



WOODS HOLE OCEANOGRAPHIC INSTITUTION

Seawater samples from June 2011 show the early spread of Fukushima radiation. White indicates no cesium-134 detected; blue represents low radiation; green is moderate; yellow is medium-high; red indicates high radiation levels.

## Fukushima radiation nears California coast, judged harmless

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By [Courtney Sherwood \(/author/courtney-sherwood\)](#) | 11 November 2014 12:00 pm | [37 Comments \(/asiapacific/2014/11/fukushima-radiation-nears-california-coast-judged-harmless#disqus\\_thread\)](#)

After a two-and-a-half year ocean journey, radioactive contamination from the

Fukushima nuclear disaster in Japan has drifted to within 160 kilometers of the California coast, according to a new study. But the radiation levels are minuscule and do not pose a threat, researchers say.

Shortly after the [meltdowns at the Fukushima Daiichi Nuclear Power Station \(http://news.sciencemag.org/asiapacific/2014/07/fukushima-report-urges-u-s-plant-operators-take-heed\)](http://news.sciencemag.org/asiapacific/2014/07/fukushima-report-urges-u-s-plant-operators-take-heed) in March 2011, Tokyo Electric Power Co. estimated that the facility had released a staggering 7000 trillion becquerels—a measure of emitted radiation—into of radiation into nearby seawater. Meanwhile, Japan's Ministry of the Environment reported readings of 45.5 million becquerels per cubic meter of water, high enough to cause reproductive problems in fish.

The National Oceanic and Atmospheric Administration showed that the power plant's radiation dissipated quickly as it spread from the coast, however. It arrived at this conclusion by measuring cesium-134, a kind of radiation “fingerprint” unique to Fukushima because of its relatively short 2-year half-life. By June 2011, cesium-134 was found 600 kilometers offshore from Japan producing 325 becquerels per cubic meter. Building models based on early readings, the World Health Organization and public health departments in California, Oregon, Washington, and Alaska all forecast that Fukushima radiation would not pose a human health risk in North America.

But antinuclear groups like Beyond Nuclear, a Maryland nonprofit that advocates against nuclear power, questioned those predictions, citing concerns about continuing releases of radioactive isotopes from Fukushima since the 2011 meltdowns. In addition, nonprofits like the Tillamook Estuaries Partnership, which monitors and works to improve watersheds in Oregon, wanted more concrete data to present to their communities.

So marine chemist Ken Buesseler of the Woods Hole Oceanographic Institution in Massachusetts convinced an eclectic group of organizations to collect water samples up and down the west coast of North America. Following the Chernobyl nuclear disaster in 1986, Buesseler had tracked radioactive contaminants in the Black Sea, the closest major water body to the accident site. To pay for similar research in the much larger Pacific Ocean, he turned to crowdfunding—the increasingly popular method of using the Internet to bring multiple people together to fund costly endeavors. Government bodies such as the Umpqua Soil

and Water Conservation District, universities, and conservation groups joined in, offering both to collect water from more than 50 sites in the Pacific Ocean near U.S. shores and to pay to ship and test those samples in Buesseler's lab.

The findings are reassuring, Buesseler says. He measured a high of just 8 becquerels of radiation per cubic meter in the samples. Of that, he says, less than 2 becquerels came from cesium-134 traced to Fukushima. The remainder is largely from strontium-90 and cesium-137: Some of that is fallout from mid-20th century atomic bomb tests in the Pacific, and some may have come from Fukushima—these isotopes lack the half-life fingerprint that ties cesium-134 to the Japanese disaster. [The total level of radiation is hardly worth worrying about \(http://www.who.edu/files/teacher.do?id=197504&pt=2&p=205589\)](http://www.who.edu/files/teacher.do?id=197504&pt=2&p=205589), Buesseler says: U.S. Environmental Protection Agency guidelines for drinking water allow up to 7400 becquerels per cubic meter. Buesseler is presenting his latest findings Thursday at the Society of Environmental Toxicology and Chemistry North America's annual meeting.

“There are people here in California who are worried they could get fried by going to a beach, and this research confirms that those fears are wrong and inappropriate,” says Daniel Hirsch, a nuclear policy researcher at the University of California, Santa Cruz, who was not involved in the study. But he also cautions that Fukushima may bring other risks to North America beyond ocean radiation levels, particularly related to seafood. Oregon State University researchers found that radiation levels in tuna caught off the Oregon coast tripled after the Fukushima meltdown—though levels remain too low to risk human health, they said. Hirsch predicts seafood radiation levels could climb as fish higher on the food chain eat and absorb radiation from smaller animals.

Although his results may not have public health implications, Buesseler says he hopes his work leads to a better informed populace. “People were making irrational decisions about spending time at the coast, or attributing starfish deaths to Fukushima,” he says. “Dental x-rays and airplanes have greater exposures than what we are measuring.”

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