Open Ocean • Here be Dragons 2018

Boston Intertidal Exploration Report

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Published on: Oct 01, 2021

DOI: <https://doi.org/10.21428/a680be9a.207c346e/00b0d1bd>

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Goals

Intertidal Exploration sought to incite curiosity in Boston-area youth regarding the functions and phenomena of urban oceans. Through a two-day workshop hosted at the [MIT Media Lab](#) and [Pleasure Bay field site](#), explorers developed experimental questions to facilitate a deeper understanding of the unique qualities of water bodies in urban contexts.

Approach

To cultivate creative and playful learning experiences for many different types of thinkers, we employed [principles of universal design](#) to develop curriculum content and structure. Our learner cohort combined members of the [Youth Science Initiative](#), a STEAM-focused engagement effort dedicated to increasing the presence of non-dominant populations in scientific fields, and the [Empowered Brain Institute](#), an organization that provides hands-on educational opportunities for neurodiverse youth.

Drawing mentorship from the MIT Media Lab [Open Ocean Initiative](#) and [MIT Sea Grant](#), the first day of the workshop provided an introduction to ecology, as well as the unique aspects and functionalities of the intertidal zone, through interactive discussion. Explorers worked in groups based on their particular interests (e.g.,

sessiles; snails; algae; gradients; salinity; spectrometry), proposed experimental questions and methods of data collection, and play-tested tools and techniques used in environmental studies.

On day two, we ventured into the field. Pleasure Bay offers an atypical beachside experience--its boardwalk punctuated by spontaneous urban vegetation--with views of in-motion cranes and passing-by cars. Given its context and unique landscape features, there is no shortage of biological questions demanding inquiry.

Following a period of unstructured discovery-by-play, workshop participants worked to investigate scientific questions as diverse as crab motility rates, distribution of fishes and sea squirts, and the biometry of snail shells. While explorers intended to focus solely on one realm of inquiry, onsite, they were quick to develop interest in all aspects of the bay. As such, while a period was devoted to data acquisition, most of our time in the field involved collaboration for addressing smaller curiosities and learning how to use different tools for site characterization and specimen collection. Back at the Lab, explorers received a crash course in data interpretation and presentation before preparing their own results based on fieldwork. Groups presented their work to their peers, and were offered feedback by a marine biologist from MIT Sea Grant, an expert in the field.

Site Set up

The fishy friends: Observations

Counts

- Observation 1
 - 17 fish
 - Locations: Moving diagonally from Site 0 to Site 2
- Observation 2
 - ~40 fish
 - Locations: Moving between Site 1 and 2

Fish

- Clear, thin
 - Camouflage/avoid detection
 - Can see internal parts of the fish
- Wing-like pectoral fins
- Silver underside
- Camouflage-sparkly like the sun on the water surface
- About 3 inches long

The fishy friends: Habitat + Habits

Site 0

- Bottom substrate: Sand, pebbles, rocks
- Water depth: 0-2 inches
- Organisms: hermit crabs, small crabs, seaweed, sea snails

Swimming

- Always swam in a school
- Approximately 20-40 fish
- Observed more fish in sampling area when water was not disturbed

Site 2

- Bottom substrate: Sand, some pebbles
- Water depth: 1 ft
- Organisms: Oysters with sea squirts and tunicates, less seaweed, no crabs

→ **protection**

Location

- Shallow water

→ **things to hide amongst (rocks, seaweed)**

Successes

While our workshop did not result in the procurement of novel scientific data, it offered many an introduction to ecological understanding, landscape literacy, and more broadly, a chance to be deeply connected to an urban ocean. Our overall results superseded our data acquired, with successes being found in storytelling, conveying of imaginations, playful recounting of experience, and, above all, a desire to explore further.

We have since used this pilot workshop as a springboard for a larger series of hands-on workshops focused on urban water bodies, launched in the spring of 2019 (Ecology, Evolution, and Engineering for Empowered Brains). The series explores how understanding the seemingly mundane water sources we encounter (rivers; wastewater; combined sewer overflow) relates to delineating larger functions of urban ecosystems, and how this relates to social and political justice. Moving forward, we are investigating ways of sharing developed curricula with broader learning networks (*e.g.*, public libraries). We are always interested in collaborating with interested local leaders to broaden the goals and impacts of this work.

Acknowledgements

Boston Intertidal Exploration was funded by the MIT Media Lab Open Ocean Initiative and the National Geographic Society.