

Could an underwater microphone in Pacific Ocean hold the key to protecting whales?

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Credit: Pixabay/CC0 Public Domain

Sitting 280 feet below water on the floor of the Pacific Ocean just 26

miles from the Golden Gate Bridge, a credit-card-sized underwater microphone represents the latest attempt to keep Earth's largest mammals safe from human-caused destruction.

The device, called a hydrophone, listens to the calls among blue, humpback and [fin whales](#) as they swim and feed off the Northern California coast. Every two hours, it reveals their identities and locations via data transmitted by a buoy on the surface.

Back on shore, the locations of whale calls and sightings are superimposed over the routes of ships, revealing the ocean's potentially deadly intersections.

The technology, dubbed Whale Safe, alerts the public—and, as important, shipping companies—to whale locations, helping vessels avoid collisions while traveling near busy ports. Last month, Whale Safe launched in San Francisco after a two-year pilot program in the Santa Barbara Channel, which many ships travel through on their way to the ports of Los Angeles and Long Beach.

The effort seeks to stem the tragic loss of whales due to ship collisions. There were 70 fatal collisions recorded off the California coast from 2007 to 2020, 49 of them involving endangered or threatened species, according to data in the 2021-22 ship strike report from the Office of National Marine Sanctuaries and the National Oceanic and Atmospheric Administration (NOAA).

In addition to locating the beloved marine mammals, Whale Safe evaluates whether vessels are adhering to a recommended slower speed of 10 knots while traveling through whale habitats.

This latest effort to reduce fatal whale-ship collisions is a collaboration among The Marine Mammal Center in Marin County, the Benioff Ocean

Science Laboratory in Santa Barbara and federal agencies.

Callie Steffen, the lead project scientist at the Benioff lab, said that linking whale and ship locations is key for the public to appreciate the problem and push for solutions.

"We don't often think about ... what was the ship's behavior or speed when they're coming through whale habitat carrying my iPhone" and other consumer goods shipped from China and elsewhere, Steffen said.

The ports of Los Angeles, Long Beach and Oakland handled about 35% of all U.S. imports in 2020, according to the 2021-22 ship strike report. In 2020, 1,921 large container ships visited the Oakland port.

So far this year, five whales have died from ship collisions off the San Francisco coast. One was Monterey Bay's famed and widely photographed humpback whale Fran, who washed ashore on a Half Moon Bay beach with a broken neck in August. Whale researcher Ted Cheeseman said he was devastated when he identified the carcass as Fran; he had personally tracked her movements for seven of her 17 years.

But the death toll is likely far greater. According to Steffen, for every one whale found on a beach, roughly 10 whales sink to the ocean floor.

In 2014, NOAA and the U.S. Coast Guard began asking large ships (over 300 gross tons) to reduce speed to 10 knots in whale habitats outside the Golden Gate. The speed reduction program is in place from May 1 until Dec. 15 during spring, summer and fall migration seasons.

Initial responses to the voluntary vessel speed reduction program outside San Francisco were muted: only 45% of ships slowed to 10 knots or less in 2017. By 2020, voluntary cooperation rose to 64%, according to the

ship strike report.

Shipping company representatives say they want to do what they can to decrease collisions. But slower speeds increase personnel and fuel costs, said Jacqueline Moore, vice president for the Oakland-based Pacific Merchant Shipping Association. The nonprofit trade association represents owners and operators of marine terminals and vessel carriers.

Moore said a proposed mandatory lower speed limit "would still need to accommodate for the safety and efficiency of the industry."

Shipping companies can sign up to receive Whale Safe's data and a daily rating of the likelihood of whale presence, similar to Smokey Bear's "Fire Danger Today" sign.

And the public can also view marine and maritime information along the West Coast. Shipping companies are listed with the yearly total nautical miles their ships travel in speed reduction zones and the percent of those miles spent traveling at 10 knots or less.

A month after Whale Safe's launch in San Francisco's shipping lane this year, the data show a wide range in ship compliance. At one end, a cargo ship from the Kisaragi Kisen Co Ltd company based in Japan sailed at 10 knots or slower 97% of the time. But two container ships of the Zim Integrated Shipping Services company based in Israel never traveled 10 knots or slower while entering or leaving the bay.

Maria Brown, the NOAA superintendent who oversees two national marine sanctuaries outside San Francisco, said she hopes the data can boost participation in speed reduction efforts. She points to one study that predicted a 25% reduction in lethal whale strikes if over 95% of ships slow down in the shipping lanes.

Compliance in Santa Barbara improved 8%, from 46% to 54%, after the program was launched but has hovered around 60% for the last two years, according to data provided by the Whale Safe program. That is not high enough, Steffen, Brown and Cheeseman agree.

Cheeseman said he wants to see other solutions next: Make the 10-knot speed limit mandatory year-round, and move the shipping corridors outside whale habitats.

"Had (Whale Safe) been implemented five years ago or two years ago, would Fran have not been killed? I find that hard to imagine," he said. "We have a lot of great technology, but as far as reducing ship strikes, legislation and policy is our best tool right now."

At a memorial service for Fran last Tuesday on the beach at Moss Landing State Park, Cheeseman urged the dozen or so whale enthusiasts to action. Public comments on the Coast Guard's proposed shipping corridors are open until Oct. 25.

While no mandatory speed reduction is currently proposed for the West Coast, NOAA superintendent Brown said she welcomes the public into the conversation about whale-ship collisions.

"They can let industry know it's important to them," Brown said. "And that's very powerful."

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