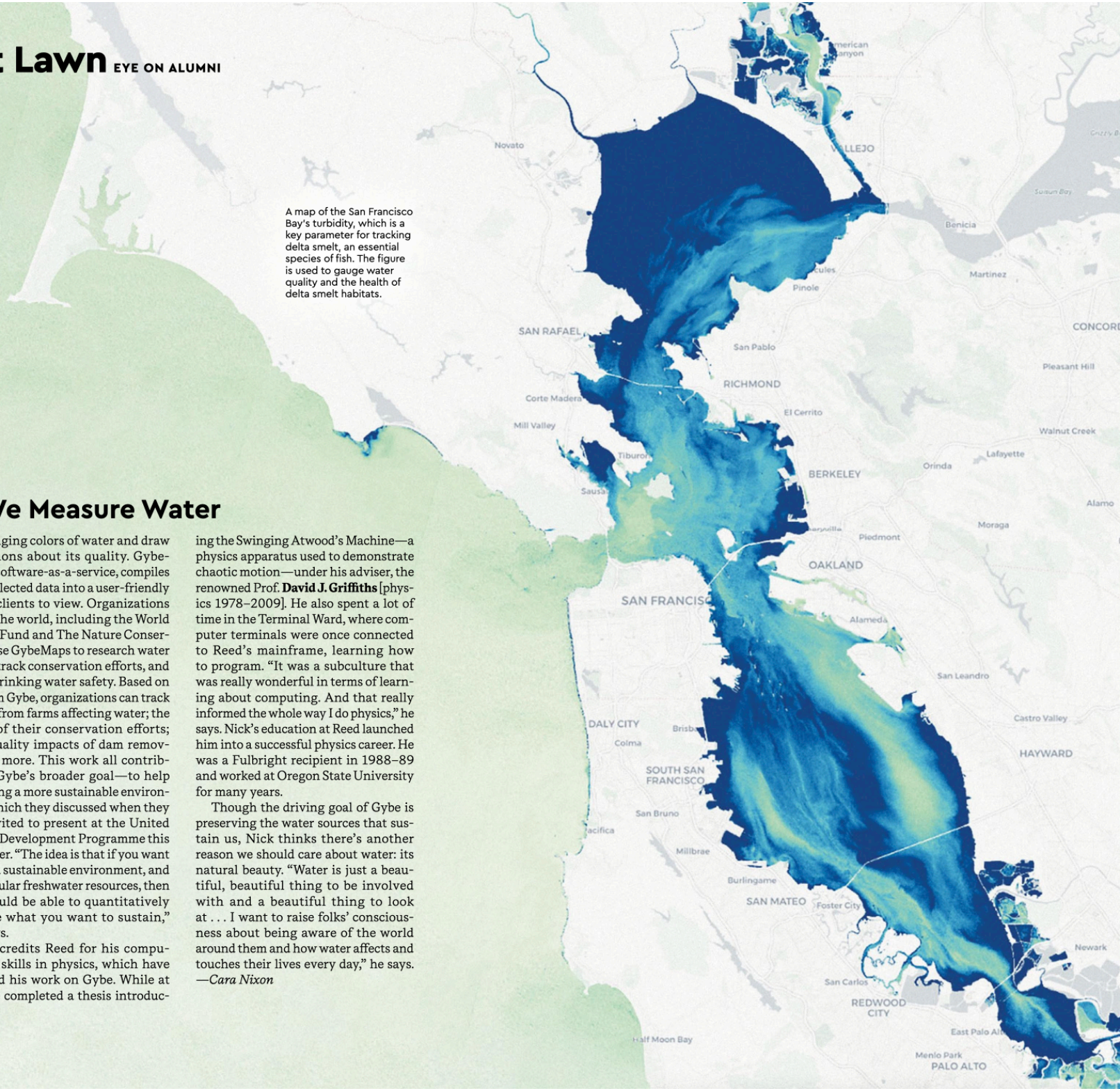

A map of the San Francisco Bay's turbidity, which is a key parameter for tracking delta smelt, an essential species of fish. The figure is used to gauge water quality and the health of delta smelt habitats.

REEDIE BUSINESS SPOTLIGHT

Revolutionizing How We Measure Water

Water is always in flux—moving, changing, and transforming. From lakes to rivers to watersheds like the Reed Canyon, part of water's beauty is its constant reshaping. But this trait has also made it difficult to measure. **Nicholas Tufillaro '82**, with the water quality measurement company he cofounded, Gybe, is making it easier, and consequently helping to work towards a more sustainable future.

Nick and his colleagues, Sara De Moitié, Ivan Lalović, and Omar Zurita, founded Gybe in 2019, after finding that environmental efforts were missing a key component: quantitative measurement. "If you want to improve the environment, you need to measure it, and then if you make changes to try to improve it, you need to have that feedback loop of measurement," Nick explains. Satellites in space already take images of water reservoirs to collect data, but they can only tell us so much. The Gybe team fuses those findings with their own, collected via an on-the-ground sensor, which has the ability to capture more accurate information about the water's quality.

Using both satellite and on-the-ground sensor data makes it easier to see the changing colors of water and draw conclusions about its quality. GybeMaps, a software-as-a-service, compiles these collected data into a user-friendly app for clients to view. Organizations around the world, including the World Wildlife Fund and The Nature Conservancy, use GybeMaps to research water quality, track conservation efforts, and ensure drinking water safety. Based on data from Gybe, organizations can track nitrates from farms affecting water; the impact of their conservation efforts; water quality impacts of dam removals; and more. This work all contributes to Gybe's broader goal—to help in creating a more sustainable environment, which they discussed when they were invited to present at the United Nations Development Programme this last winter. "The idea is that if you want to have a sustainable environment, and in particular freshwater resources, then you should be able to quantitatively measure what you want to sustain," Nick says.

Nick credits Reed for his computational skills in physics, which have informed his work on Gybe. While at Reed, he completed a thesis introducing the Swinging Atwood's Machine—a physics apparatus used to demonstrate chaotic motion—under his adviser, the renowned Prof. **David J. Griffiths** [physics 1978–2009]. He also spent a lot of time in the Terminal Ward, where computer terminals were once connected to Reed's mainframe, learning how to program. "It was a subculture that was really wonderful in terms of learning about computing. And that really informed the whole way I do physics," he says. Nick's education at Reed launched him into a successful physics career. He was a Fulbright recipient in 1988–89 and worked at Oregon State University for many years.

Though the driving goal of Gybe is preserving the water sources that sustain us, Nick thinks there's another reason we should care about water: its natural beauty. "Water is just a beautiful, beautiful thing to be involved with and a beautiful thing to look at . . . I want to raise folks' consciousness about being aware of the world around them and how water affects and touches their lives every day," he says.
—Cara Nixon