of 5:10 minutes for children versus 4:49 minutes for adults; and a median amount of time of 4:21 minutes for children versus 3:53 minutes for adults).

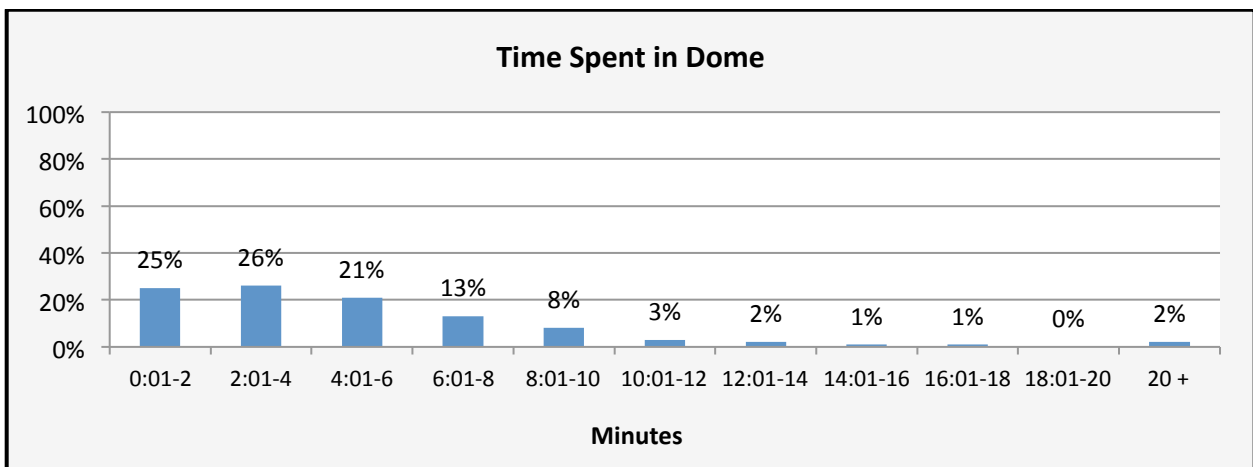


FIGURE 4. Frequency of visitor time spent in the dome in minutes during timing and tracking (n=179).

Behaviors. While in the dome, most visitors (96%) made at least one attention stop (see figure 5 for frequencies). An attention stop was noted when a visitor pointed his or her head in a single direction for two or more seconds. On average, visitors made 4.3 separate attention stops in the

dome (median 4.0), with 20 being the maximum number of attention stops made by a single visitor.¹⁰ Children had averaged more attentions stop in the dome than adults (5.1 versus 4.1).

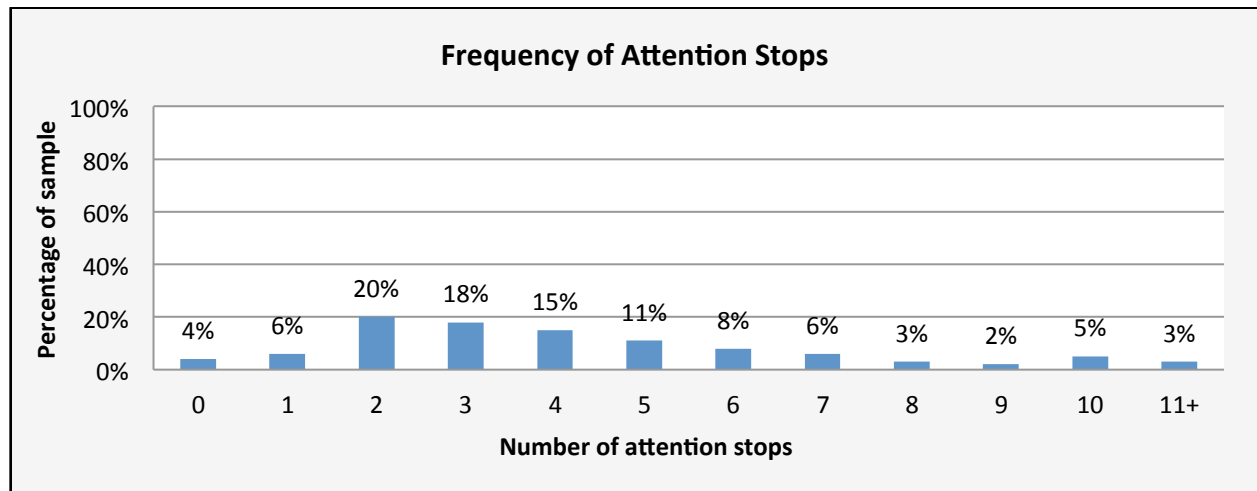


FIGURE 5. Frequency of observed attention stops per visitor during timing and tracking (n=179).

Other commonly observed behaviors included conversations within the visitor’s group, pointing, and sitting on one of the benches. See figure 6 for other behaviors and their frequencies.

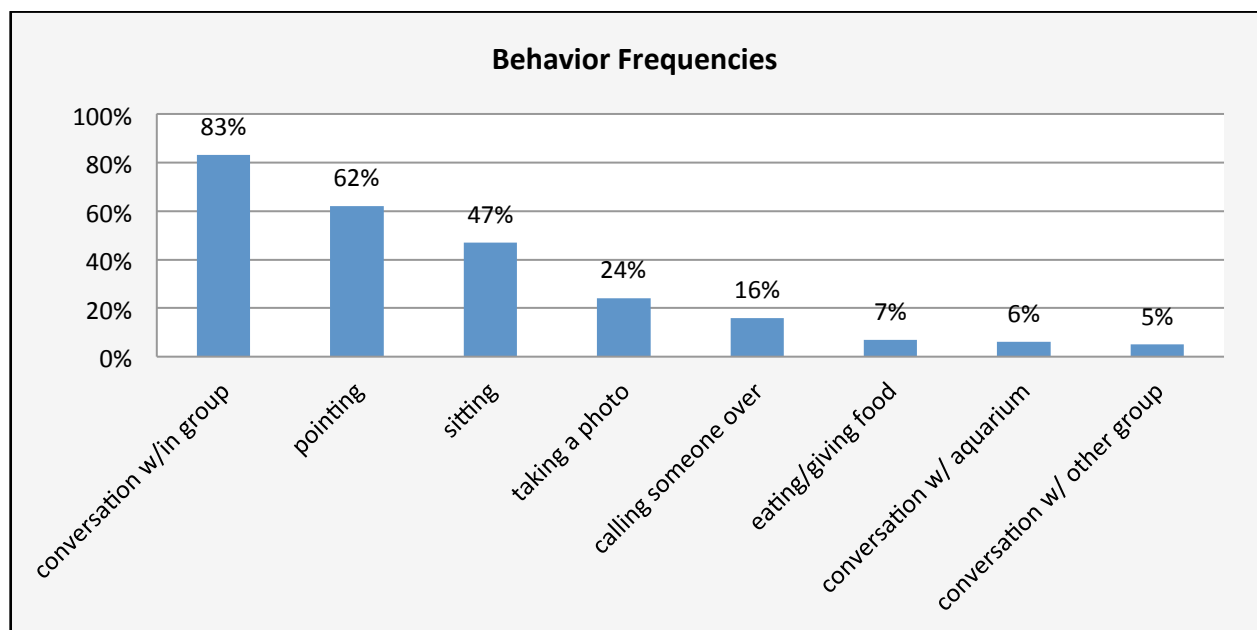


FIGURE 6. Frequency of visitor behaviors during timing and tracking, noting all that applied (n=179).

¹⁰ Attention stops were only counted once per location. For instance, if a visitor had multiple attention stops while standing at point A and one attention stop while sitting at point B, the frequency of stops would still only be 2.

Sign interaction. Most visitors (74%) did not interact with any of the three animal identification signs.¹¹ Of visitors who did interact with one or more of the signs in at least one way, browsing was the most frequent behavior (13% of total visitors, 52% of visitors who interacted with the sign). Browsing was defined as slowly turning the sign to read the different labels, possibly while looking back up to the tank itself. For other frequent behaviors, see figure 7.

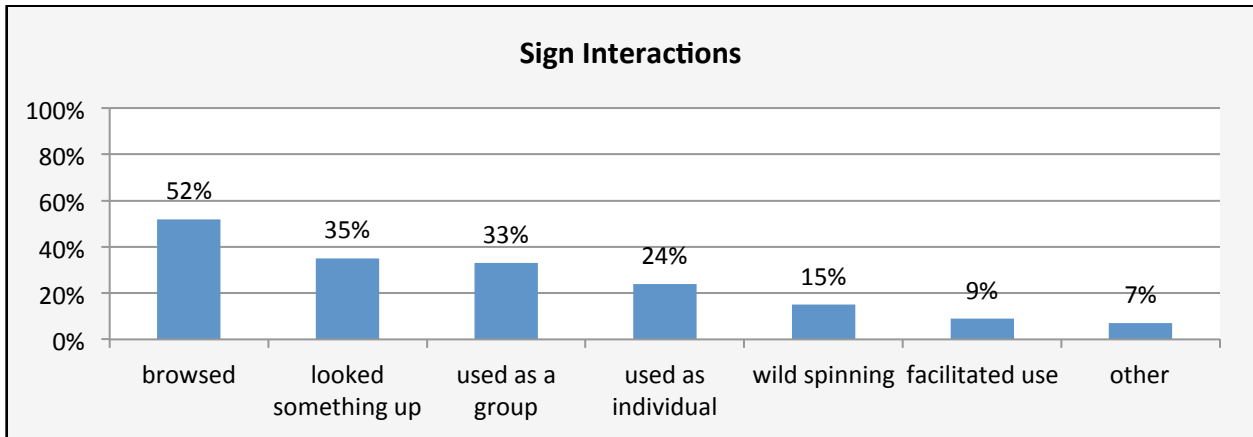


FIGURE 7. Frequency of observed visitor interactions with one or more of the identification signs during timing and tracking, noting all interactions that applied (n=43).

Staff/Volunteer Interaction. During timing and tracking observations, at least one Aquarium staff member or volunteer was present 40% of the time. When someone from the Aquarium was present, he or she most often did not have a cart and most observed visitors did not have a conversation with the staff member or volunteer (see figures 8 and 9). When a cart did accompany a staff member or volunteer (n=27), visitors had a conversation with the staff member or volunteer 15% of the time.

¹¹ The identification sign in the upper left quadrant of the dome was missing for part of the data collection period and may have influenced the rate of visitor interaction with the signs.

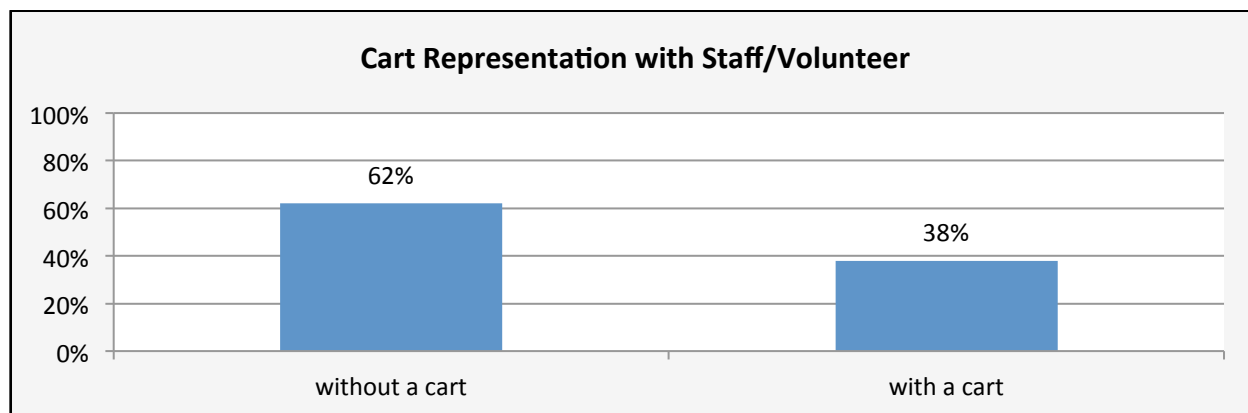


FIGURE 8. Frequency of a staff member or volunteer being accompanied by a cart while in the dome during timing and tracking (n=71).

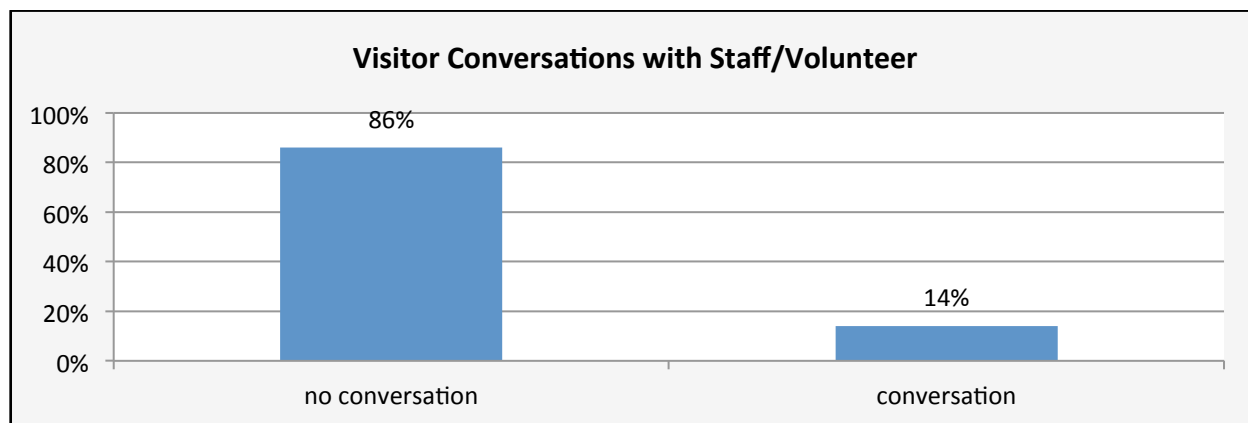


FIGURE 9. Frequency of observed visitor conversations with a staff member or volunteer in the dome during timing and tracking (n=71).

Administered Survey

A total of 186 administered surveys were collected with a refusal rate of 35%.¹² Of the 186 surveys, 158 were usable.¹³ Surveys were mostly collected on weekdays and in the afternoon (see table 3). Most survey participants were part of an adult/child(ren) or adult only group (see

¹² Commonly cited reasons for refusal included: being part of a school group, needing to chase after or keep an eye on a young child, and being pressed for time.

¹³ Administered surveys were considered unusable if any of the following information was missing or could not be extrapolated from surrounding instruments: Aquarium personnel presence; light, noise, or crowding conditions, any demographic information, and if multiple survey questions were incomplete.

figure 10 for the remaining group representation).¹⁴ Participants were also mostly in the 25- to 35-year-old age range and from Washington but outside of the Seattle area. Male and female genders were almost equally represented. See figures 11 to 13 for more information about the sample’s representation across these categories.

TABLE 3: Administered Survey Data Collection Days and Times (n=158)

Day of Week		Time of Day	
Monday–Friday	77%	Afternoon	86%
Saturday, Sunday	23%	Morning	14%

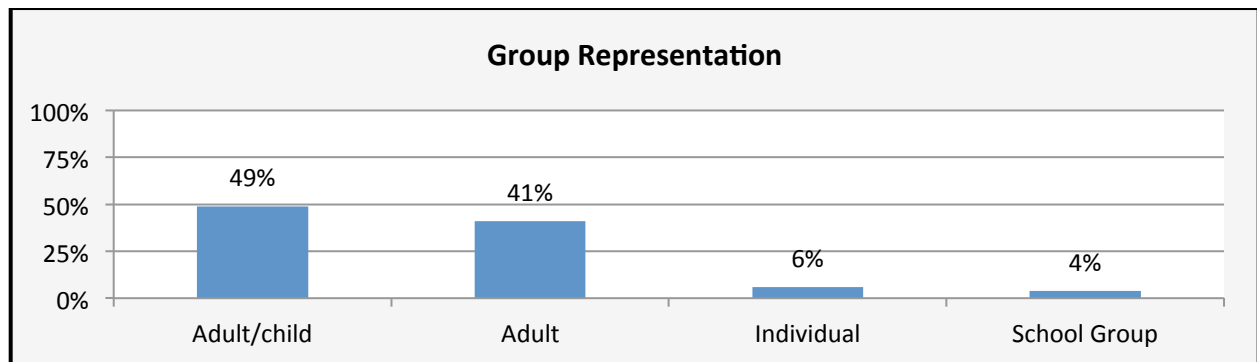


FIGURE 10. Administered survey group makeup (n=158).

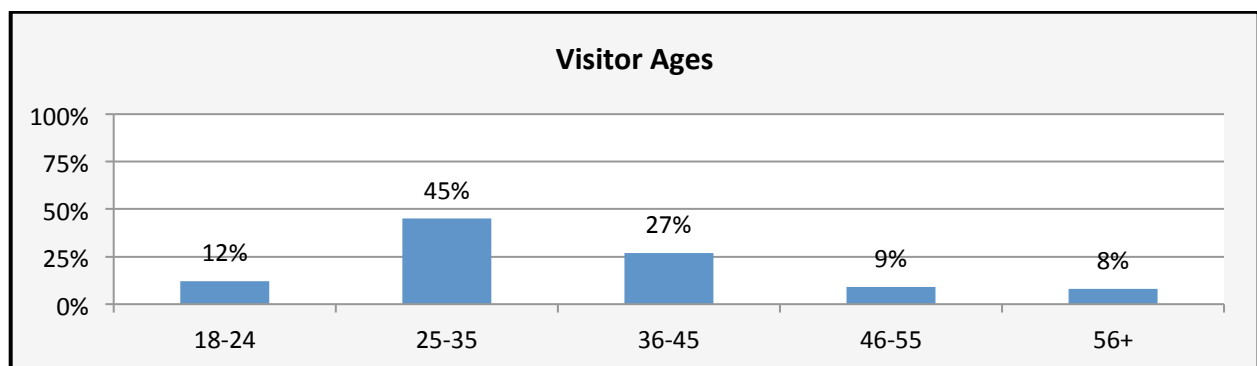


FIGURE 11. Frequency of age ranges represented in the administered survey sample (n=158).

¹⁴ The low representation of school groups in the sample despite relatively high numbers of school groups that attend the Aquarium may be accounted for by the fact that many refusals came from visitors who were part of a school group. Adult chaperones tended to not agree to participate in the survey.

TABLE 4: Administered Survey Gender Representation (n=158)

Subject	Representation within Data
Female	56%
Male	44%

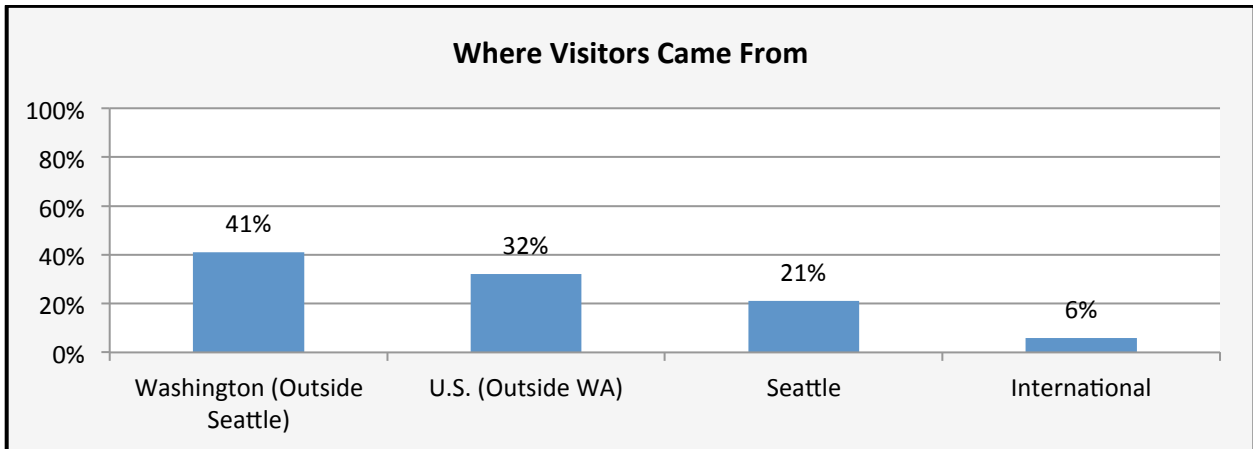


FIGURE 12. Frequency of where visitors came from (based on ZIP code) who participated in the administered survey (n=158).

Visitor background. When asked why they came to the Aquarium, most visitors cited recreational reasons, with tourism being the second-most common reason (see figure 13).¹⁵ Half of the visitors surveyed had visited the Aquarium at least once before, and half said that this was their first visit. Most of those who said they had visited the Aquarium before, also said they had visited the Underwater Dome before (84%).

¹⁵ During pilot-testing, eight overarching reasons visitors come to the Aquarium were identified. During data collection, data collectors coded visitor responses to one or more of these eight reasons or to “other.”

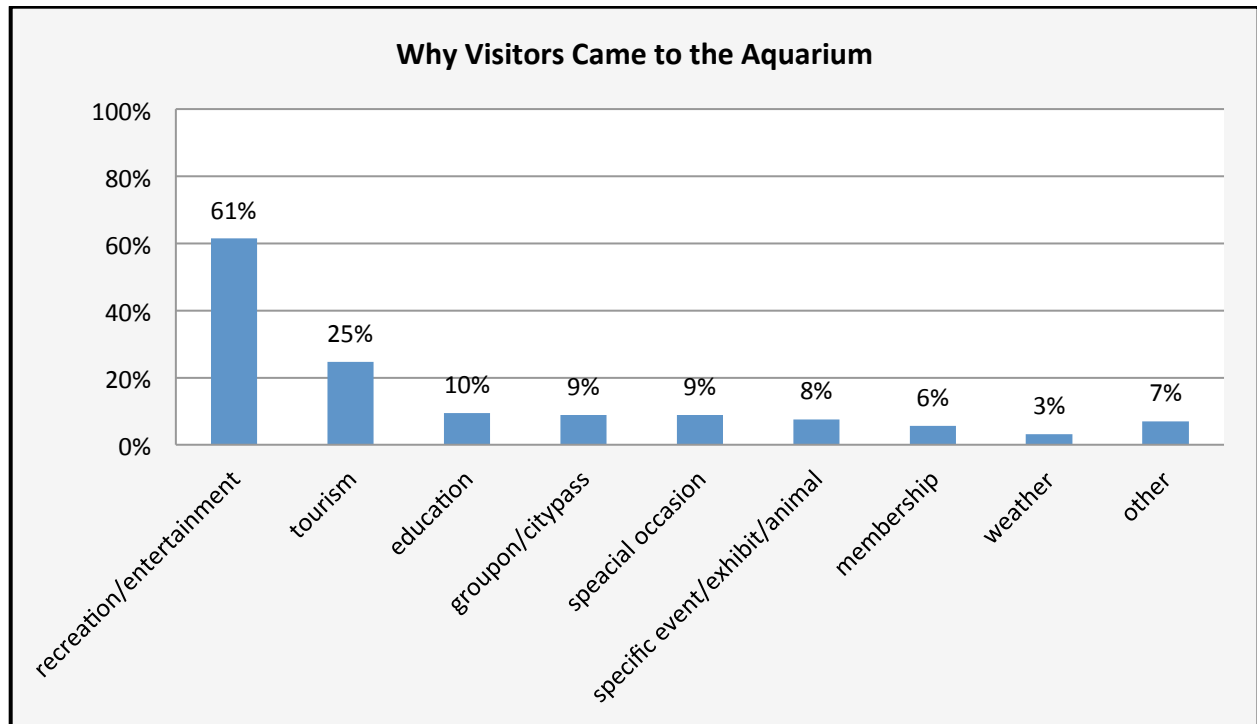


FIGURE 13. Frequency of visitor responses, checking all that applied, within pre-determined categories to the question on the administered survey “Why did you come to the Aquarium today?” (n=158).

Activities in the dome. Most visitors reported watching or looking while in the dome, with visitors also frequently reporting sitting down and moving around the dome. See figure 14 for behavior frequencies and table 5 for sample responses within each behavior code.

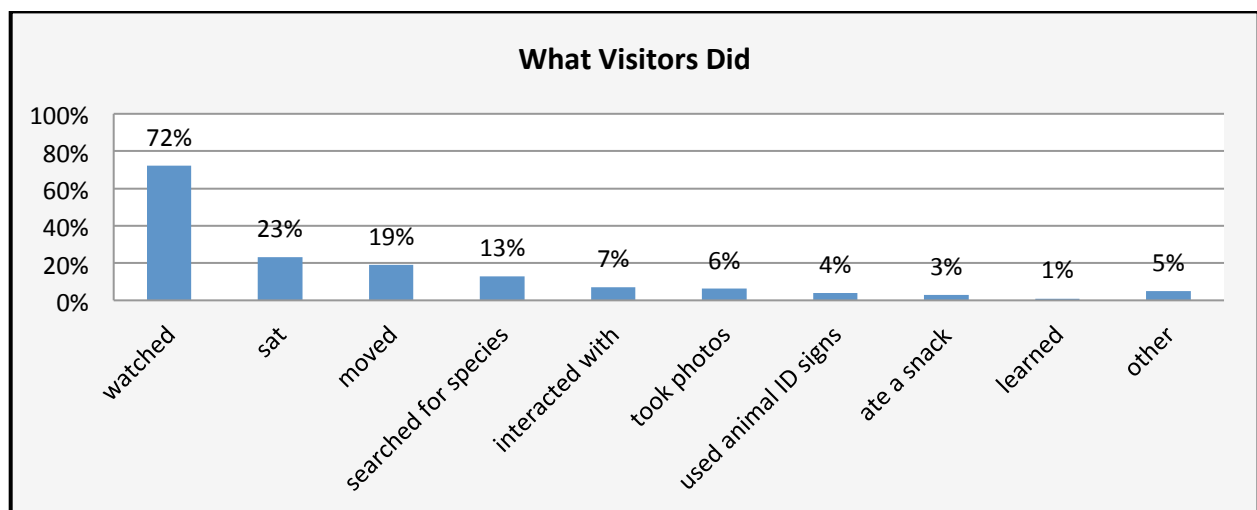


FIGURE 14. Frequency of visitor responses, checking all that applied, within coded categories to the question on the administered survey “What did you do in the dome today?” (n=158).

TABLE 5: Sample responses to the questions on the administered survey: “What did you do in the dome today?”

Behavior Codes	Sample Responses
Watched	“looked at fish” • “looked at ceiling to see if fully enclosed” • “observed”
Sat	“sat down” • “sat” • “sitting after lots of walking”
Moved	“wandered all the way through” • “climbed stairs” • “let kids run around”
Searched for species	“picked out the fish they knew” • “saw sharks” • “pointed out sharks/starfish” • “look for interesting fish”
Interacted with others	“my husband teaches them about fish” • “staff talked about stuff” • “showing son different windows” • “explored diff levels with small child”
Took photos	“took it all in/take photos” • “took pictures”
Used animal ID signs	“looked at fish and looked at the pictures to look up the fish” • “looked at wheel descriptions” • “read displays”
Ate a snack	“sat and ate lunch” • “eat snacks and watch”
Learned	“learned about the eggs and the ling cod” • “looking up fish, learning names”
Other	“enjoy quiet” • “didn’t know if they could enter” • “birds”

Visitor likes. When asked what they liked best about the dome, a majority of visitors reported liking elements of the physical structure of the dome. This included things like the seating area, architecture of the dome itself, and the 360-degree views provided by the structure. Visitors also mentioned a specific animal species within the dome as their favorite thing about the exhibit. Many of those who cited a favorite animal species, named the sharks as their favorite. Other common responses were about the atmosphere and immersive nature of the exhibit, or the variety of fish and diversity of life represented in the tank. Several visitors appreciated that the dome highlights local, native species in particular. See figure 15 for the frequencies for each coded response and table 6 for sample responses within each code.

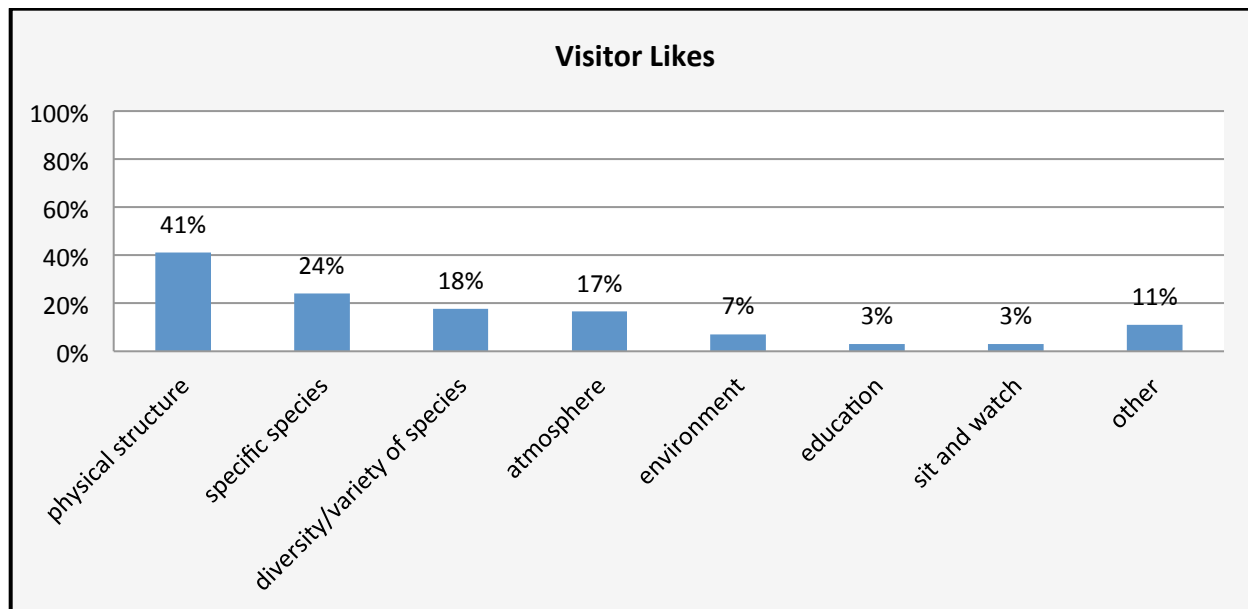


FIGURE 15. Frequency of visitor responses within coded categories to the question on the administered survey “What did you like best about the dome?” (n=158).

TABLE 6: Sample responses to the questions on the administered survey: “What did you like best about the dome?”

“Like Best” Codes	Sample Responses
Physical structure	“pilings, steps (architecture)” • “sitting area/lighting” • “the dome itself” • “360° viewing”
Specific species	“flat fish, flounders” • “sharks!” • “big fish/sting rays”
Diversity / variety	“variety/volume of fish” • “diversity of fish” • “variety of local fish”
Atmosphere	“relaxing” • “puts you underwater, better feel of their environment” • “peaceful” • “warm and open” • “looks nice to sit and contemplate”
Environment	“how the fish are from here” • “seeing fish in natural setting, being able to see the rain” • “actually Puget Sound” • “like that it’s local, Puget Sound fish” • “cool to see what [fish] we have” • “it’s all natural”
Education	“learning about the fish” • “fish names/labels” • “trying to ID the fish”
Sit and watch	“looking at fish” • “sitting and watching” • “chance to sit and take it all in”
Other	“interaction” • “reminds him of the library on the Nautilus 20,000 leagues” • “What’s not to like?” • “everything”

Visitor dislikes. Most visitors did not mention anything they disliked about the dome or reported not knowing what they liked least. Visitors that did report disliking something, made comments about how crowded the dome was, or disliked elements of the physical structure of the dome—in particular the perceived size of the space and the obstruction of views created by the concrete between the window panes. Twenty-one percent of visitors who reported disliking the structure also mentioned crowding. See figure 16 for frequencies for each coded response and table 7 for sample responses within each code.

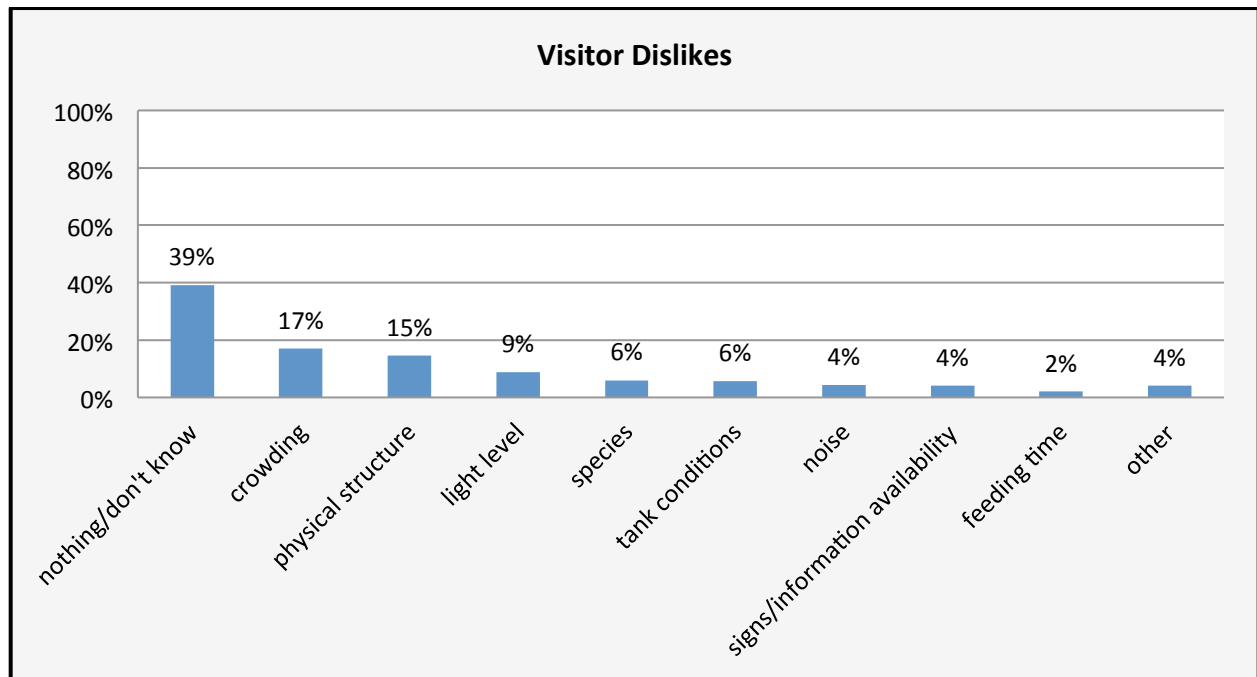


FIGURE 16. Frequency of visitor responses within coded categories to the question on the administered survey “What did you like least about the dome?” (n=158).

TABLE 7: Sample responses to the questions on the administered survey: “What did you like least about the dome?”

“Like Least” Codes	Sample Responses
Crowding	“crowded a little” • “nothing, maybe little kids getting under feet” • “when crowded it is very stuffy, had to take young son out of room”
Physical structure	“concrete bars” • “windows a bit small, concrete gets in the way - not a big deal” • “not big enough, too crowded b/c people stay because it's a great spot to rest” • “wish there was not so much concrete” • “It's small”

Light level	“dark” • “little too dark”
Species	“fish are far away” • “not enough sharks” • “more tropical fish, it's Puget Sound and not interesting” • “no big sharks”
Tank conditions	“Hard to see through the water, can't see top of it” • “the murky water” • “Water not clean”
Noise	“loud children” • “noise level” • “hard to hear”
Signs/information availability	“animal ID could be more useful (like spinning though)” • “not very interactive, not information about what you're seeing” • “lack of information - kids playing with spinny things” • “identification of fish was hard with flip chart”
Feeding time	“missed feeding time, would like more than one” • “missed feeding”
Other	“floor too dirty for crawling baby” • “kid trips near windows, kid falls down” • “cold” • “warmer in here than would like” • “more color”

Visitor questions. Most visitors had no questions or did not recall having any about the dome. Of those who did have questions, most were related to species with most of those species-related questions being about animal identification. A small percentage of people had their questions answered by an identification sign or by a staff member or volunteer. See figure 17 for other question-related frequencies, figure 18 for species question frequencies, and table 8 for sample species-related responses.

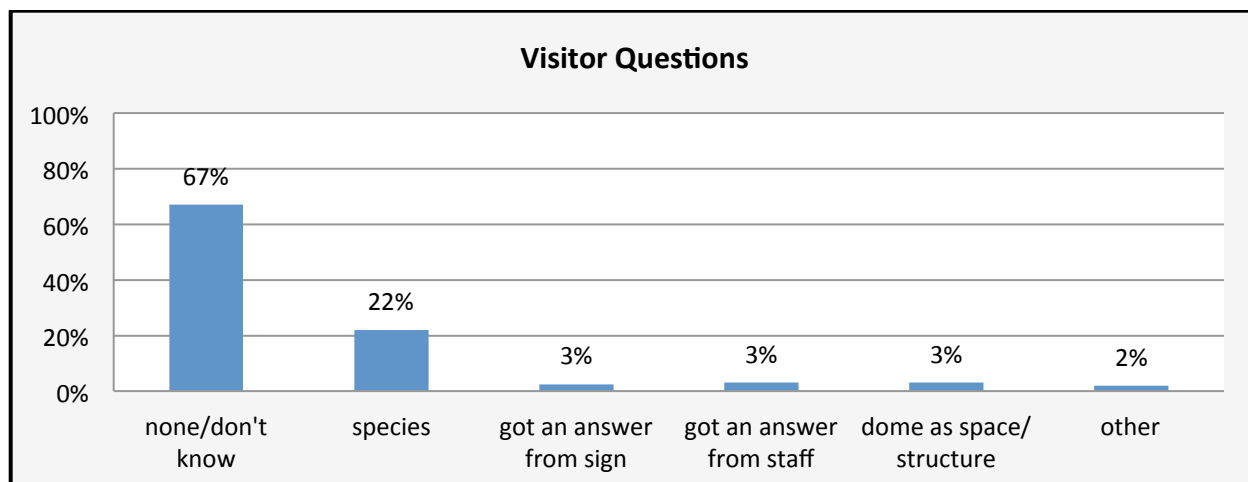


FIGURE 17. Frequency of visitor responses within coded categories to the question on the administered survey “Was there anything you saw or did in the dome today that prompted any questions? If so, what?” (n=158).

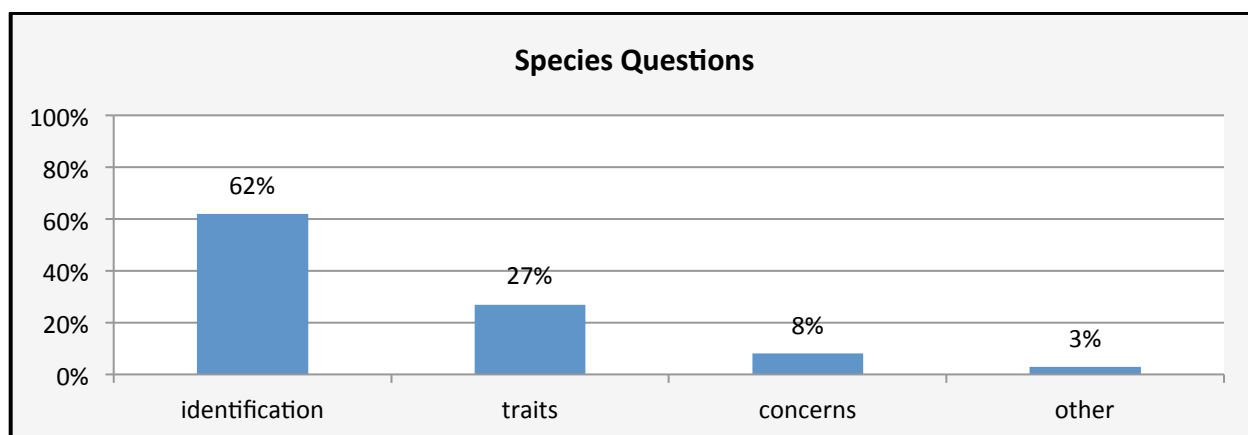


FIGURE 18. Frequency of types of visitor questions about species within coded categories in the administered survey (n=37).

TABLE 8: Sample species-related questions.

Species Questions Codes	Sample Responses
Identification	“what were the flat fish? not on species are on the spin signs” • “big long fish—what was it?” • “question about whether or not something was a shark - no cell service so couldn't verify” • “can't find eel--where is it?”
Traits	“resting why? (on bottom)” • “are they all fish from around here?” • “I wondered how people knew how to put certain fish together so they do not eat each other” • “starfish stick to glass, why? [from child w/ adult]” •

	“how do you keep sharks from eating other fish?”
Concerns	“seems like there were more fish/sharks before?” • “no, but there was a dead fish - do people know about that?”
Other	“how do you have baby sharks?”

Puget Sound connection. When prompted, 25% of participants said they did not know what underwater region the dome reminds them of. The next most frequent response was related to the Puget Sound. Additionally, nearly half (45%) of visitors said that the dome reminded them of regions around or encompassing the Puget Sound (percentage includes responses coded as “Sound,” “Pacific Northwest,” and “Seattle Area”). Other common responses included the ocean in general or other specific underwater regions distinct from the Puget Sound. See figure 19 for frequencies for each coded response and table 9 for sample responses.

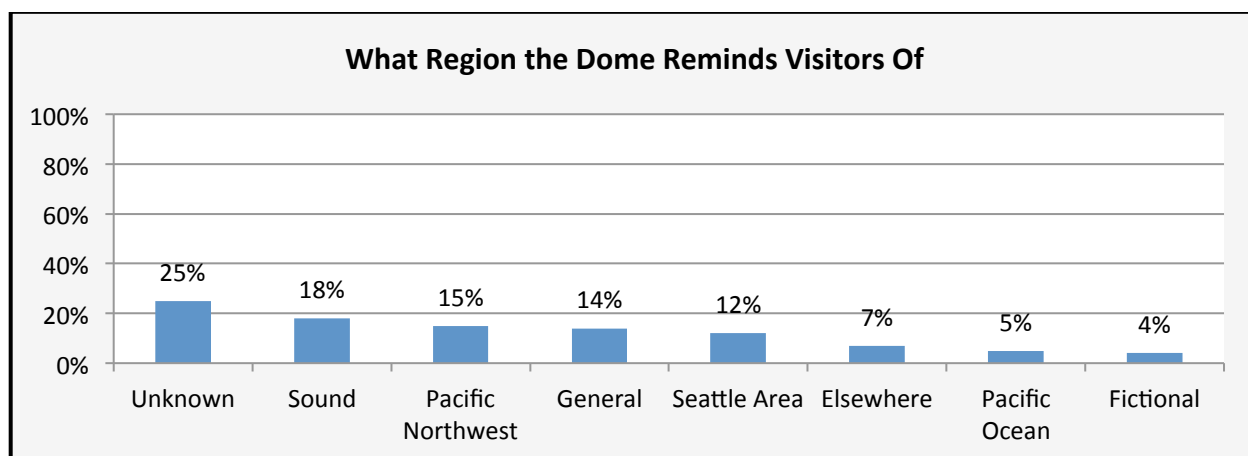


FIGURE 19. Frequency of visitor responses in the administered survey within coded categories to the question “When standing in the dome, what underwater region does it remind you of?” (n=158)

TABLE 9: Sample responses to the questions on the administered survey: “When standing in the dome, what underwater region does it remind you of?”

Region Codes	Sample Responses
Sound	“Puget Sound” • “the Sound”
Pacific Northwest	“Northwest” • “PNW – know because I’m a diver” • “upperwest coast”

General	“underwater” • “like a lake” • “the harbor” • “not Hawaii, somewhere colder” • “kelp beds”
Seattle Area	“probably here” • “our area” • “local” • “under piers along waterfront” • “Seattle” • “Port Townsend”
Elsewhere	“Alaska” • “tropical with colored fish.” • “snorkeling in Hawaii” • “Gulf of Mexico” • “Chile” • “coral reef?”
Pacific Ocean	“Pacific Ocean” • “Pacific” • “West Coast”
Fictional (includes unnatural settings)	“Sea World” • “Atlantis” • “finding nemo” • “Jules Verne” • “aquarium of Chicago and at Montreal”

Fill-in-the-blank Survey

A total of 241 fill-in-the-blank surveys were collected with a refusal rate of 44%.¹⁶ Of the 241 surveys, 203 were usable.¹⁷ Surveys were mostly collected on weekdays, with almost equal collections during mornings and afternoons (See table 10). Most survey participants were visiting with their family, friends, or significant other (see figure 20 for remaining group representation). Participants were also mostly in the 25-35 age range, were from the U.S. and Washington State (outside of Seattle), and identified female.¹⁸ See figure 21-23 for more information about the representation across these categories.

TABLE 10: Fill-in-the-Blanks Survey Data Collection Days and Times (n=203)

Day of Week		Time of Day	
Monday–Friday	62%	Afternoon	52%
Saturday, Sunday	38%	Morning	47%

¹⁶ Because this instrument used convenience sampling, specific reasons for refusal were not recorded.

¹⁷ Fill-in-the-blank surveys were considered unusable if any of the following information was missing: any portion of the conditions box at the top of the instrument or the answers to multiple questions.

¹⁸ Fill-in-the-blank participants were asked to self-identify. When a possible gender could be inferred, the response was coded as such.

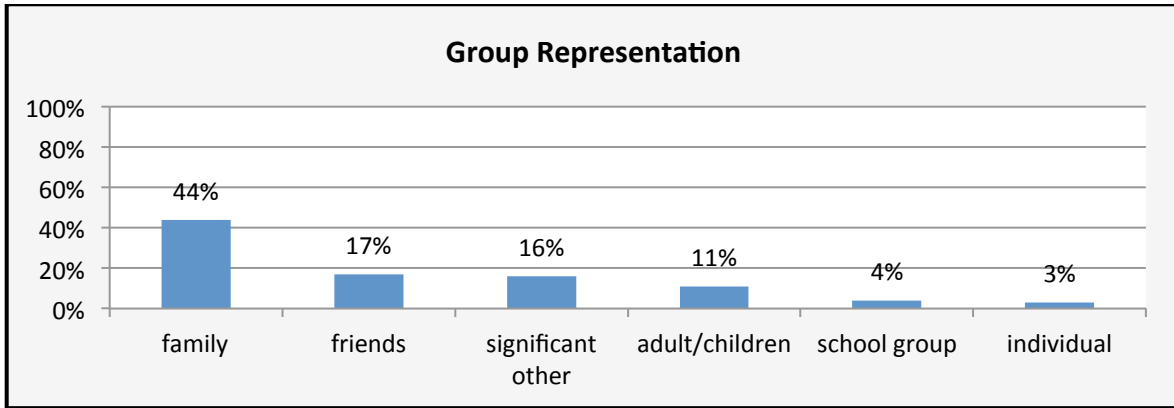


FIGURE 20. Fill-in-the-blank survey group makeup (n=193)

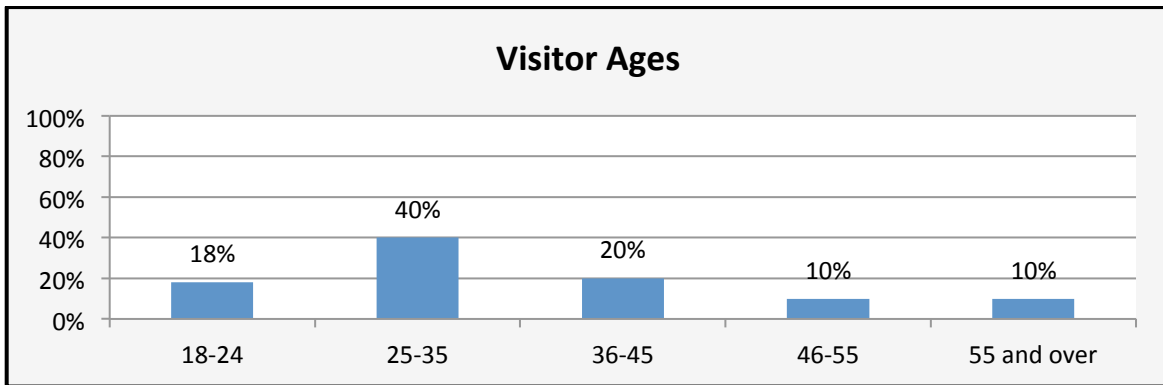


FIGURE 21. Frequency of age ranges represented in the fill-in-the-blank survey sample (n=198)

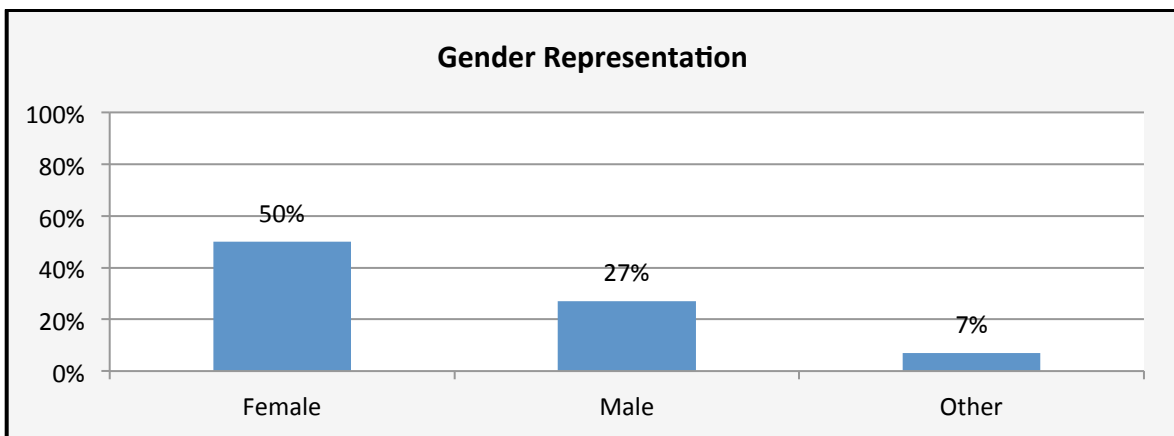


FIGURE 22. Fill-in-the-blank survey gender representation (n=172)

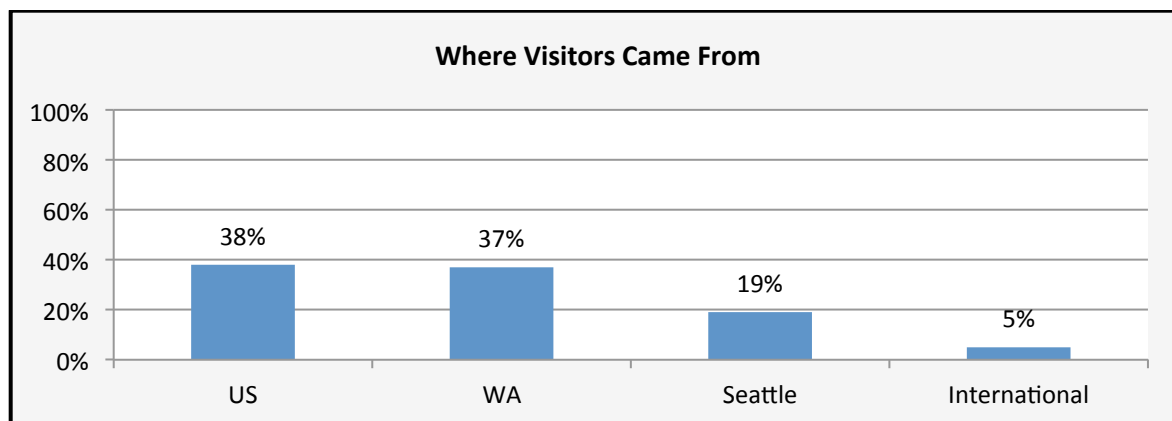


FIGURE 23. Frequency of where visitors came from (based on ZIP code) who participated in the fill-in-the-blanks survey (n=200). U.S. answers exclude Washington, and Washington answers exclude Seattle.

TABLE 11: Sample responses to the self-identify question on the fill-in-the-blank survey

Gender Codes	Sample Responses
Female	“girl” • “mother of 3” • “woman” • “auntie” • “grandma” • “lady”
Male	“Irish male” • “dude” • “gentleman” • “father” • “baby daddy”
Other	“parent” • “3 rd grade teacher” • “scientist” • “dive master” • “scientist”

“When I was in the dome I _____ (verb – action word or description).”¹⁹

Visitor Behaviors. When asked what they did in the dome, almost half of visitors reported watching or looking at something, with the next most frequent responses being an expression of feeling awe or enjoyment. See figure 24 for other response frequencies and table 12 for sample responses.

¹⁹ Because of the unconventional nature of the fill-in-the-blank survey, exact questions as they appeared on the instrument are included here with each discussion point.

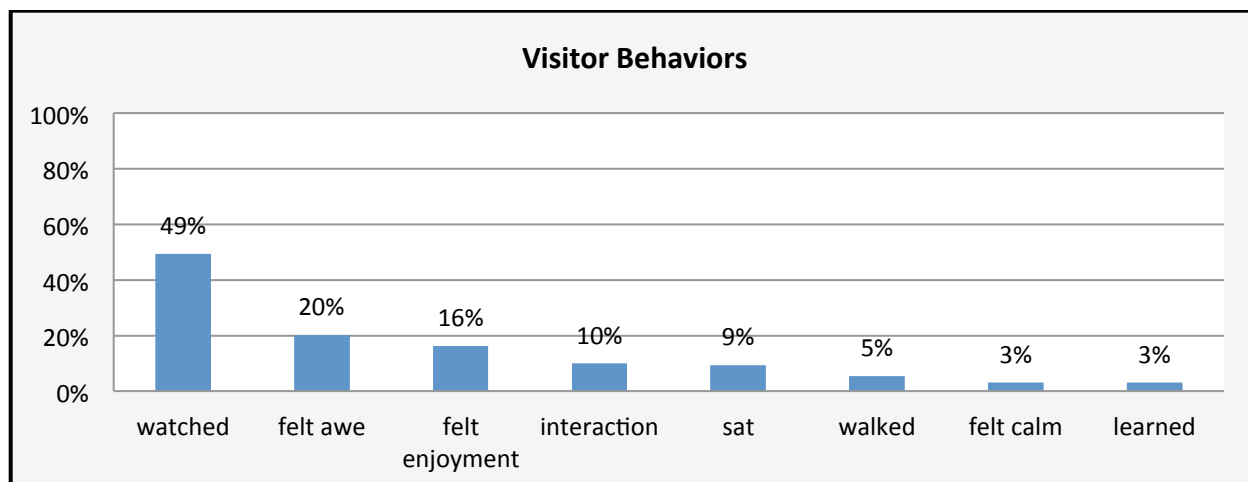


FIGURE 24. Frequency of visitor responses, checking all that applied, to the question on the fill-in-the-blank survey “When I was in the dome I _____.” (n=195)

TABLE 12: Sample responses to the fill-in-the-blank question “When I was in the dome I _____.”

Behavior Codes	Sample Responses
Watched	“I enjoyed looking at all the fish” • “watched the kids play” • “watched the fish” • “sat and looked at the fish” • “looked at all the animals”
Felt awe	“was awed” • “was amazed” • “watched the boys in awe of the fish” • “remained in awe—it is my favorite of the entire aquarium. when I was a little girl, I gazed under it the same way I did today” • “stared in awe” • “was intrigued by all the species and in awe of the cool dome’s view”
Felt enjoyment	“enjoyed the information and variety” • “enjoyed the atmosphere” • “I enjoyed looking at all the fish” • “enjoyed the large flounder/halibut” • “enjoyed the variety of fish to see” • “enjoyed the experience” • “enjoyed the staff and talking with the girls”
Interaction	“chased my child” • “ran, walked” • “walked; got close; sat down” • “followed my grandson”
Sat	“sat and watched the fish” • “it was nice being able to sit down” • “sat down and relaxed” • “sat down and observed”
Walked	“walked around” • “chased my child” • “ran, walked” • “followed him around” • “did a lot of walking”
Felt Calm	“felt relaxed” • “feel calm and serene” • “sat down and relaxed” • “peacefully sat down and watched the fish” • “felt peaceful + amazed”

Learned	“learned a lot” • “saw what I used to think was only freshwater fish” • “identified fish species” • “learned lots” • “learned something new” • “enjoyed the information and variety”
---------	--

“My favorite thing about the dome has got to be _____ (noun – person, place, or thing word[s]).”

Visitor favorites. For most visitors, a specific species or the diversity of species was their favorite thing about the dome. Among visitors who mentioned specific species, 5% mentioned a species that cannot be found in the dome (e.g., sea otters). The architecture of the dome was also frequently mentioned as a favorite. See figure 25 for other response frequencies and table 13 for sample responses.

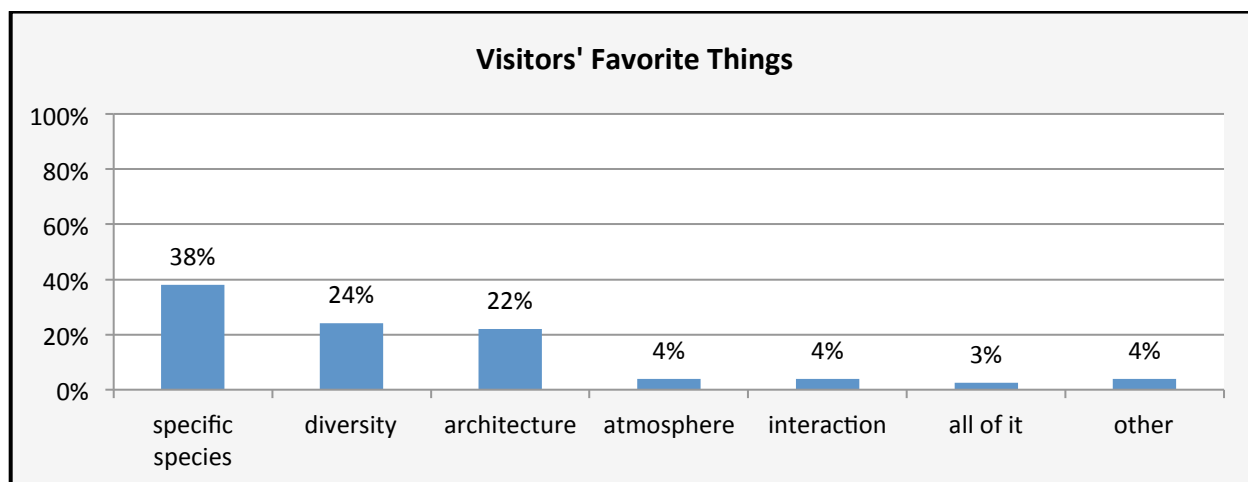


FIGURE 25. Frequency of visitor responses, checking all that applied, to the fill-in-the-blank question “My favorite thing about the dome has got to be _____” (n=190)

TABLE 13: Sample responses to the fill-in-the-blank question “My favorite thing about the dome has got to be _____”

Favorite Things Codes	Sample Responses
Specific species	“giant clams” • “the salmon” • “the flat fish” • “halibut” • “little sharks”
Diversity	“the variety of fish and feeling like being underwater” • “variety of species” • “the variety of fish” • “all the fishes” • “the fish variety”
Architecture	“the dome shape” • “being able to see the fish up close” • “close view of

	so many fish” • “the architecture” • “the glass at the top” • “seeing the fish all around us; we like that you can sit and watch” • “being under the fish” • “open space” • “the size of the space and the variety of animals in it” • “sitting underwater and viewing all the creatures naturally; starfish” • “that you can tell it opens up to the sky”
Atmosphere	“I find it peaceful; relaxing” • “the variety of fish and feeling like being underwater” • “a sense of wonder; the wow factor” • “it is warm” • “the tranquility” • “peacefulness” • “the setting” • “the cool environment” • “
Interaction	“seeing my kids enjoy picking up neat qualities about the fish” • “David’s stories” • “my kids’ reactions” • “seeing my son point out a variety of animals/fish”
All of it	“everything!” • “that’s too difficult; I enjoy the whole experience”
Other	“with my grandson who loved it” • “being here again”

“For me, being in the dome was _____ (adjective – descriptive word[s]).”

Visitor response. Visitor responses to this question were diverse and did not lend themselves well to categorization. The eight words used most commonly, from most to least frequent, were: (1) fun, (2) relaxing, (3) interesting, (4) amazing, (5) cool, (6) exciting, (7) educational, and (8) calming. Visitors also conveyed feelings of nostalgia (“fantastic reminded me of childhood”), immersion (“almost like being in the Sound”), and inspiration (“inspiring”). Almost all answers were positive in tone, but only one person giving a directly negative answer (“loud and crowded”). The wordel in figure 22 provides additional insight into visitors’ responses.

TABLE 14: Sample responses to the fill-in-the-blank question “I felt like I was in _____”

Sense of Place Codes	Sample Responses
Ocean	“a sea” • “the ocean” • “the ocean; scuba diving without getting wet” • “underwater” • “under the sea”
Fictional place	“the TV show <i>Lost</i> ” • “magical fairyland” • “Atlantis” • “dream” • “tee-pee” • “outer space” • “an underwater kingdom”
Nonfictional place	“an aquarium” • “the port” • “a dome” • “Hawaii” • “Cancun” • “FL keys”
Puget Sound	“ the Puget Sound” • “the Sound” • “Puget Sound” • “the Puget Sound near the docks”
Seattle	“Seattle” • “here”
Pacific Ocean	“the Pacific” • “the Pacific NW” • “Northwest”

Discussion

How are visitors using the space of the Underwater Dome?

Data from all three instruments suggests visitors use the dome in a wide range of ways. Although no single behavioral use prevails, it does seem clear that people are likely to visit the upper left quadrant (rocky reef area) of the dome and to go downstairs.

Data also suggests that visitors spend quite a bit of time in the dome, particularly given its size. According to the sweep-rate index used to calculate how quickly visitors move through an exhibit (Serrell, 1997), the dome has a low sweep rate.²⁰ The low sweep rate may indicate high levels of visitor attention to and engagement with the exhibit. When implementing cost-effective, short-term updates to the dome, the Aquarium may want to keep an eye on how such changes might influence the sweep rate.

Also, the data shows that most visitors are not using the informative resources the Aquarium provides in the dome (the identification signs and occasional staff members or volunteers with or without an educational cart). Part of the low usage of the identification signs may be related to the signs' locations, which are designed to be read from the upper level of the dome. Since most visitors do spend some of their time on the downstairs level of the dome, they may not have easy access to a sign if they want information while they are downstairs. Visitors who did use the species identification signs were mostly observed to use them as intended, but the administered and fill-in-the-blank survey instruments point to the fact that the current signs do not necessarily provide the information visitors seek. The low use of the current identification signs, despite the length of time visitors spend in the dome, suggests the signs may not be in a form or location that visitors find useful and convenient.

As for visitors' interaction with Aquarium personnel, additional research is needed. Although staff members or volunteers were present in the dome during 40% of timing and tracking observations, visitors were rarely observed speaking with them. There is currently insufficient data about visitor/personnel interactions from which to draw strong conclusions.

²⁰ The sweep rate of an exhibit is determined by dividing the exhibit's square footage by the average amount of time visitors spend in that exhibit. In this case, 688 square feet divided by 4.88, creates a sweep rate of 141.

What reactions are visitors having to the Underwater Dome?

Just as visitors use the dome in a wide variety of ways, the data also shows that their responses to the dome are diverse. People react both to the more tangible physical space and marine life of the dome as well as to the more intangible emotions and sensations they may experience there.

Visitors seem to be particularly reacting to the dome's physical structure, which was mentioned fairly frequently in both visitor likes and dislikes, with likes tending to include mentions of the view created by the structure and the space to sit, and dislikes tending to include mentions of the size of the space and the cement beams.

Visitors also have strong reactions to and interest in the species in the dome tank, with many visitors reporting specific species as the thing they like best about the dome. Because of this high appreciation of species, it is not surprising that visitor questions while in the dome primarily concern species, including their identification, traits, and behaviors. These questions suggest that visitors may want information beyond what the current interpretive resources in the dome offer or, given the low usage of the identification signs, visitors may not be aware of the information that is available.

As for more intangible reactions, visitors seem to primarily have positive experiences while in the dome. Again, people's responses to the dome are diverse, ranging from feelings of excitement and fun to ones of peace and contentment. These findings seem to underscore the value of the dome to a wide range of visitors as part of their Seattle Aquarium visit.

To what extent do visitors understand that the Underwater Dome represents the Puget Sound?

Most visitors do not know what underwater region the dome reminds them of. However, although the Puget Sound is not the most frequent response given by visitors, it is still well represented among the data. Furthermore, many visitors mention areas within or encompassed by the Puget Sound. This suggests that visitors may be struggling to make the Puget Sound

connection with precision, but almost half of all visitors do seem to understand that the exhibit is meant to represent a local environment.

Limitations

Two primary limitations have been identified that may affect the findings presented here. First, one of the three identification signs was missing during part of our data collection period (the one in the upper left quadrant [rocky reef area] of the dome). This may have influenced visitors' low usage of the identification signs. Second, both the administered and fill-in-the-blank survey questions that connected to the third evaluation question about the Puget Sound could have benefitted from additional pilot testing and possible revisions. These questions elicited a wider array of answers than expected, which may have diluted some of our findings.

Conclusion & Recommendations

The goal of this evaluation was to provide a baseline understanding for the Aquarium of how visitors use and react to the Underwater Dome exhibit. As this evaluation has shown, the dome is an area where visitors spend an extended period of time, during which they use the space in a variety of ways and experience a range of responses. Despite the mixed-use, mixed-response nature of the dome, this evaluation does reveal specific findings that can inform the Aquarium as it considers updates to refresh the exhibit.

In light of the findings presented above and the Aquarium's interest in pursuing short-term, cost-effective updates to the dome, it is recommended that two areas be considered as particularly relevant and actionable:

Signage and interpretive materials. Updating or reinventing current signage, adding additional signage, or providing other interpretive resources and materials may be valuable ways to refresh the dome exhibit and to connect with visitors' existing interests about the space and species.²¹ Signage changes might also be one way to make the connection between the dome and the Puget Sound to be stronger for more visitors. If the Aquarium does undertake changes to signage or interpretive materials, quadrant visitation rates can help guide sign placement for maximum visibility. The fact that three quarters of visitors spend some time downstairs should also be considered when planning updates or changes. Pilot testing sign styles and placements with front-end observations can help further ensure that updated signs are more useful to visitors.

Staff members and volunteers. Visitor interactions with staff members and volunteers in the dome are a rich area for future evaluation. Such personnel could have a potentially significant impact on visitor experiences in the dome and could be a valuable supplement to existing or updated interpretive materials in the dome. Future evaluation could target how people currently

²¹ For instance, given the mixed responses of visitors to the physical structure of the dome, the Aquarium might consider ways it could convey information to visitors about the dome itself, such as the size of the tank or its legacy as part of the original 1977 Aquarium structure. Also, given visitors' high levels of interest in what's behind the glass, updates to the dome should be considered, at least in part, in terms of how they might improve visitors' experiences with and learning about the various species.

interact with staff and volunteers in the dome, and it could also be used to pilot test other methods of interaction (for instance, activity carts, props, or scheduled “ask us” sessions).

Whatever updates or changes are pursued, this research reaffirms the Aquarium’s recognition that the Underwater Dome exhibit is an area worth investment and evaluation. As part of the Seattle Aquarium’s beginning in 1977, the dome is still a valued and dynamic part of visitor experiences today.

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Appendices

Appendix A: Photos of the Dome



Photo Credit: Seattle Aquarium

View from the Orca Family Activity Center Entrance (note: special event image).



Photo Credit: Seattle Aquarium

View of the downstairs level with seating.



Photo Credit: Researchers

View into the tank from the upstairs level.



Photo Credit: Researchers

One of the species identification signs.

Appendix B: Timing and Tracking Instrument

Data Collector Initials: _____ (<input type="checkbox"/> mus <input type="checkbox"/> aqua) Date: ___/___/2013 Time of Day: <input type="checkbox"/> morning <input type="checkbox"/> afternoon	Instrument #: _____
Volunteer or Staff in Dome (does not include diver)?: <input type="checkbox"/> No <input type="checkbox"/> Volunteer <input type="checkbox"/> Staff <i>If so: Do they have a cart?</i> <input type="checkbox"/> yes <input type="checkbox"/> no <i>(if present, mark their location on the map with an "A")</i>	
Diver in Tank?: <input type="checkbox"/> Yes <input type="checkbox"/> No Light level: <input type="checkbox"/> Dark <input type="checkbox"/> Moderate <input type="checkbox"/> Bright Noise Level: <input type="checkbox"/> Quiet <input type="checkbox"/> Moderate <input type="checkbox"/> Loud Level of crowding: <input type="checkbox"/> < 25% full <input type="checkbox"/> 25% full <input type="checkbox"/> 50% full <input type="checkbox"/> 75% full <input type="checkbox"/> > 75% full	
Group Makeup: <input type="checkbox"/> individual <input type="checkbox"/> adult group <input type="checkbox"/> adult/children group <input type="checkbox"/> school group Who did you track?: <input type="checkbox"/> adult <input type="checkbox"/> child Total Time in Exhibit: ____:____ (min:sec)	
ANIMAL ID SIGNS CHECKLIST: <input type="checkbox"/> no interaction <input type="checkbox"/> spun sign wildly <input type="checkbox"/> looked up a species <input type="checkbox"/> used as a group <input type="checkbox"/> used as an individual <input type="checkbox"/> parent/adult facilitated <input type="checkbox"/> browsed through sign <input type="checkbox"/> other: _____ <i>Other notes/comments:</i> _____	
NOTES: _____ _____ _____	
KEY: X = attention stop Cg = conversation w/ in group Cx = conversation w/ another group Ca = conversation w/ volunteer/staff P = pointing F = calling others over S = sitting E = ate a snack ☆ = took photo ● = Data collector's location	

Appendix C: Administered Survey Instrument

Instrument #: _____

Collector Initials: _____ (museo student aqu staff)

Date: ____/____/13

Time: Morning Afternoon

[FILL OUT BEFORE APPROACH]

(b1) **Volunteer or Staff in Dome?:** No Volunteer Staff (b2) w/ Cart w/o Cart

(b3) **Diver in Tank?:** Yes No

(b4) **Notes (opt.):** _____

(b5) **Noise Level:** Quiet Moderate Loud

(b6) **Light Level:** Dark Moderate Bright

(b7) **Crowding Level:** < 25% full 25% full 50% full 75% full >75% full

[FOR APPROACH] *Hello! My name is _____, and today I'm talking with people about the Underwater Dome. Could I ask you a few quick questions?*

- [If "no"] *It only takes a minute, and there are no right or wrong answers.*
- [If still "no"] *Thank you very much for your time, and enjoy the aquarium!*
- [If "yes"] *Thank you for taking the time.*

1. Why did you come to the Aquarium today? [Check all that are referenced.]

- Education
- Recreation / Entertainment
- Special Occasion
- Specific event / exhibit / animal
- Tourism
- Weather
- Other: _____

2. Have you ever visited this aquarium before? Yes No

2a. [If "yes"] Have you ever visited the Underwater Dome before? Yes No

3. What did/do [1st timers/return visitors] you do when you came/come to the dome?

4. What did/do you like best about the dome?

5. What did/do you like least about the dome?

6. Was there anything that you saw or did in the dome today that prompted any questions? If so, what?

7. When standing in the dome, what underwater region does it remind you of?

8. Did you talk with a staff member while you were in the dome today? Yes No

[TRANSITION] *Do you mind if I ask you what year you were born and what your ZIP code is? [Ask other questions if unclear from observation.]*

9. Gender: Male Female **10. Year Born:** 19____ **11. ZIP Code:** _____

12. Who are you with today? Myself Adult Group Adult/Child(ren) Group School Group

Appendix D: Fill-in-the-Blank Instrument

Instrument #: _____

Date: ___/___/13 Time: Morning Afternoon

Hello! We want to know what you think about the Underwater Dome. Please fill in the blanks with the word that best represents your experience at the dome today.

My experience at the Underwater Dome today...

1. Today, I visited the Underwater Dome with _____ .

2. When I was in the dome I _____ .
(verb – action word or description)

3. For me, being in the dome was _____ .
(adjective – descriptive word[s])

4. I felt like I was in _____ .
(place or geographic location)

5. Just so you know a bit more about me, I am a _____ - year-old _____ .
(age) (preferred identification)

and my ZIP code is _____ .

6. Now back to the Underwater Dome... My *favorite* thing about the dome has got to be _____ .
(noun – person, place, or thing word[s])

7. Overall, I was having a _____ day,
(adjective – descriptive word[s])

and/but I had a _____ experience in the underwater dome.
(adjective – descriptive word[s])

8. **Do you have any additional comments?** Please share them here.

Thank you! Please give this form back to the staff member.