

Subscribe
 \$15 National Geographic Magazine




Inspiring people to care about the planet since 1888 | [Learn More »](#)

[Sign In](#) [SUBSCRIPTIONS](#)

[HOME](#) [PHOTOGRAPHY](#) [ANIMALS](#) [ENVIRONMENT](#) [TRAVEL](#) [ADVENTURE](#) [NATGEOTV](#) [KIDS](#) [VIDEO](#)

[Daily News](#) | [The Magazine](#) | [Maps](#) | [Science](#) | [Education](#) | [Games](#) | [Music](#) | [Blogs](#) | [Movies](#) | [In the Field](#) | [Mobile](#) | [Newsletters](#)

NATIONAL GEOGRAPHIC Daily News

[Home](#) [Animals](#) [Ancient World](#) [Energy](#) [Environment](#) [Cultures](#) [Space/Tech](#) [Water](#) [Weird](#) [News Photos](#) [News Video](#) [News Blogs](#)

Radiation in Japan Seas: Risk of Animal Death, Mutation?

More radiation from nuclear plant could cause "bizarre mutations."



Aboard a boat pulling a barge with water for Japan's overheating Fukushima nuclear plant Thursday.

Photograph from Japan Maritime Self-Defence Force via Reuters

Share

[Comments \(0\)](#)

[Facebook](#)

[Twitter](#)

[Google Buzz](#)

[Digg](#)

Christine Dell'Amore
 National Geographic News
 Published April 1, 2011

If radioactive material from the Fukushima Daiichi nuclear power plant—disabled by the March 11 [Japan earthquake and tsunami](#)—continues to enter the ocean, marine life could be threatened, experts say.

(See related [photos](#): "[Japan Tsunami: 20 Unforgettable Pictures](#).")

Most Popular News



Space Pictures This Week
 Auroras ripple over Canada, galaxies tango toward a merger, stars make a "rose" bloom, and more in the week's best space pictures.



Photos: Trees Robed in Spider Webs
 Documented by an aid worker, millions of spiders took to the trees to spin their webs after heavy floods inundated Pakistan in 2010.



Japan Tsunami: 20 Indelible Images
 A giant wave tosses cars like toys, a yacht teeters atop a building, and a refinery burns in unforgettable pictures chosen by our editors.

ADVERTISEMENT

[Great Energy Challenge Blog](#)

 [StumbleUpon](#)

 [Send to a Friend](#)

[More »](#)

News Video



[Bird-Safe Oil Spills?](#)



[Fish "Walks" on Beach to Spawn](#)



[Tsunamis 101](#)

[See All News Video »](#)

In the past week, seawater samples taken near the nuclear power plant, on Japan's eastern coast, have shown elevated levels of radioactive isotopes, including cesium 137 and iodine 131, according to the *New York Times*. (See "Japan Tries to Avert Nuclear Disaster.")

All life on Earth and in the oceans lives with exposure to natural levels of ionizing radiation—high-frequency radiation with enough energy to change DNA. Most such genetic damage heals, but the addition of human-made radiation can make it harder for the body to repair broken genes.

Radiation concentrations in the Japanese seawater samples have fluctuated in past days, but on Wednesday the amount of iodine spiked to 3,355 times the legal limit for seawater, Japanese nuclear safety officials told the Associated Press.

That level is the highest so far—and an indication that more radiation is entering the ocean, though how is still unknown, the agency reported. Cesium was also found to be 20 times its safety limit on March 28, according to the *Times*.

Radiation Can Cause "Bizarre Mutations"

Once in seawater, radiation can hurt ocean animals in several ways—by killing them outright, creating "bizarre mutations" in their offspring, or passing radioactive material up the food chain, according to [Joseph Rachlin](#), director of Lehman College's Laboratory for Marine and Estuarine Research in New York City.

"There will be a potential for a certain amount of lethality of living organisms, but that's less of a concern than the possible effects on the genetics of the animals that become exposed," Rachlin said.

"That's the main problem as I see it with radiation—altering the genetics of the animal and interfering with reproduction."

Even so, according to radioecologist [F. Ward Whicker](#), the concentrations of iodine and cesium levels "would have to be orders of magnitude larger than the numbers I've seen to date to cause the kind of radiation doses to marine life that would cause mortality or reductions in reproductive potential.

"I am very doubtful that direct effects of radioactivity from the damaged reactors on marine life over a large area off the coast of Japan will be observed," Whicker, professor emeritus at Colorado State University, said via email.

Likewise, using legal limits to gauge damage to marine life is of little value right now, he said.

To make a "credible assessment" of the risk to marine animals, scientists would have to know the actual concentrations of radioactive iodine in the water and fish or other marine animals off Fukushima Daiichi, he said.

Radiation Hardest on the Little Ones

It's possible that levels of radioactive contamination near the Fukushima nuclear reactors could increase and cause some harm to local marine life, Whicker said.

"If this happens, the most likely effects would be reductions in reproductive potential of local fishes. ... ," he said.

Marine organisms' eggs and larvae are highly sensitive to radiation, since radioactive atoms can replace other atoms in their bodies, resulting in radiation exposure that could alter their DNA, Whicker said. ([Get the basics on genetics.](#))

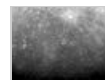
Most such deformed organisms don't survive, but some can pass abnormalities on to the next generation, Lehman College's Rachlin said. Either way, the radiation exposure could hurt the population's ability to survive long-term.

Rachlin thinks the most susceptible critters would be soft-bodied [invertebrates](#) such as jellyfish, sea anemones, and marine worms—which can take up the radiation more quickly than shelled creatures—though Whicker said fish may be most at risk.

Whicker added, "I would expect any temporary losses in reproduction in local fish

- [Lessons from Japan: Energy Policy and Apocalyptic Dread](#)
- [Learning From Japan's Nuclear Disaster](#)
- [The Human CO2 Legacy Keeps Going and Going and Going](#)
- [On Cookstoves, Research Paves Way to Action](#)
- [U.S. Nuclear Power: A Global Warming Answer that Leaves 72,000 Tons of Waste](#)

News Blogs



First Orbital View of Mercury

A spidery crater features in the first picture of the innermost planet taken from orbit by a NASA spacecraft.



New Hope for a Rare Bird

A few years back, Gianluca Serra found a legendary bird thought extinct in Syria. Now he's working to ensure they survive.



Zodiacal Light Rising

Once mistook for campfires and volcanoes, the faint cone of light caused by interplanetary dust will be visible for the next

two weeks.

Japan Disaster



Japan Radiation Harming Sea Life?

If radiation from the Fukushima Daiichi nuclear plant continues to enter the ocean, animals could suffer "bizarre mutations" or worse.



Photos: Top Nuclear Nations' Earthquake Risk

Among the ten nations that produce the most nuclear power, Japan is not alone in facing an earthquake hazard.



New Tsunami Pictures

Newly released before-and-after pictures show what it was like to be face-to-face with the tsunami.



Inside Japan's Hot Zone

Photographs from inside the Fukushima Daiichi power plant show workers as they struggle, amid peril, to stabilize the damaged reactors.



Seeking Safer Nuclear Design

Only four of the 65 nuclear plants under construction worldwide are designs with integrated "passive safety" systems that could stave off overheating when power is lost.

[Get the Latest News »](#)

Got Something to Share?

- [E-mail Us at Newsdesk@ngs.org](mailto:Newsdesk@ngs.org)
- [Send Us Your Photos](#)

to be offset by immigration of unaffected individuals from surrounding areas that would be impacted to a lesser degree."

(See "[Chernobyl Birds' Defects Link Radiation, Not Stress, to Human Ailments.](#)")

In addition to its threats to reproduction, pockets of radioactive material can burn fish passing through, hitting them like a stream of searing water, Rachlin said.

Complicating matters is the fact that predator species in the Pacific such as tuna and sailfish are already stressed by [overfishing](#), according to Rachlin.

"I'm concerned—this is the spawning season. ... If this impacts the survivorship of the young and larvae, this will be a further insult."

Radiation Threat Here to Stay?

According to chemical oceanographer [Bill Burnett](#), "In the short run [the radiation] could have some definite negative impacts" on marine life.

"The good news is the half life [of iodine] is only eight days," added Burnett, an expert in environmental radioactivity at Florida State University.

So "if they stop the source of radioactive leakage, this is going to be a short-term problem."

However Fukushima Daiichi's leaking cesium is potentially more serious, since that isotope takes 30 years to decay, Burnett said.

Radiation Can Travel Up the Food Chain

There could also be some movement of radiation up the food chain if animals eat irradiated plants and smaller, radioactive animals, Rachlin said.

In particular, plants such as [kelp](#) can quickly absorb iodine, FSU's Burnett said. (See [pictures of ocean wildlife.](#))

There's a possibility that the devastation of towns in northeastern Japan caused by the earthquake and tsunami also released toxic metals such as lead into the soil and water, according to Texas Tech University ecotoxicologist [Ron Kendall](#).

Previous studies have shown that metals can work in concert with radiation to suppress immune systems in vertebrates, making them more vulnerable to disease, Kendall said.

It's a "big issue for the environment and human health because of the widespread destruction. It takes me back to New Orleans after Hurricane Katrina—this to me is even more complicated with the radiation."

(See [photos: "Japan Reactor Crisis: Satellite Pictures Reveal Damage."](#))

Ocean Resilient Against Radiation

The ocean has a "tremendous capacity" for diluting radiation, Colorado State's Whicker noted.

"It also has resilience, in the sense that the area would recover over time as the situation improves and as the radioactivity decays and disperses."

"But I should caution that we have not had much opportunity to study the effects of very large releases of radioactivity into marine ecosystems," he said. The best data comes from nuclear weapons tests in the Pacific in the 1950s and 1960s.

Texas Tech's Kendall also pointed out that there's not much known about radiation in seawater.

"The dose makes the poison," he said, "and the more concentrated the radiation, the more potential effects. It's something we definitely need to monitor."

Added Lehman's Rachlin: "If it's a one-shot pulse, OK, not a problem."

But if the radiation leaks continue for several months, Japan may be dealing with a more serious blow to marine life, he said.

The coastline, after all, isn't Chernobyl, he said. "We can't cement [over] that whole area."

Shop National Geographic



Genographic Kit
\$99.95

[SHOP NOW »](#)

The Complete National Geographic

~~\$79.95~~ \$39.95

National Geographic 9th Edition Atlas

~~\$175.00~~ \$160.00

Discover Your Roots



Your Genealogy

Everyone on Earth is ultimately part of the same human family. Take what you know of your branch and discover more than you ever thought possible.



Genetics

Learn about what's passed on from generation to generation with an interactive look at DNA.

SPECIAL AD SECTION



See Who Won

See the Grand Prize photo contest winner!



The Last Lions Sweepstakes

Enter *The Last Lions* sweepstakes for your chance to win a trip for two to Botswana, Africa!



Confirm

You like **Radiation in Japan Seas: Risk of Animal Death, Mutation?** Unlike · Admin Page · Insights · **Error**
Lori Gibler and one other person like this. One person likes this.

Comments

There are no comments yet. Be the first to leave a comment.

You must be logged in to post a comment

[Sign In](#)

Latest News



April Fool's Day Mystery



Japan Radiation Harming Sea Life?



April Fools' Pictures: Animal Hoaxes



Photos: Trees Robed in Spider Webs

More From National Geographic



Japan Tsunami: Before & After Photos



February's Best Photos



Taming the Wild



The Last Lions



U.K. National Park Guides



Colossal Sea Creatures



Alaska Trek Photo Gallery

[National Geographic Home](#) » [News](#) » [Radiation in Japan Seas: Risk of Animal Death, Mutation?](#)

[HOME](#) [PHOTOGRAPHY](#) [ANIMALS](#) [ENVIRONMENT](#) [TRAVEL](#) [ADVENTURE](#) [NATGEOTV](#) [KIDS](#) [VIDEO](#) [SHOP](#)

[Daily News](#) | [The Magazine](#) | [Maps](#) | [Science & Space](#) | [Education](#) | [Games](#) | [Music](#) | [Blogs](#) | [Movies](#) | [In the Field](#) | [Mobile](#) | [Site Index](#)

[Subscriptions](#) | [Buy Prints](#) | [Stock Footage](#) | [Stock Photos](#) | [Travel With Us](#) | [Newsletters](#) | [Jobs](#) | [Global Sites](#) | [About](#) | [Contact](#)

[Donate](#) | [Press Room](#) | [Customer Service](#) | [Advertise With Us](#) | [Terms of Service](#) | [Privacy Policy](#)



© 1996-2011 National Geographic Society. All rights reserved.