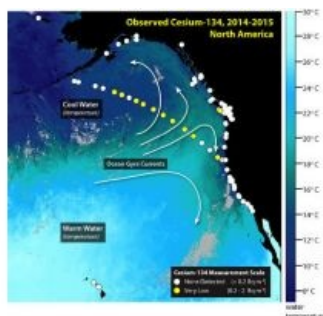


# Trace Amounts of Fukushima Radioactivity Reach Canadian Shoreline



Scientists at the Woods Hole Oceanographic Institution (WHOI) have detected the presence of small amounts of radioactivity from the 2011 Fukushima Dai-ichi Nuclear Power Plant accident in a seawater sample from the shoreline of North America. The sample, which was collected on 19 February 2015 in Ucluelet, British Columbia, with the assistance of the Ucluelet Aquarium, contained trace amounts of caesium (Cs) -134 and -137, although well below internationally established levels of concern to humans and marine life.

The WHOI scientists, with the help of citizen volunteers, have collected samples at more than 60 sites along the U.S. and Canadian West Coast and Hawaii over the past 15 months for traces of radioactive isotopes from Fukushima. In November 2014, the team

reported their first sample containing detectable radioactivity from Fukushima 150km offshore of Northern California. However, no radiation had yet been found along any of the beaches or shorelines where the public has been sampling since 2013.

## Half-life

Scientists at WHOI are analysing samples for two forms of radioactive caesium that can only come from human sources. Caesium-137, the “legacy” caesium that remains after atmospheric nuclear weapons testing, is found in all the world’s oceans because of its relatively long, 30-year half-life. This means it takes 30 years for one-half of the caesium-137 in a sample to decay. The Fukushima reactors added unprecedented amounts of caesium-137 into the ocean, as well as equal amounts of caesium-134. Because caesium-134 has a two-year half-life, any caesium-134 detected in the ocean today can only have been added recently—and the only recent source of caesium-134 has been Fukushima.

The Ucluelet sample contained 1.4 Becquerels per cubic meter (Bq/m<sup>3</sup>) (the number of decay events per second per 260 gallons of water) of caesium-134, a telltale sign of having come from Fukushima, and 5.8 Bq/m<sup>3</sup> of caesium-137. These levels are comparable to those measured 100 miles off the coast of Northern California last summer. If someone were to swim for 6 hours a day every day of the year in water that contained levels of caesium twice as high as the Ucluelet sample, the radiation dose they would receive would still be more than one thousand times less than that of a single dental x-ray.

## Monitoring Effort

Ken Buesseler, a marine chemist at WHOI who has been measuring levels of radioactivity in seawater samples from across the Pacific since 2011, has had to rely on a crowd-funding and citizen-science initiative known as ‘Our Radioactive Ocean’ to collect samples because no U.S. federal agency is responsible for monitoring radiation in coastal waters. The results are publicly available on the website [OurRadioactiveOcean.org](http://OurRadioactiveOcean.org). He expects more of the sites will show detectable levels of caesium-134 in coming months, but ocean currents and exchange between offshore and coastal waters is quite complex. Predicting the spread of radiation becomes more complex the closer it gets to the coast and the public’s help is needed to continue this sampling network.

Recent partnerships between Buesseler’s group and a Canadian-funded programme called InFORM, led by Jay Cullen at the University of Victoria, Canada, has added more than a dozen monitoring stations along the coast of British Columbia. In addition, upcoming cruises with the Scripps Institution of Oceanography in La Jolla, California, will add more than 10 new sampling sites offshore. Also in 2015, a National Science Foundation-sponsored project led by WHOI physical oceanographer Alison Macdonald includes funding to analyse more than 250 seawater samples collected on a research ship travelling this May between Hawaii and the Aleutian Islands, Alaska.