Executive Summary: *Unseen Oceans* Teacher Programs Evaluation

In 2018, the American Museum of Natural History opened a new temporary exhibition, *Unseen Oceans*. This exhibition sought to spark excitement about ocean exploration, spotlight the work of scientists, demonstrate the diversity of habitats within a vast ocean, and highlight the impact of human activities. AMNH also provided professional learning (PL) opportunities for K-12 teachers to encourage use of the exhibition in classrooms. Evaluation sought to answer three questions, in short: 1) To what extent do PL programs result in field trips? What are the barriers to field trips? 2) What concepts or topics do teachers use *Unseen Oceans* to teach? 3) Which content from the exhibition are most resonant to students in essay contest submissions?

The accompanying report presents complete results from an evaluation conducted by J. Sickler Consulting. The study used four methods and triangulated the results to draw larger conclusions about the evaluation questions. The study used survey data collected at two teacher PL programs (n=43 summer course; 163 Educator's Evening), an online survey of PL attendees about field trip use (n=132) follow-up interviews with teachers who took *Unseen Oceans* field trips (n=7), and coding a sample of student essay submissions (n=45). This summary highlights the study's cross-cutting conclusions.

Teacher PL experiences, both workshops and Educators' Evenings, were effective at promoting field trips to *Unseen Oceans*.

Data showed that 40% of teachers who attended a PL event brought students to *Unseen Oceans* on a field trip. While a slightly higher proportion of summer course participants went to *Unseen Oceans* compared with Educators' Evening attendees, the difference was not significant. Together, these two programs represent a balance of depth and breadth strategies, and seem able to be effective and important attendance drivers. The interactivity of *Unseen Oceans* was another strong asset that drove teachers to select it over a visit to the Hall of Ocean Life, which has some similar content.

Teachers valued the variety and quality of PL experiences provided by AMNH, using them to become familiar with exhibits and plan field trips.

Teachers who attended the PL experiences reacted very positively to both of the opportunities. Across the data collected at both of these events, it was clear that teachers benefited from: 1) seeing and learning about the exhibition and its content; 2) receiving classroom resources and activities they could use; and 3) generating excitement and enthusiasm about the special exhibition and its content. Teachers reported the summer course was effective in thinking about planning a trip, and Educators' Evening resulted in a majority of responding teachers feeling the content had at least some curriculum alignment and that they were somewhat likely to come on a field trip.

For teachers who come for field trips, the biggest barrier to visiting *Unseen Oceans* was seeing content connections with their curriculum.

Barriers to taking a field trip are largely out of the museum's control (time constraints, budget, etc.). Once teachers overcame those barriers, it was important that they saw content connections with an exhibition. Data indicated that *Unseen Oceans* had the flexibility to serve classes from a range of content areas – biology to Earth science. It was most used by high school grades, although data showed high school teachers were no more likely to take an *Unseen Oceans* field trip than other teachers who attended the PL. Attendance at the exhibit and the PL were similarly distributed across grade levels.

Teachers were able to connect *Unseen Oceans* with a wide variety of content areas, drawing on the range of sciences used to study oceans.

Teachers described connecting *Unseen Oceans* with a variety of content, including ecosystem dynamics, human impacts, natural resources, and climate change. Interviews highlighted diverse ways that teachers, particularly in middle and high school grades, used specific areas of the exhibition to bring the topics they study in class to life. This ranged from microorganisms in the Mysterious Drifters gallery to topographical maps in Going Deep. The opportunity to explore the exhibition's content during PL may be particularly useful in supporting teachers to find connections in galleries that are not obvious from a title or short description of an exhibition online.

Teachers have limited class time to engage in follow-up activities, but they use AMNH resources to support planning and use workshops on trips.

Interviews indicated that, while teachers might like to do more in-depth projects with students, the most common follow-up activity was group discussion about what was learned. Pre-visit activities seemed a bit more common, and this was where the Educator's Guide was mentioned most often. Teachers used the Guide to introduce students to the exhibition and what they would see. The worksheets provided by AMNH also seemed to be a useful resource for a number of teachers. In interviews, teachers described how the structure of the worksheet (especially the drawing) helped focus students' attention and get them to slow down and engage more with the experience. Among teachers from the summer course, over 60% reported they had used the resources and content gained from the workshop.

Through the Essay Contest, students were able to explore content about researchers, their tools, and the animals they study in greater detail.

Essay contest entries revealed a bit about the topics and areas of *Unseen Oceans* that resonated with students, within the parameters of the essay prompts. Students explored and talked about a wide variety of ocean animals from the exhibition. Although jellies and whales were most commonly mentioned, more than 10 types of animals were referenced in the 45 essays – from plankton to chain catsharks. It was notable that exhibition's featured live animals (eels, chain catsharks, and seahorses) were all mentioned.

Related to scientific research, students incorporated a wide range of tools in the portions of the essays that were free-choice – from soft robotics to animal tracking. Similarly, there seemed to be substantial interest in Dr. Becker and her work with soft robotics, but students also identified interest in the work of other research teams studying animal tagging and fluorescence. Students' selections represented most of the "Scientist at Work" exhibits.

Implications & Next Steps

Based on the findings and consideration of results with the AMNH team, several insights were gleaned to inform future directions.

- **Keep using a variety of PL opportunities to engage educators and drive interest in special exhibitions**. Evidence suggests that both the summer course and the Educators' Evenings encouraged field trip visits.
- ***Unseen Oceans* was effectively targeted to MS/HS grades; ES teachers may need an exhibit with simpler concepts.** While MS and HS teachers who used *Unseen Oceans* seemed able to use it effectively, the content was quite complex for younger grades. If targeting younger grades, an exhibition with more appropriate content levels may be needed.
- **Exhibitions with complex content can engage a variety of teachers in one place**. Teachers who used *Unseen Oceans* connected it in a variety of ways by focusing on particular galleries, each of which addressed a different type of science. This is an opportunity for future exhibitions that use complex science, but teachers may need help seeing connections.
- **Hands-on experiences are important to K-12 audiences**. While the exhibition evaluation showed the value of interactive experiences for general learners, we found K-12 teachers also saw these as a major draw of the exhibition.
- **Continue the strong work with teacher support resources.** Evidence supported that when the Educator's Guide and worksheets were used, they were valued for what they contributed to the field trip. AMNH's 2017 evaluation of teacher supports provide robust recommendations for materials.
- **Manage expectations about how much in-class follow-up is expected.** As with other research (DeWitt & Storksdieck, 2008), teachers struggled to engage in post-visit classroom activities; the most common activities were wrap-up discussions. During-visit worksheets may have more uptake or use.