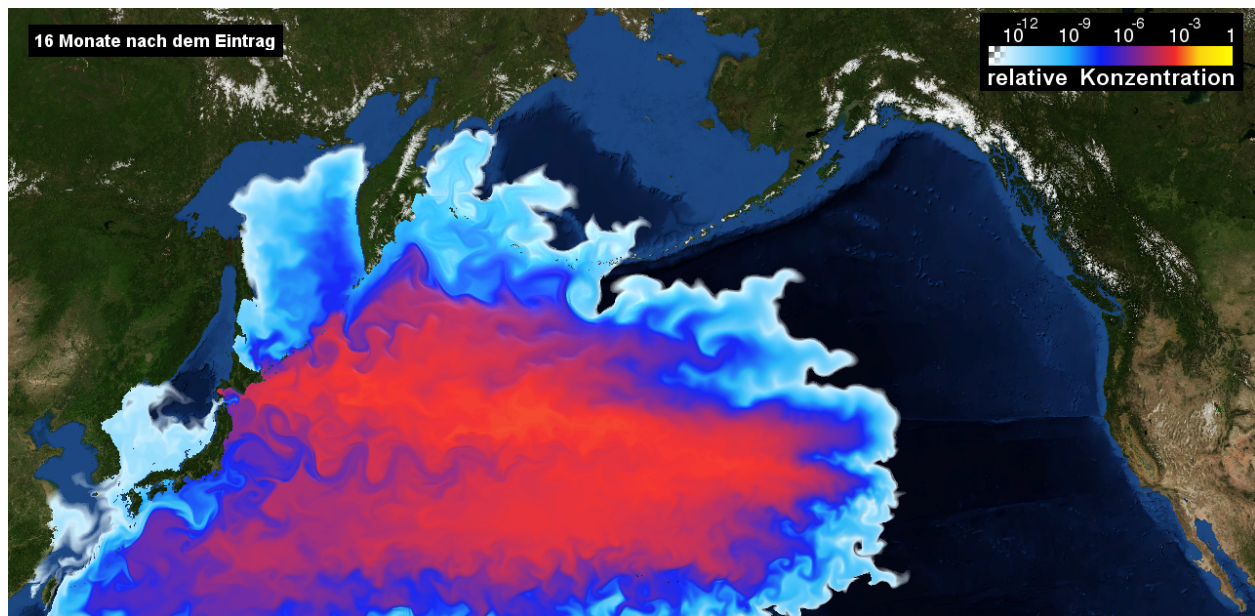


Last Update: Aug 26, 2022 • Disclaimer: This essay is not about the efficacy of nuclear energy. It focuses only on the Fukushima Decommissioning Project.

# Overview

Radioactive contamination from Fukushima has been detected in US plants, animals, and food supply, ranging from fish ([Stanford](#)) to wine ([CNN](#)). Computer models by [GEOMAR](#) show the diluted radionuclides reaching U.S. fisheries in 5-16 months. An [independent, comprehensive review](#) of the situation was published in the Japan Times on August 26, 2022.



SOURCE: <https://www.geomar.de/en/news/article/fukushima-the-fate-of-contaminated-waters>

## Background

Fukushima Daiichi is one of the largest nuclear meltdowns in history. Currently there are over 1.3 million tons of radioactive waste water stored in tanks near the site of the meltdown. Storage costs and real estate implications have been cited as the reason for a new plan to “discharge” the tanks into the Pacific Ocean, despite the presence of radioactive materials.

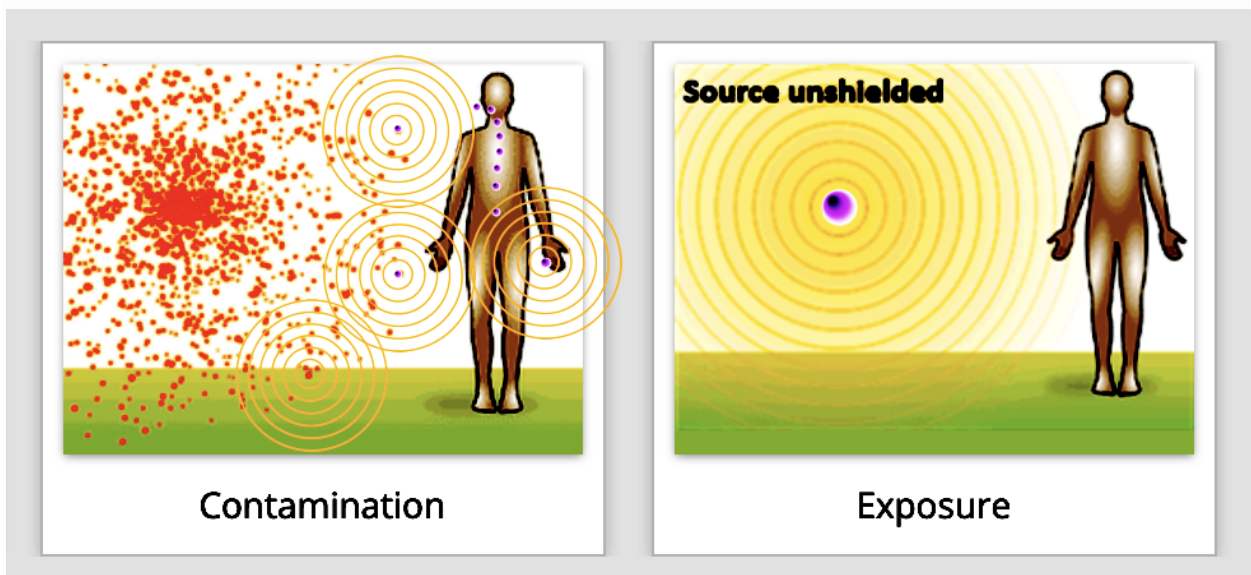


SOURCE:

[https://en.wikipedia.org/wiki/Comparison\\_of\\_the\\_Chernobyl\\_and\\_Fukushima\\_nuclear\\_accidents](https://en.wikipedia.org/wiki/Comparison_of_the_Chernobyl_and_Fukushima_nuclear_accidents)

## Dispersal of radionuclides

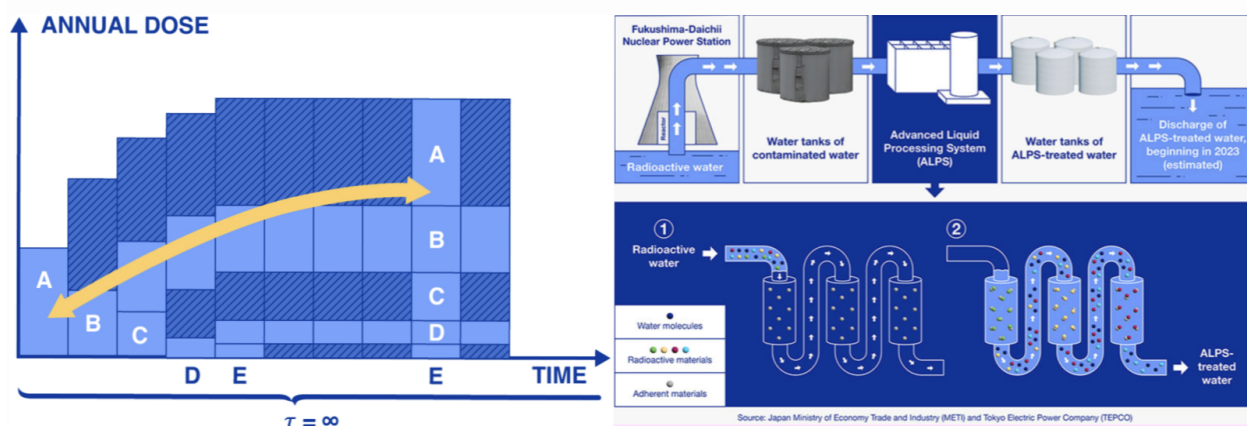
Radioactive contamination of the environment by radionuclide dispersion is much more hazardous and insidious than exposure to a localized radiation source. If the radionuclides enter the water supply and food supply they will continue to emit radiation for hundreds of years.



SOURCE: <https://remm.hhs.gov/index.html>

## Unknowns, Potential Risks and Side effects

Proposals released by TEPCO describe discharging of “treated” radioactive water into the Pacific Ocean by mid-2023. The discharge is a 30-year process of continuous release into the ocean. The reports also appear to evaluate the changes in radiation dosage over time in the environment. However, several environmental groups and [nuclear energy consultancies](#) pointed out that TEPCO’s water treatment technology, ALPS, could not remove tritium and other radioactive isotopes.



SOURCE: [docs/assets/reports/report\\_1\\_review\\_mission\\_to\\_tepco\\_and\\_meti.pdf](#)

## Environmental Effects

Marine plants produce over 70% of our oxygen, and aquatic invertebrates constitute approximately 90% of life on the planet and play a vital role in ecosystem function. The ocean is critically important in our strategy to solve climate change. Irreversibly contaminating the entire Ocean with radioactive materials undermines ecological stability.

Scientists studying marine wildlife around the reactor site are concerned about the effects of radioactive waste on the aquatic environment. Despite TEPCO’s claims that these radionuclides will be diluted and therefore present in only small quantities, these do not account for the accumulation of radionuclides in consumers higher up in the food chain, including humans. Lab studies have presented [evidence for DNA damage](#) from extended exposure to radioactive particles, including isotopes (such as tritium) found at

the Fukushima reactor site. Health assessments of Palau and Pacific Island nation citizens who were subjected to nuclear testing, also provide evidence of radioisotopes having detrimental effects on humans. It is also critically important to consider that the natural water cycle will precipitate contaminated water particles and carry them inland, which will release radionuclides into our watersheds and soils.

## Alternative Solutions and Recommendations

Multiple remediation plans and waste recycling plans have been proposed by academic institutions and scientists.

- **Storage:** The [University of Hawai'i at Manoa](https://www.greenpeace.org/static/planet4-japan-stateless/2021/12/9a52607f-public-comment-on-fukushima-radiological-assessment-.pdf), [Fairewinds Energy Institute](https://www.hawaii.edu/news/2022/05/02/treated-nuclear-wastewater-dump), and [Greenpeace](https://www.fairewinds.org/fairewinds-recomendation-for-fukushima/?rq=Fairewinds%20reco) all recommend the continuation of storage, thereby allowing for the half-life of many radionuclides to decay significantly to safer levels.

SOURCE: <https://www.greenpeace.org/static/planet4-japan-stateless/2021/12/9a52607f-public-comment-on-fukushima-radiological-assessment-.pdf>

SOURCE: <https://www.hawaii.edu/news/2022/05/02/treated-nuclear-wastewater-dump>

SOURCE: <https://www.fairewinds.org/fairewinds-recomendation-for-fukushima/?rq=Fairewinds%20reco>

- **[Injecting drilling mud](#):** Aside from long-term storage, Fairewinds Energy Education also recommends focusing on preventing groundwater leaks by injecting drilling mud.
- **[Mycoremediation](#):** Paul Stamets, a renowned mycologist, has developed a bioremediation plan to utilize fungi to decontaminate radioactive regions at the site.
- **[Detritiation](#):** Laker TRF, a Canadian company, offers a cost-effective water detritiation technology, removing the radioactive isotope from Fukushima's nuclear waste.
- **[Nuclear waste recycling](#):** The National Ignition Facility (NIF) at Lawrence Livermore National Laboratory was able to achieve ignition for nuclear fusion using tritium, found in Fukushima's contaminated water, showing promise for recycling nuclear waste into energy.



- [Pulse lasers](#): A Nobel-prize winning solution has been developed which could cut the lifespan of nuclear waste from “a million years to 30 minutes” using lasers.

## International Law

“[H]ailed by environmentalists as a turning point in the protection of the world’s oceans, the United States and 36 other governments voted yesterday to impose a permanent, legally binding ban on the dumping of all types of radioactive waste at sea.” - [New York Times](#) (in reference to The London Convention)

While modern micro-nuclear reactors offer unprecedented power density and operational capabilities for many future applications, including high-speed space travel and interplanetary human expansion, international laws help to ensure a safe and healthy environment for future generations of humans, animals, and all other life. The passing of this agreement represented the best of international collaboration and proved that safe nuclear power and healthy oceans could coexist. The most important component of this international agreement is the [Precautionary principle](#) where there is a possibility for irreversible damage. It is time to reaffirm our commitment to The London Convention for our children and future generations.

London Convention: [docs/assets/reports/london\\_convention\\_pdf.pdf](docs/assets/reports/london_convention_pdf.pdf)

## Acknowledgement

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## Resources

“Tuna caught off California carry radiation from the Japanese disaster, Stanford scientist finds”  
<https://news.stanford.edu/news/2012/may/tuna-radioactive-materials-053012.html>

“Cesium-137 can get into your body if it's inhaled or ingested. Exposure to radiation from cesium137 can result in malignant tumors and shortening of life. “  
<https://semspub.epa.gov/work/HQ/176308.pdf>

“Scientists say impact of long term low-dose [radiation] exposure to the environment and humans are unknown, and that tritium can have a bigger impact on humans when consumed in fish than in water.”

<https://www.sfgate.com/news/article/Japan-OKs-plan-to-release-Fukushima-nuclear-plant-17180803.php>

“Fukushima Radiation Detected Off California Coast”

<https://www.iflscience.com/harmless-levels-fukushima-radiation-detected-california-coast-26283>

“Tests of milk samples taken last week in Spokane, Washington., indicate the presence of radioactive iodine from the troubled Fukushima Daiichi nuclear plant in Japan “

<https://www.nytimes.com/2011/03/31/us/31milk.html>

Greenpeace Summary & Recommendation

<https://www.greenpeace.org/static/planet4-japan-stateless/2021/12/9a52607f-public-comment-on-fukushima-radiological-assessment-.pdf>

Fairewinds Recommendations:

<https://www.fairewinds.org/fairewinds-recomendation-for-fukushima/?rq=Fairewinds%20reco>

University of Hawaii Recommendations:

<https://www.hawaii.edu/news/2022/05/02/treated-nuclear-wastewater-dump>

Paul Stamets Recommendation & Petition:

<https://www.permaculture.co.uk/articles/how-mushrooms-can-clean-radioactive-contamination-8-step-plan>

<https://sign.moveon.org/petitions/implement-paul-stamets>

Lasers could cut lifespan of nuclear waste from “a million years to 30 minutes,” says Nobel laureate

<https://bigthink.com/the-present/laser-nuclear-waste/>

Science: Opening the floodgates at Fukushima

<https://www.science.org/doi/10.1126/science.abc1507>

Friends of the Earth Statement: TEPCO Dumping Radioactive Wastewater Into Sea

<https://foe.org/news/2011-04-tepcu-dumping-radioactive-wastewater-into-sea/>

Nuclear Consulting Group: Should TEPCO / Japanese Government Dump Tritium-Contaminated Water from Fukushima into the Sea?

<https://www.nuclearconsult.com/blog/should-tepco-japanese-government-dump-tritium-contaminated-water-from-fukushima-into-the-sea/>

Official TEPCO AFPS Water Treatment Plan:

[https://www.iaea.org/sites/default/files/report\\_1\\_review\\_mission\\_to\\_tepco\\_and\\_meti.pdf](https://www.iaea.org/sites/default/files/report_1_review_mission_to_tepco_and_meti.pdf)

Official TEPCO Decommissioning site:

<https://www.tepco.co.jp/en/hd/responsibility/index-e.html>

Impact of Radioactive Wastewater on Marine Life

<https://theconversation.com/nuclear-power-how-might-radioactive-waste-water-affect-the-environment-159483>

Fukushima: Contaminated water could damage human DNA

<https://www.bbc.com/news/world-asia-54658379>

Journal of Radiation Research: Health effects triggered by tritium

<https://academic.oup.com/jrr/article/62/4/557/6256015>

Scientific American: Is Radioactive Hydrogen in Drinking Water a Cancer Threat?

<https://www.scientificamerican.com/article/is-radioactive-hydrogen-in-drinking-water-a-cancer-threat/#:~:text=Cancer%20is%20the%20main%20risk.some%20other%20biologically%20important%20molecule>

Overview by Greenpeace

[https://www.greenpeace.org/static/planet4-japan-stateless/2021/03/ff71ab0b-finalfukushima2011-2020\\_web.pdf](https://www.greenpeace.org/static/planet4-japan-stateless/2021/03/ff71ab0b-finalfukushima2011-2020_web.pdf)

<https://www.forumsec.org/2022/06/02/release-proof-sought-by-global-experts-on-safety-of-treated-water-at-fukushima/>

### 3D Animated Reactor Overview

<https://www.youtube.com/watch?v=YBNFvZ6Vr2U>

<https://www.thenation.com/article/archive/seven-years-on-sailors-exposed-to-fukushima-radiation-seek-their-day-in-court/>

### Petitions

[https://actions.sumofus.org/a/japan-stop-tepco-dumping-nuclear-waste-in-the-pacific?sp\\_ref=772864211.99.182249.t.0.2&source=tw](https://actions.sumofus.org/a/japan-stop-tepco-dumping-nuclear-waste-in-the-pacific?sp_ref=772864211.99.182249.t.0.2&source=tw)

[https://secure.avaaz.org/community\\_petitions/en/STOP\\_FUKUSHIMA\\_RADIATION\\_UN\\_ACTION\\_NEEDED/](https://secure.avaaz.org/community_petitions/en/STOP_FUKUSHIMA_RADIATION_UN_ACTION_NEEDED/)

<https://sign.moveon.org/petitions/implement-paul-stamets>