



Land & Sea

Marine Science at CTY

by Violeta Keifer

Maybe it's because I live in the desert that I've always enjoyed being near water. My interest turned academic when, in tenth grade, I chose to focus on water quality over the school year for a Science Olympiad event. Studying independently on the computer, I learned a tremendous amount about everything from water chemistry to coral reef health indicator species, but I didn't feel a connection to what I was learning. I wanted to experience what I was learning firsthand and understand how these topics could affect me in real life.

When I read the course description for CTY's Whales and Estuary Systems, I knew I'd have the chance to do just that. We would conduct science both in land-based labs and aboard the *Lady Maryland* as we sailed from the Chesapeake Bay to Stellwagen Bank in Massachusetts. I knew this course was perfect for me and would expand my knowledge of estuaries, the oceans, and whales—which I hoped I would get to see on a whale-watching trip.

About the Water, on the Water

After traveling nonstop from Phoenix to Baltimore, I was exhausted but excited—and became even more excited when I met my

classmates at Notre Dame of Maryland University. But we weren't there long. The next day, right after breakfast, our group of nine students headed to Baltimore's Inner Harbor and got our first look at the *Lady Maryland*, a 104-foot schooner that would be our home for the next nine days. Once on the ship, we met the professional crew, which included the captain, our amazing cook, first mate, second mate, and our two education coordinators, Cassie and Erin. From the first moment, the students were an integral part of the maintenance of the ship; our work was not only expected but appreciated as much as that done by the professional crew.

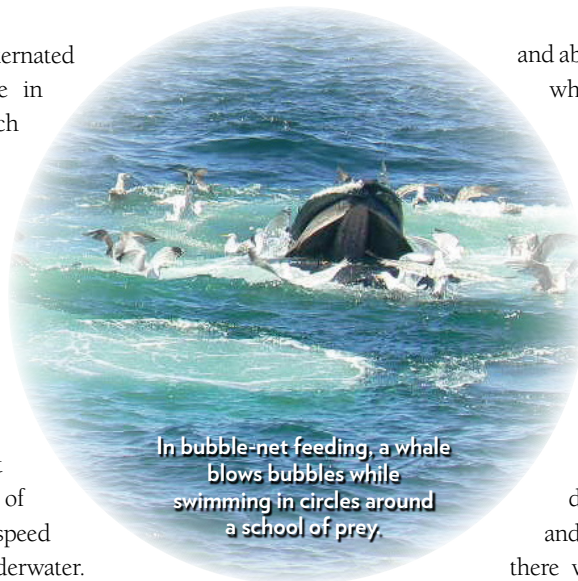
We broke into two groups and alternated between class time and watch time in four-hour blocks. During our watch time, we learned how to steer the ship using a compass, navigate using maps, and relay other ships' locations to the captain using a point system. During class time, we learned about cetaceans (whales, dolphins, and porpoises) and the estuaries we would visit. We also conducted research. For a project based on a question we had about cetaceans, I researched the effect of pH on whale populations and the speed at which their calls can travel underwater.

When our research was completed, we put together posters and presented them to each other below deck. It was a great experience to learn not just from our instructors, but from each other.

We also discussed in class why estuaries are so important to the environment. I hadn't realized that these areas where freshwater mixes with saltwater can sustain such a diverse abundance of creatures. We got to see this for ourselves when we trawled the bottoms of different estuary systems with a small trawl net. Once the net was set, we stood in a line by one side of the boat and tossed it overboard. After 20 minutes, we hauled it back up and found it filled with seaweed and small creatures. We then spent the next hour sorting through the menagerie, armed with nets to scoop up small fishes and crabs.

Once the sea creatures were sorted and the excess seaweed was tossed overboard, we leafed through guides to determine what species we had. This was a process that we repeated at several locations as our team sailed north from the Chesapeake Bay. New York Harbor yielded a banded sea robin, a spider crab, and mussels, while New Bedford brought us slipper shells, European green crabs, and hermit crabs. After we identified all the creatures, we logged the type and number of each species before putting them back in the water.

For me, the highlight of this part of the course was touring the Stellwagen Bank National Marine Sanctuary, where we saw over 40 humpback whales and 150 striped dolphins! We saw many instances of bubble-netting, a feeding behavior in which whales swim circles around prey while blowing bubbles to confuse them. While sailing away from this area, a whale we identified as a finback breached right off our port bow—exactly the close-up experience I'd hoped for. Then, to learn more about whaling history, we went to the Cold Spring Harbor Whaling Museum in New York and the New Bedford Whaling Museum in Massachusetts. At both locations, we learned why whales were viewed as a commodity



In bubble-net feeding, a whale blows bubbles while swimming in circles around a school of prey.

and about the impact of whaling on the world's whale population.

Back on Shore

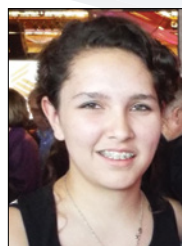
After our amazing voyage at high sea, we had high expectations for our class on land—and we were not disappointed! We no longer had to contend with seasickness or wind blowing our papers overboard, so we could invest more time in learning about whales and estuaries.

We prepared presentations about different whale and dolphin species, and I was amazed to learn how many there were. We discussed whale hunting in different cultures and then held a mock debate to explore what whales meant to various cultures around the world.

My group, which represented Australia, wanted to ban all whale hunting, especially by Aboriginal groups that often killed the mother of a mother-calf pair. In the lab, we used gel electrophoresis to compare whale DNA in order to determine which whale out of four whales had washed up on a beach in a hypothetical stranding. This kind of lab work was new to me and extremely exciting because it used the same techniques scientists use to study whales.

Although we were on land, we didn't stay on campus the whole time. We took a trip to Washington, DC, and toured the American Museum of Natural History, where we were lucky enough to get a behind-the-scenes look at the fossil room under the museum. We specifically looked at fossils of archaeocetes, and I found it fascinating to see how whales evolved from sea animals into land animals and then back into sea animals.

This course changed my perception of the ocean forever. Sailing on it and experiencing how hard and amazing that life is gave me a deep respect for sailors (and seafaring scientists!) across the ages. I learned more about what people are doing to save the whales and their ecosystems, and gained a greater appreciation than I already had for the animals themselves. Now that I'm back home in the desert, I find that I value the ocean—and the time I spent immersed in learning about it—even more. ■



Violeta Keifer is junior at The Gregory School in Tucson, AZ. A competitive swimmer, she also enjoys water skiing and kayaking. She plans to study marine biology in the future and looks forward to going on her next sailing adventure.